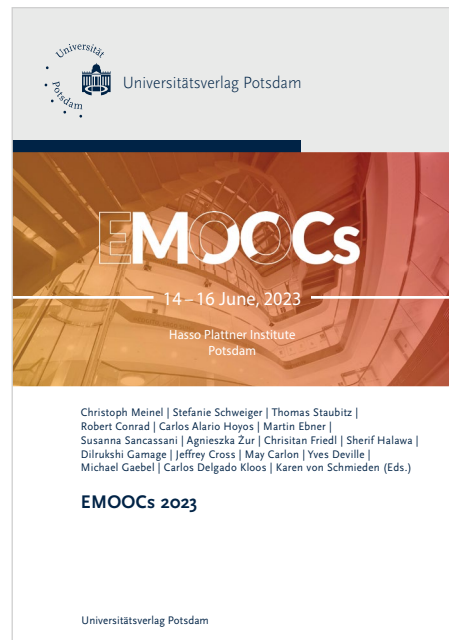Christoph Meinel, Stefanie Schweiger, Thomas Staubitz, Robert Conrad, Carlos Alario Hoyos, Martin Ebner, Susanna Sancassani, Agnieszka Żur, Christian Friedl, Sherif Halawa, Dilrukshi Gamage, Jeffrey Cross, May Kristine Jonson Carlon, Yves Deville, Michael Gaebel, Carlos Delgado Kloos, Karen von Schmieden (Eds.)

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A Taxonomy of Video Genres as a Scaffolding Strategy for Video Making in Education

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This research paper aims to introduce a novel practitioner-oriented and research-based taxonomy of video genres. This taxonomy can serve as a scaffolding strategy to support educators throughout the entire educational system in creating videos for pedagogical purposes. A taxonomy of video genres is essential as videos are highly valued resources among learners. Although the use of videos in education has been extensively researched and well-documented in systematic research reviews, gaps remain in the literature. Predominantly, researchers employ sophisticated quantitative methods and similar approaches to measure the performance of videos. This trend has led to the emergence of a strong learning analytics research tradition with its embedded literature. This body of research includes analysis of performance of videos in online courses such as Massive Open Online Courses (MOOCs). Surprisingly, this same literature is limited in terms of research outlining approaches to designing and creating educational videos, which applies to both video-based learning and online courses. This issue results in a knowledge gap, highlighting the need for developing pedagogical tools and strategies for video making. These can be found in frameworks, guidelines, and taxonomies, which can serve as scaffolding strategies. In contrast, there appears to be very few frameworks available for designing and creating videos for pedagogical purposes, apart from a few well-known frameworks. In this regard, this research paper proposes a novel taxonomy of video genres that educators can utilize when creating videos intended for use in either video-based learning environments or online courses. To create this taxonomy, a large number of videos from online courses were collected and analyzed using a mixed-method research design approach.

1 Introduction

Although there is an immense amount of systematic and rigorous research reviewing the educational use of videos, a contradiction can be identified in the research literature. On the one hand, these reviews document various usage patterns and estimate impacts on learning outcomes (e.g. [3, 25, 26]. On the other hand, there appear to be few practice-oriented frameworks, guidelines, and taxonomies for video making, with the exception of certain well-known frameworks. A leading example is the work of Mayer and colleagues [21, 22, 23], which provides pedagogical guidelines for the professional production of multimedia learning content. Contrastingly, there are few taxonomies that attempt to categorize and systematize the various shapes and forms that a video can take in video-based learning. These could serve as the basis for a novel framework that educators can use to create educational videos.

In this regard, the goal of this research paper is to propose a novel taxonomy of video genres for educators to use in creating educational videos. This taxonomy was developed through the analysis and categorization of a dataset from online teacher training courses. To explain this taxonomy, a research approach will be employed that begins with asking the following research questions (RQ):

- RQ1: *By measuring videos from a dataset of online courses used in teacher training, how can we characterize their design and usage?*

- RQ2: *What different video genres can be distinguished?*

To detail the specifics of the taxonomy, this will be done across the paper's various sections. The first part provides an overview of a relevant research horizon, followed by a detailed discussion of the methods and the taxonomy itself. The final sections will discuss the taxonomy further and conclude the analysis.

