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Editors: Mohammad Khalil, Martin Ebner, Michael Kopp, Anja Lorenz & Marco Kalz

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Enhancing MOOC Videos: Design and Production Strategies

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Abstract

Since its inception in 2008, MOOCs have been including videos as a primary mean to improve the learning experiences. Since we are part of a team involved with the design and production of MOOCs aimed to address STEM curricula, we think that a deep analysis on this process, in particular of MOOC videos, became fundamental, both from an efficient pedagogical and communicational point of view, and of a cost-effective production techniques point of view. Based on the cinemetrics analysis, we then recommend the following characteristics for the MOOC videos: short (6–10 min. long), dynamic (ASL ranging 6–30 sec.), personalised (by each instructor) and focused (one topic at a time).

Keywords

Elearning, MOOC, digital learning contents, video design and production, cinemetrics analysis, Average Shot Length (ASL)

1 Introduction

The beginning of the twenty-first century brought the emergence of new paradigms in education sciences, which allow more flexibility and are more aligned with recent teaching practices (ANDERSON, 2004; MARSH & WILLIS, 2006; McAULEY, STEWART, SIEMENS & CORMIER, 2010; SELWYN, 2011). This new paradigm integrates new technologies, e-learning contents and social networking. A good example of the increase for the efficiency in the use of ICT for learning through learning tools is the growing success of social *software* within personal learning environments (Personal Learning Environment's[1] – *PLE's*), of Open Educational Resources, and from 2008 on of Massive Open Online Courses (MOOCs) that come to shape, all of them questioning new forms of learning using Internet (TURKER & ZINGEL, 2008). Universities and other academic institutions are offering each year more online courses, which together with the generalized use of web and intranet platforms for academic management, have the consequence of increasing the funding that goes to personnel staff and technological resources dedicated to the development of IT platforms (FORMIGA, 2013).

A deep analysis on the process of designing and producing these courses, in particular of MOOC videos, became fundamental to achieve cost-effective production contents that are simultaneously significant from both pedagogical and communicational point of views. For instance, we think that the negative effect of possible discrepancy between enrolment and completion noticed (and may be overly publicized) in the first runs of MOOCs (see e.g. news from 2013–2014[2]) can be overcome with good practices and with carefully designed videos (GUO, KIM & RUBIN, 2014; KIM, GUO, SEATON, MITROS, GAJOS & MILLER, 2014). Recently, as part of a team involved with the design and production of MOOCs aimed to address Science, Technology, Engineering and Mathematics (STEM) curricula, inside Universidade de Lisboa (University

[1] http://edutechwiki.unige.ch/en/Personal_research_and_teaching_environment

[2] https://www.insidehighered.com/news/2013/03/08/researchers-explore-who-taking-moocs-and-why-so-many-drop-out;
http://www.wsj.com/articles/SB10001424052702303759604579093400834738972.

of Lisbon, http://www.ulisboa.pt/en/), we formulate guidelines of good practices with this goal in mind, and conclude the following general principles:

- Online courses, prepared to be open to potential students/participants and massive that must include a schedule for orientation through the different proposed weekly activities and have communication channels;
- The online course must have a short duration: run at most 7-8 weeks, if possible 4-5 weeks;
- Traditional expository and/or tutorial classes shall be substituted by a sequence of short video modules typically 10 minutes long, complemented with learning activities by online self-assessment and evaluation quizzes;
- Each course includes a discussion forum, where students can put their questions and get feedback by fellow students or tutors (dedicated staff members).

Besides, we recognize the fact that video is a key pillar of the digital literacy, we also came to a conclusion that it can bring tangible benefits to the online learning experience when well designed and produced (MOURA SANTOS, COSTA, VIANA & GUEDES SILVA, 2015). In the present paper, we are going to present some results of our cinemetrics analysis, done in full detail for 46 videos from 31 MOOCs, and propose the design and production of short, dynamic, focused and technically strong videos that enhance the learning experience of a MOOC. Finally, although what we present here constitutes an overview of recent design practices and different style approaches to MOOC videos, our final goal is to apply our conclusions to our own practice of video design and production.