2 Research perspective

To make the case that the taxonomy of video genres can serve as a scaffolding strategy for creating educational videos, it is crucial to define a research perspective. This involves identifying relevant research literature that this paper intends to engage with and contribute to. Additionally, it is necessary to explain how specific core concepts used in the analysis of scaffolding within education, as well as selected research trends in video-based learning and online courses, or Massive Open Online Courses (MOOCs), are related to the proposed taxonomy. Given this, it becomes important to clarify what is meant by 'genre' and how it is defined, as there is a diversity of views among scholars when it comes to classifying media

texts into different categories. For example, some scholars may argue that genre is a beneficial tool for distinguishing between various media texts, while others may question the value of classification systems altogether. Despite this, a genre can be defined as a type of communication with socially agreed-upon conventions that evolve over time [12], a definition adopted in this paper, it and forms an important basis for building the taxonomy. Taking these factors into account not only delineates the scope but also provides further justification for employing this approach, specifically, the approach of using video genre in video making of educational videos.

The underpinning pedagogical thinking of the proposed taxonomy aims to establish a connection with a relevant learning theory, specifically that of socio-cultural learning theory. Within this theory, Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD) and scaffolding are intrinsically linked [32, 9, 35]. These concepts significantly contribute to the understanding of cognitive development and learning processes, emphasizing the role that social interaction plays in these processes. In essence, the ZPD describes the disparity between what a learner can do unassisted and what they can achieve with guidance. Scaffolding serves as a teaching strategy that facilitates learners' progression within their ZPD by providing them with successive levels of support, thereby enabling them to reach a higher level of understanding and skills. Essentially, scaffolding is an instructional strategy that offers learners the support necessary to complete tasks they might struggle with independently. This support is gradually withdrawn as the learner acquires new knowledge, hones their skills, and builds the confidence necessary for independent work. In the realm of educational research, nonetheless, there is a long-standing tradition of developing frameworks and taxonomies, including but not limited to TPACK [24], Bloom's taxonomy [1], and DigCompEdu [27]. These frameworks are formulated for numerous reasons. One is that they can articulate and express the current ontologies and social epistemologies of something that may be rather ambiguous, providing a clear structure to these entities and their embedded knowledge systems [33]. In a sense, they rationalize and break down knowledge and skills into smaller meaningful components. Thus, they have the ability to deconstruct and define complex pedagogical concepts, such as digital competence, making them more accessible and easier to apply for practitioners. In a way, frameworks and taxonomies can function as tools or strategies to reduce ambiguity in situations of significant uncertainty or complexity, providing structure and guidance for easier task performance. In other words, one could argue that the purpose of a framework or taxonomy is to conceptualize a structure that can serve as a supportive guide for constructing something meaningful and useful, thus, having the potential to serve a purpose similar to that of scaffolding strategies.

In a similar vein, the proposed taxonomy of video genres can serve a purpose akin to the scaffolding strategy. The rationale for this is primarily related to the

complexity of creating videos for educational purposes, a process where educators often face many challenges. These challenges can manifest in various ways, such as not knowing where to begin, or how to design, create, and produce videos. Furthermore, designing and producing for various learning environments, such as flipped classrooms, hybrid education, and asynchronous online courses, may pose even greater challenges. In other words, it is a demanding craft to master in practice, which raises the need for developing practitioner-based support structures. Conversely, in video-based learning, one finds various frameworks that can be utilized. A notable example is the pivotal research work of Mayer and colleagues [21, 22, 23], who have laid down the foundation for designing intricate classification systems. Mayer, for instance, has suggested twelve learning design principles for the production of learning media content that are rooted in cognitive learning theory, many of which are applied when creating educational videos. Koumi (2015) [16]attempted to operationalize Mayer's learning design principles but placed a greater emphasis on a socio-cultural learning theory approach. In fact, Koumi proposed as many as 34 different techniques that educators can use to enhance learning in videos. But, a great disadvantage is that Mayer and Koumi focus on specific components in videos, such as the composition of a frame and the placement of objects within a frame. This raises the question of whether their guidelines are practical for the general educator looking to learn and incorporate video into their teaching practices, as they indeed develop into complex frameworks that contradict their purpose – instead of helping, they can be too complex to understand and use in practice. Considering that, one might question the need for other guidelines, suggesting that the taxonomy of video genres could serve as a fresh alternative.