2 Methodology

Although the cinema, and by extension the video are languages to communicate using sounds and images with almost universal understanding, they have structural rules, syntax and context, to which we can access and understand through a process of deconstruction. In order to enable the present study of the different languages used in MOOC videos, we have firstly chosen to build a classification grid that allow us to identify categories and measure, as objectively and rigorously as possible, the several components of film/video language. To begin with, what one sees on the screen, or display of a screen, is the narrative content of the film/video, which is simple called narrative and can be subdivided into two distinct major areas (STADLER & McWILLIAM, 2009): stage-in (*mise-en-scene*, in French), the set of all components that are placed on the stage to be seen and heard by the viewer; shot-in (*mise-en-shot*, in French), which encompasses all aspects of technical and photographic style used for translating a stage-in into a movie/video (macro) and plan sequences/shots (micro).

Table 1: Video classification grid

Areas	Categories	Indicators
Stage-in (Mise-en-Scene)	**Focus of interest (FOI)**	Teacher
		Teacher+blackboard/ presentation
		Blackboard/presentation
		Other
		Headings/credits
		Cutaway
Shot-in (Mise-en-Shot)	**Framing (F)**	Centered
		Non-centered
		Obliquous
	Field Size (FS)	Close-up
		Medium shot
		Full Shot
		Long shot
	Depth of the Field (DOF)	Low
		High
	Camera Movements (CM)	Static
		Zooming
		Translation/Rotation
Recording and Pos-production aspects	**Recording Location (RL)**	Studio
		Lecture rooms
		University campus
		Other places
	Video Sources (VS)	Original footage
		Chroma Key
		Archive images (photo and video)
		Computer graphic images

In the process of analyzing MOOC videos, we identified focus of interest (FOI) as the most significant aspect of the stage-in phase. FOI refers to the selected element at the center of the action in each shot, and in the context of producing videos in STEM fields, we chose the following indicators: teacher shot (Fig. 1), teacher and presentation or blackboard shot (Fig. 2), presentation or blackboard shot (Fig. 3), other inserted focus of interest; computer graphics images and/or credits (Fig. 4) and cutaways; i.e. photographs or videos from archives (Fig. 5).

Figure 1: Teacher close-up

Figure 2: Teacher and presentation shot

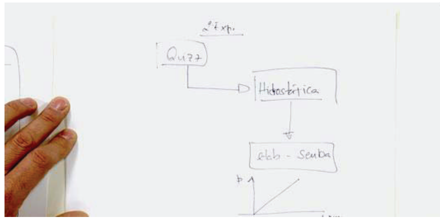

Figure 3: Presentation shot

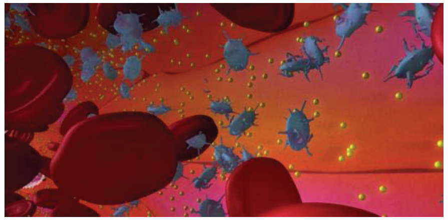

Figure 4: Computer animated shot

Figure 5: Data bank images (stills or video)

Regarding the shot-in, the categories we considered most relevant in the MOOCs context are: framing (F), field size (FS), depth of field (DOF) and camera movements (CM), which includes translational and rotational movements of the camera.

To complete the video analysis we also considered two complementary categories related to the video production and post-production: recording location (RL), i.e. the place where the elements of the shot-in are captured, an video source of the footage (VS) used in assembling the videos.

To sort out RL we identified four types of locations: recording studio (with real or virtual sets), lecture rooms (classrooms and laboratories), other locations on campus and eventually other places, real or virtual. Regarding VS, we considered the original footage for a given MOOC, archive images, computer graphics images produced specifically, and the action of replacing the latter two in scenarios using Chroma Key.

Finally, to perform the study of all described video categories, we have relied on the principles of cinemetrics analysis (http://www.cinemetrics.lv/), which includes as a major classification principle the average duration of each shot for a given movie, called Average Shot Length (ASL). This statistical filmic analysis is traditionally used to compare different ASLs for the same movie director and then build a graph of its own evolution and artistic choices over time. But, it also allows study the movie editing and directing styles based on the average rates of the cuts over several decades of film production (TSIVIAN, 2011; SALT, 2011).

In our case, each video was first decomposed by frames/scenes contents into shots and their durations measured. After this first step, we then classified the shot contents according to the different categories and indicators described in the above classification grid. This approach, unlike others statistical studies based on Youtube Analytics (DIWANJI, SIMON, MARKI, KORKUT & DORNBERGER, 2014) and video analytics (KIM, GUO, SEATON, MITROS, DUDES & MILLER, 2014), allows us, staying at pre-production phase, to have a technical/ artistic reading of each individual video and establish statistics data on the video language used in the considered MOOCs.