That being said, it is essential to connect the proposed taxonomy to a relevant research stream, which is related to research on the use of videos in MOOCs. This research literature appears to approach the field from two different perspectives. Firstly, one research stream measures video performance, mapping user patterns and learner engagement, meaning that a strong learning analytic research approach has emerged. For instance, Guo et al. (2014) [14] found that different video styles yield varying learning outcomes based on perceived use. Their analysis of a data sample from 6.9 million video sessions concluded that shorter videos and those with instructor involvement were more accepted than traditional video lecturing formats. Similarly, Mamgain et al. (2015) [20] conducted a survey asking about various video features embedded in Coursera and edX. Their study revealed that learners favored short videos over in-built video-quiz features. Other studies establish that learners tend to watch videos at faster speeds. For instance, Kim et al. (2014) [15]examined data on where learners stop watching videos. Their analysis of click-level interaction (playing, pausing, and quitting patterns) indicated that long videos and tutorials are less preferred. Brinton and colleagues (2016; 2015) [8, 7] applied clickstream data from video-watching to build algorithms that can predict

learner behavior. This could potentially lay the foundation for customizing assign-ments and assessments in new ways. Recent studies provide additional insights, showing that learners engage with videos in more complex ways than before. For example, Li et al. (2015) [19] collected data on learners watching video lectures and found that learners create new video user patterns. These are matched to personal learning strategies and the perceived difficulty of the learning content. Bonafini et al. (2017) [5] completed a study where they found that video watching and participation in discussion forums increase the likelihood of course completion. In addition, there is a trend towards making videos more interactive by embedding quizzes within them, as studied by Kovacs (2016) [17]. Kovacs' findings suggest that learners engage more deeply with in-built video quizzes, demonstrating that users who begin watching a video are likely to participate in a subsequent in-built video quiz. Furthermore, researchers have begun to employ eye-tracking technologies. Sharma and colleagues (2014, 2015) [31, 30] used this technology to demonstrate that varying gaze patterns influence student attention, thus impacting engagement. They found that learners who watch videos and engage with other learners simul-taneously have better learning outcomes than students who only engage with the video material.

Secondly, there is a stream of research that has analyzed various pedagogical video styles of recorded lectures used in MOOCs. This approach aligns with, and has inspired, the development of the proposed taxonomy of video genres [2]. The research stream describes an interesting overall picture, and is more focused on understanding the meaning and purpose of how educational videos are made than measuring their performance. Although the 'talking head' video style is com-mon in MOOCs, however, researchers have begun to refine their understanding of the recorded lecture. Early studies suggested that the simple lecture record-ing was not the most dominant video style and could be divided into smaller segments. For example, [14] classified six types of instructional videos used in MOOCs: (1) classroom lecture with instructor on the blackboard; (2) talking head of instructor at desk; (3) digital drawing board (Khan-style); (4) slide presentation; (5) studio without audience; and (6) computer coding session. Over time, the range of lecture-centric video styles has expanded. Rahim and Shamsudin (2019) [28]con-ducted an insightful study on video lectures and identified over fifteen different design approaches. Accordingly, researchers propose new ways to conceptualize videos. Some studies argue that it is more meaningful to categorize videos as either speaker-centric (a visible person delivering the content) or board-centric (content displayed on a large rectangular surface). These styles are also preferred by learners [18, 29]. Furthermore, researchers are moving from merely categorizing video styles towards developing taxonomies of videos. They are more interested in establishing their dimensional value, determined by human presence and the type of instructional media [10]. However, what seems to be missing from this emerging

research stream are taxonomies of video genres that are based on pedagogical communication and the intent of the video.

One of the main reasons for drawing inspiration from pedagogical video styles as described above and relating them to the proposed taxonomy, however, is to build upon the current research, which is viewed as valuable and insightful. Another reason pertains to the context sensitivity of pedagogical video styles and their alignment with how educational videos are typically used by educators for teaching and learning. In other words, these pedagogical video styles may be more meaningful and applicable to educators, given their familiarity with how videos are used in various teaching practices. This aligns very well with Vygotsky's (1978) sociocultural theory, suggesting that pedagogical video styles are more resonant with the social and cultural learning contexts of educators [32]. Moreover, the advantage of pedagogical video styles, or video genres, is their familiarity, which could potentially reduce the ambiguity and complexity of video making, thereby creating conditions to broader acceptance of the proposed framework. By tailoring the taxonomy to these aspects, it could potentially become easier to enact scaffolding strategies, thus better supporting educators in making of educational videos.

3 Methods

To develop the proposed taxonomy of video genres, an initial research design was devised. It is crucial to explain this design because the taxonomy is primarily based on research, building upon previous studies on video production in online courses. For this investigation, a mixed-method research approach was adopted [11]. Quantitative research strategies were first used to create a dataset, which was gathered from videos from online courses at a university college. In contrast, qualitative research strategies were employed to interpret the videos and develop the foundation for the taxonomy. The research process can be divided into three distinct phases.

Firstly, the process began with a review of relevant literature, with the aim of identifying existing frameworks for the educational use of video that could serve as the basis for developing the taxonomy. Although various frameworks were found, they were either too complex or did not address specific needs, such as a simplified framework of video genres that could be used as scaffolding strategies for video creation. It is important to note that the development of the taxonomy did not start entirely from scratch. In fact, a couple of the video genres were derived from previous research conducted by one of the authors of this paper [13]. However, for various reasons, it was determined that these genres did not fully encompass the

range of possibilities for creating educational videos, which are indeed numerous. Consequently, further development was necessary.

Secondly, quantitative research strategies were primarily used as a foundation and inspiration for expanding the taxonomy, which involved creating a large dataset of educational videos. As mentioned, the dataset was constructed by gathering and collating videos from online courses offered at a teacher training program at a university college. The data collection period took place in 2021. All videos from the online courses, including both self-produced and embedded videos, were scrutinized. Self-produced videos are those created by the course instructors, while embedded videos are produced by third parties and incorporated into the overall learning design for pedagogical purposes. In other words, embedded videos typically consist of YouTube videos.

Following the creation of the dataset, a straightforward coding strategy was implemented, which involved categorizing the diverse range of educational videos into initial codes that would later evolve into video genres. During the application of this coding strategy, specific criteria were used. All videos were categorized into codes based on their properties, pedagogical purposes, mediating artifacts, and the specific actions depicted in the videos. For instance, if an instructor demonstrated a particular action or activity, the video would be categorized under the "demonstration" genre. Conversely, if an educator explained a concept or if the pedagogical activity involved knowledge transfer (similar to "talking head" videos), the video would be tagged as an "instructional video" genre. This coding process laid the groundwork for further refinement of the taxonomy.

Third, the next step involved employing qualitative research strategies, primarily focusing on data analysis to further map out the potential details of the video genres. Based on the rough drafts of the videos from the dataset, the researchers developed a preliminary outline that could form the basis of the taxonomy. Naturally, this required further refinement, and was achieved through an ongoing data analysis process that involved interpreting and reflecting on the codes. These codes gradually evolved into themes that eventually became the video genres. To carry out this work, the research team utilized a data analysis strategy as outlined by [6]. They suggest applying a hermeneutical approach, which involves a cycle of interpretation, where the researcher moves from understanding the parts to the whole and back again, in an attempt to gain a deeper understanding of the context and the meaning behind the text or phenomenon. Additionally, the researchers presented a rough draft to other experts engaged in video-based education, both within and outside the university college. These experts provided valuable feedback, which was instrumental in revising and refining the taxonomy. A simplified representation of this process is displayed in Figure 1.