We present here several results of the detailed analysis of 31 MOOC videos selected from 4 platforms (Coursera, edX, MiríadaX, Open2Study), in 4 languages (Chinese, Spanish, French and English), from 9 countries (Australia, Belgium, China, Colombia, Spain, United States, India, Mexico and Switzerland). The videos were selected from four distinct classes, classified according to the purposes they serve and roll played in MOOCs: teasers, introductory videos, videos of theoretical/expository content, and tutorial/laboratory videos. In the next section, we describe in more detail the results for the teasers, which includes the cinemetrics analysis of 26 teaser videos from courses in STEM areas (Chemistry, Mathematics, Physics and Computer Science), followed by a brief description of the stage-in for 20 videos of the other classes of MOOC videos.

3 Results

After doing a thorough analysis for all 26 teasers, grouping the results for each of the thematic areas, we will discuss them for the three selected indicators: stage-in, shot-in and complementary aspects of production and post-production. Thereafter, as a general picture, we can conclude that on average the teaser videos are 120 seconds long and consist of 26 shots with an average duration of 5 seconds. To complement these results, we also give the stage-in analysis for 20 MOOC videos from the same STEM topics, and classified as introductory videos, videos of theoretical/expository content and tutorial/laboratory videos.

3.1 Stage-in: Focus of Interest (FOI)

Table 2: FOI cinemetrics analysis for the MOOC teasers

Video Class	Areas	General Results				Stage-in (Mise-en-Scene) Focus of Interest (FOI)											
		Sample		Shots		Teacher		Teacher +blackboard/ presentation		Blackboard/ presentation		Other		Headings/ credits		*Cutaway*	
		Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration
Teaser	**STEM**	26	120s	26,0	5s	6,3	10s	3,0	5s	3,7	5s	4,0	8s	2,8	4s	14,2	3s
	Chemistry	6	148s	26,0	6s	5,5	17s	0,0	0s	2,0	2s	1,0	14s	3,8	5s	14,4	3s
	Matematics	6	121s	24,0	5s	6,7	9s	2,0	4s	2,3	7s	8,0	3s	2,6	4s	12,0	3s
	Physics	8	105s	26,0	4s	5,6	6s	0,0	0s	8,0	6s	0,0	0s	2,4	4s	16,1	3s
	Computer Science	6	112s	27,8	4s	7,8	8s	4,0	5s	1,0	7s	3,0	6s	2,4	5s	13,8	2s

Table 3: F and FS cinemetrics analysis for the MOOC teasers

Video Class	Areas	General Results				Shot-in (Mise-en-Shot) Framing (F)						Field Size (FS)							
		Sample		Shots		Centered		Non-centered		Obliquous		Close-up		Medium shot		Full shot		Long shot	
		Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration
Teaser	**STEM**	26	120s	26,0	5s	9,2	6s	10,7	5s	6,7	3s	6,9	5s	9,8	6s	7,4	5s	3,5	3s
	Chemistry	6	148s	26,0	6s	9,3	9s	7,3	6s	5,4	5s	5,8	5s	7,3	12s	7,2	4s	2,8	3s
	Matematics	6	121s	24,0	5s	4,8	7s	14,3	5s	7,3	4s	10,0	6s	12,8	3s	6,0	7s	2,0	4s
	Physics	8	105s	26,0	4s	12,6	5s	10,0	4s	5,4	3s	6,4	3s	8,8	5s	8,9	4s	3,8	3s
	Computer Science	6	112s	27,8	4s	9,0	4s	11,3	5s	9,0	3s	5,5	6s	10,8	4s	7,2	4s	5,2	2s