Figure 1: Coding process for creating video genres

4 Data analysis

In this section, the details of the taxonomy of video genres are presented. This is achieved by answering the two research questions (RQs) introduced at the outset of the research paper, which were formulated as follows: RQ1: By analyzing videos from a dataset of online courses used in teacher training, how can we characterize their design and usage? RQ2: What different video genres can be distinguished? The subsequent analysis is divided into two sections. The first part involves explaining and examining the dataset from three online courses. In second section, ten different video genres are presented, which forms the foundation for the taxonomy.

4.1 Presentation of overall data set

The process of creating the taxonomy of video genres began with an exploration of how the authors of this research paper had been developing online courses over several years, and the role that video creation played as part of their online teaching practice. At their place of employment, Østfold University College in

Norway, the teacher training department has been offering asynchronous online courses to teacher students and working teachers for several years. These courses are inspired by and developed using MOOC pedagogies and approaches, implying that openness, scalability, and flexibility are vital to their course design. The online courses cover various topics related to the digitalization of education, such as a basic introduction to ICT, pedagogical use of ICT, professional digital competence, fundamental programming, online teaching, and online course production. It is evident that videos play a significant role in the university college's asynchronous online courses, with the majority being produced by the teacher trainers themselves.

In the start of the data analysis, three asynchronous online courses completed in 2021 were selected. For analytical purposes, these are referred to as ICTMOOC, ICTPEDMOOC, and OnlineEDUMOOC. A comprehensive overview of all the videos from these online courses was compiled into a dataset, resulting in a total of 1,271 videos. Given that it is a common practice for teacher trainers to create their own videos for the online courses they teach, an analytical distinction was made between self-produced and embedded videos. Self-produced videos refer to those created by the teacher trainers, while embedded videos are those produced by others and incorporated into the online courses for pedagogical purposes. The total number of videos, as well as the breakdown for each online course, is displayed in Table 1.

Table 1: Overview of three online courses categorized into self-made and embedded videos.

Video production	ICTMOOC	ICTPED-MOOC	Online-eduMOOC	Total videos	Total in percent
Self-made videos	306	240	279	825	65
Embedded videos	104	131	211	446	35
Total videos	410	371	490	1271	

In the second phase of the analysis, the dataset of 1,271 videos was divided and categorized into ten video genres. This categorization and division was based on a set of criteria outlined in the methodology section of the paper.

Upon examining the percentages of videos that can be categorized into various genres, some interesting statistics emerged. These figures are displayed in Table 2. For instance, 46.5 percent of the videos can be classified as "How-To-Do" videos, while 18.2 percent are considered "Instructional/Teaching videos". The "Introduction video" genre accounts for 5.7 percent, followed by "Interview videos" making

Table 2: Overview of videos divided by genre

| Video genre	ICTMOOC	%	ICTPEDMOOC	%	OnlineeduMOOC	%	Total videos	Total in pe
1 How-to-do-tutorial/demonstration	270	65,9	151	40,7	161	32,9	582	46,5
2 Instructional/teaching video	44	10,7	80	21,6	108	22,0	232	18,1
3 Introduction video	19	4,6	15	4,0	41	8,4	75	5,7
4 Interview video	19	4,6	60	16,2	74	15,1	153	12,0
5 Video on location	2	0,5	2	0,5	10	2,0	14	1,0
6 Recording in video meeting	11	2,7	1	0,3	4	0,8	16	1,3
7 Streaming/conference recording	10	2,4	4	1,1	7	1,4	21	1,6
8 Animation / Virtual Reality	15	3,7	25	6,7	37	7,6	77	6,0
9 (Self)reflection video	1	0,2	1	0,3	4	0,8	6	0,4
10 Professional video recordings	19	4,6	32	8,6	44	9,0	95	7,4
Total	410	100	371	100	490	100	1271	100

up 12 percent of the dataset. The difference in video genre utilization among the three online courses can also be observed. For example, in the ICTMOOC, the usage of the video genre "How-to-do-tutorials/demonstration" is significantly higher than in the other online courses. This higher percentage can be attributed to the nature of the ICTMOOC course, which is an introductory course in the use of various digital technologies and software, necessitating a tool-focused approach and a need for videos explaining how these tools work. In other words, tutorials are evidently required for instructional and pedagogical purposes. Conversely, in online courses that emphasize the pedagogical use of digital technologies and stress online pedagogy, like ICTPEDMOOC and OnlineEDUMOOC, the "Instructional/Teaching video" genre is more prevalent.