The results of the cinemetrics analysis for the focus of interest (FOI) are given in Table 2. A simple image of the teacher is the focus of interest in 96.2% of the cases. When this happens, the teacher appears on average 6.3 times for approximately 10 seconds[3] each time. The teacher only appears next to the blackboard or the presentations in 11.5% of cases. When this occurs, it happens on average 3 times during the teaser in 5s for each shot. The use of the board or the presentations is present in 38.5% of the teasers, with an average of 3.7 times and 5s lengths. Other focuses of interest, for example, graphics or images intended to divert the attention from previous focus, occur 26.9% of the time, within circa of 4 shots with an average duration of 8s. Headings or credits appear in 88.5% of cases, only 2.8 times for teaser and with an average duration of 4s. Finally, the cutaways are used in 76.9% of cases, about 14.2 times and with a mean duration of 3s each shot. The segmentation results of these promotional videos (teasers) by subject area are quite variable and are mostly due to the way in which they are designed and carried out. For example, the Chemistry and Physics videos barely make use of the teacher+blackboard/presentation and the other indicator of FOI. For these videos the cutaways are dominant. On the other hand, the blackboard/presentations are hardly used, reaching only 50% of the cases in Mathematics and Physics.

[3] From now on, we are going to abbreviate seconds by the letter s.

Table 4: DOF and CM cinemetrics analysis for the MOOC teasers

						Shot-in (Mise-en-Shot)									
		General Results				Depth of the Field (DOF)				Camera Movements (CM)							
		Sample		Shots		Low		High		Static		Zooming		Translation/ Rotation			
Video Class	Areas	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration		
Teaser	STEM	26	120s	26,0	5s	10,0	4s	16,7	6s	19,2	5s	2,5	4s	6,3	4s		
	Chemistry	6	148s	26,0	6s	11,2	5s	11,8	9s	17,2	8s	3,0	4s	5,0	5s		
	Matematics	6	121s	24,0	5s	7,0	3s	19,3	5s	14,7	6s	3,6	6s	12,7	3s		
	Physics	8	105s	26,0	4s	9,6	3s	17,8	4s	21,5	4s	1,8	3s	4,3	3s		
	Computer Science	6	112s	27,8	4s	12,2	4s	17,7	4s	22,7	4s	1,8	4s	4,0	4s		

Table 5: RL and VS cinemetrics analysis for the MOOC teasers

						Recording and Pos-production aspects															
		General Results				Recording Location (RL)								Video Sources (VS)							
		Sample		Shots		Studio		Lecture rooms		University campus		Other places		Original footage		Chroma Key		Archive images		Computer graphic images	
Video Class	Areas	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration
Teaser	STEM	26	120s	26,0	5s	6,8	7s	7,6	3s	9,4	8s	12,0	4s	12,6	7s	4,2	10s	9,3	3s	5,0	5s
	Chemistry	6	148s	26,0	6s	7,0	6s	11,0	3s	4,8	20s	10,5	4s	7,5	13s	0,0	0s	10,2	3s	3,5	4s
	Matematics	6	121s	24,0	5s	6,3	8s	4,5	2s	20,0	5s	9,3	4s	17,4	5s	5,5	8s	4,0	3s	5,7	4s
	Physics	8	105s	26,0	4s	5,3	8s	8,8	3s	4,4	4s	15,3	4s	14,5	4s	3,5	12s	8,5	3s	5,9	5s
	Computer Science	6	112s	27,8	4s	9,3	5s	5,7	5s	10,0	4s	12,0	3s	10,3	5s	8,0	8s	14,8	3s	4,8	4s

3.2 Shot-in: Framing (F), Field Size (FS), Depth of Field (DOF) and Camera Movements (CM)

The results of the cinemetrics analysis for the shot-in aspects are presented in Table 3 for framing and field size, and in Table 4 for depth of field and camera movements.

3.2.1 Framing (F) and Field Size (FS)

For F the averages of centered (9.2 shots/video[4]) and non-centered (10.7s/v) shots are equivalent both in number and in duration (from 5 to 6s). However, when we look closer, we notice that the number of centered shots is 2.5 times higher for Physics than for Mathematics and that the average duration of this type of shots for Chemistry is more than double than for Computer Science. Similar signs of variability exist for the non-centered shots, with Mathematics MOOC videos doubling Chemistry in number of this kind of shots (14.3s/v in average versus 7.3s/v). The oblique shots are less common and when applied they tend to have a smaller duration (3s in average) and a less frequency (6.7 shots in average).

For FS the mid shot prevails (9.8s/v, almost 40% of all shots) despite being closely followed by the full shot (7.4s/v) and the close-up (6.9s/v). Also, for these three cases we have an average duration ranging from 5 to 6s. The long shots shows a similar pattern as the oblique, they are less common and when applied they tend to have smaller duration (3s in average) and a less frequency (3.5 shots in average). Detailing the results, we notice that the number of close-ups is almost 2 times higher for Mathematics than for Computer Science videos, and that the mean duration of this type of shots for Physics is half of the length for Mathematics and Computer Science videos. As for the medium shot, the biggest difference arises between Chemistry and Mathematics MOOC videos. For Mathematics we found smaller (3s) but more frequent (12.8s/v) mid-shots, while for Chemistry we found the opposite results (12s) and (7.3 s/v), respectively.

3.2.2 Depth of Field (DOF) and Camera Movements (CM)

The use of a high depth of field is more frequent (16.7%) and happens on slightly longer periods (6s). However, when we look closer we notice that the use of high DOF is 63% higher for Mathematics than for Chemistry and that the average duration of this type of shots for Chemistry is more than double than for Physics and Computer Science. Similar signs of variability exist for the low DOF, with Computer Science videos doubling Mathematics in number of this kind of shots (12.2s/v in average versus 7s/v).

Camera movements are not very common in these videos, in fact the majority of the images are captured within a fixed plan (73%). Sometimes, the apparent motion is actually obtained using the Ken Burns technique, particularly with photos/pictures from archives or computer graphics. Translational or rotational movement is 3 times

[4] We are going to use s/v as the short abbreviation for shots per video.

more used in Mathematics than in Computer Science or Physics, and 2.5 times more than zooming for the STEM videos.

3.3 Recording and Post-production aspects

The results of the cinemetrics analysis for the recording location and post-production aspects are given in Table 5 for both categories.

3.3.1 Recording Location (RL) and Video Sources (VS)

The other places category prevails (12s/v, more than 46% of all) despite being closely followed by the university campus (36%) and the classroom and / or laboratory (29%). The university campus shots have an average duration of 8s, which is the double of the other two classes. The studio shots show a similar duration as the campus (7s) but are less frequent, only 6.8 s/v. In detail, we notice that the number of university campus shots is almost 4 times higher for Mathematics than for Chemistry and Physics and double of Computer Science. On the other hand, the average duration of this type of shots is 4 to 5 times higher in Chemistry (20s), if compared with the remaining areas.

Analysing the video sources is clear that the use of original image, captured on purpose for the teaser, prevails when compared to other types (48%), particularly with Chroma Key technique that has been used only in 1/6 of the videos (16%) although being relatively long shots (about 10s). Archive images are another relevant source for the construction of the teasers (36%) but they tend to be very short (3s) inserts normally used to connect sequences of shots. Computer graphic images are used with moderation (19%) with an average duration of 5s for each shot. As in the previous categories it is visible a large scatter in the results for the different STEM areas.

3.4 Stage-in: FOI for the other classes of MOOC Videos

We have also realised the cinemetrics analysis for the FOI for each of the areas and for the remaining three classesof videos: introductory, theoretical/expository and tutorial/laboratorial videos. For that purpose we used a comprehensive set of 20 videos from

6 different STEM courses. The MOOC introductory videos duration are 11.5 minutes[5] (691s) long and consist of 19.8 shots/video with an average of 67s. For expository videos the average duration is 13mn and 21s (801s), being composed of 20.3 s/v with a mean duration of 49s. Finally, the tutorial videos have an average duration of 8mn and 23s (503s) and consist of 11.2 s/v with an average duration of 50s. Regarding the most relevant indicators for each of the three classes, we reach the following results for introductory videos:

- The teacher appears in 80% of videos with 2.2 s/v, with a mean duration of 2mn and 45s;
- The blackboard/presentation also occurs in 80% of videos with 8.4 s/v, with an average duration of 4mn and 30s.
- In the case of theoretical/expository videos we have the following results:
- Teacher+blackboard/presentation occurs in 90% of videos, with 9.8s/v and an average duration of 41s;
- The blackboard/presentation also occurs in 90% of videos, with 6.8s/v and an average duration of 62s.
- Finally, for the tutorial and laboratory videos:
- The teacher occurs in 60% of videos, with 2s/v and an average duration of 57s;
- The blackboard/presentation in 80% of the videos, with 5.4s/v and an average duration of 6mn and 9s (369s).

[5] We are going to abbreviate minutes by the letters mn.

Table 6: FOI cinemetrics analysis for the MOOC introductory, theoretical/ expository and tutorial/laboratory videos

Video Class	Areas	General Results				Stage-in (Mise-en-Scene) Focus of Interest (FOI)											
		Sample		Shots		Teacher		Teacher +blackboard/ presentation		Blackboard/ presentation		Other		Headings/ credits		*Cutaway*	
		Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration	Quantity	Duration
Introductory videos	STEM	5	691s	19,8	67s	2,2	165s	7,6	23s	8,4	270s	0,0	0s	1,0	5s	0,6	7s
	Chemistry	1	547s	3,0	182s	1,0	537s	0,0	0s	0,0	0s	0,0	0s	2,0	5s	0,0	0s
	Matematics	2	690s	33,5	21s	1,5	48s	18,5	29s	11,0	7s	0,0	0s	1,5	5s	1,0	6s
	Physics	1	490s	16,0	31s	7,0	27s	0,0	0s	8,0	37s	0,0	0s	0,0	0s	1,0	8s
	Computer Science	1	1039s	13,0	80s	0,0	0s	1,0	12s	12,0	1027s	0,0	0s	0,0	0s	0,0	0s
Theoretical/ practical videos	STEM	10	801s	20,3	49s	1,8	68s	9,8	41s	7,6	56s	0,0	0s	1,8	4s	0,6	4s
	Chemistry	2	725s	20,5	35s	0,0	0s	12,0	51s	6,5	16s	0,0	0s	2,0	5s	0,0	0s
	Matematics	5	806s	24,8	32s	1,4	74s	14,2	26s	8,0	51s	0,0	0s	2,8	4s	1,0	3s
	Physics	1	767s	22,0	35s	11,0	40s	0,0	0s	10,0	32s	0,0	0s	0,0	0s	1,0	8s
	Computer Science	2	884s	8,0	111s	0,0	0s	1,5	68s	6,5	120s	0,0	0s	0,0	0s	0,0	0s
Tutorial/ laboratorial videos	STEM	5	503s	11,2	50s	2,8	57s	5,2	294s	6,5	369s	0,0	0s	3,0	14s	1,0	8s
	Chemistry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Matematics	3	560s	8,7	65s	2,0	78s	7,0	386s	5,5	594s	0,0	0s	3,0	14s	0,0	0s
	Physics	1	490s	16,0	31s	7,0	27s	0,0	0s	8,0	37s	0,0	0s	0,0	0s	1,0	8s
	Computer Science	1	348s	14,0	25s	1,0	25s	5,0	20s	8,0	28s	0,0	0s	0,0	0s	0,0	0s

4 Conclusions

From the main results of the analysed MOOC videos, we highlight the following aspects: the mean duration is 6mn and 12s, the average shot length (ASL) is 26s, in average the videos have 22.5 shots. This indicators are particularly useful to set limits to the STEM video design variables in a pre-production phase of a MOOC. As recommendations we highlight the following principles: short and dynamic videos with a particular emphasis on personalized and focused contents. The teasers should have a maximum duration of 2 to 3mn, while the introductory and expository videos should average the 9 to 11mn and tutorial videos should not exceed the 7mn. All considered four classes of video should use at least 3 different FOI with a dynamic shot sequence in order to attract student's attention. Particular care should be taken in the development of teasers, because of their promotional nature, we advise the use of a low ASL of around 6s. The future development will be the use of web metrics and video analytics along with cinemetrics.

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A research agenda for exploring MOOCs and change in higher education using Socio-Technical Interaction Networks

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Abstract

In recent years, exaggerated claims about the impact of MOOCs on education systems have appeared in various media. But how can claims about the effects of MOOCs in higher education be effectively investigated? Simplistic, technologically determinist concerns with ‘impact’ mask the complexity of processes, infrastructure and interactions involved in the creation and use of MOOCs. It is challenging, therefore, to investigate the relationship between technology and change in higher education. This paper proposes a novel way of researching MOOCs as socio-technical systems. It is argued that the analytic strategy of Socio-Technical Interaction Networks (STIN) can highlight the social and technical forces intertwined in the construction and practical use of MOOCs in particular HE contexts.

Keywords

MOOCs, Socio-Technical Interaction Networks, STIN, Web Science, Social Informatics, educators, learning designers