4.2 Presentation of a taxonomy for video genres

In this section, ten video genres are presented. An overview of the video genres is displayed in Figure 2.

Genre 1: How-to-do tutorials/demonstration
The "How-to-do tutorials/demonstration" genre involves videos where knowledge about a specific task is transferred from the tutor to the learner as an integral part of the learning process. This genre bears similarities to YouTube tutorials and often replaces the use of written manuals that may be too complex to navigate. The underlying premise of such videos is that the tutor possesses extensive knowledge about a range of digital tools and can break down and explain how to locate and utilize specific features. A sizable portion of the videos in the dataset fall under
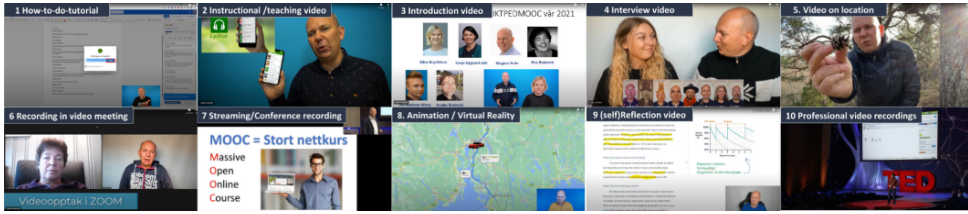
Figure 2: Overview of videos divided by genre

this genre. "How-to-do" tutorials are used to train teacher students to develop digital skills needed in their teaching practice, including the use of various digital tools, software, and resources. Typically, these videos have a narrative structure and learning goal; the tutor provides a detailed, step-by-step explanation of how to use a digital resource, simultaneously enabling the learner to apply it. The videos can be produced using screen recordings (like showing how to use a feature in software) or demonstrations of how to perform a task (such as setting up lights in a home studio).

Genre 2: Instructional/teaching videos
"Instructional/Teaching videos" is a genre where the educator either transfers or disseminates knowledge to the learner. This genre is used to explain core definitions and concepts, and it also appears in the dataset. The genre effectively substitutes the educator at the front of a classroom with one on the screen, sharing similarities with the typical "talking head" video. However, it is crucial to stress that the understanding of this genre has a broader application. A unique property of this video genre, it is argued, is that the educator disseminates, interprets, and simplifies academic or textbook knowledge, making it easier for the learner to understand the learning material. The dissemination of knowledge can occur in various ways, including lecture recordings, talking head videos, screencast recordings, image narration, greenscreen usage, and more.

Genre 3: Introduction video
The "Introduction Video" is a genre that primarily aims to familiarize the learner with topics that will be addressed later in the learning process. Introduction videos can also be employed for administrative purposes. The main characteristic of this genre, however, is to convey essential information to the learner. This information could pertain to learning content, activities, or assignments. A common example is module introduction videos, which are widely used in the three online courses. Other examples of introduction videos might include information about online

courses, lectures, portraits (of researchers/lecturers), or promotional material for study programs.

Genre 4: Interview video

An "Interview Video" is a genre that emulates the format of an interview. An interview is a structured conversation involving two or more individuals with distinct roles: the interviewer, who asks questions, and the interviewee, who responds. In the context of online courses, however, the use of interview videos often involves soliciting the opinion of an expert. Many interview videos feature a traditional interview setting, where the educator (interviewer) poses a question and the expert provides an explanation in response. The primary purpose of the video is to acquire the interviewee's perspective on a specific topic. This genre is employed to present diverse viewpoints within the online courses. Possible interviewees can range from colleagues, academics, experts, guest lecturers, conference participants, and keynote speakers, to authors of research articles and professional practitioners.

Genre 5: Video on location

The "Video on Location" genre refers to videos that shift the educator or learning experience away from traditional locations typically associated with video-based learning, such as lecture halls or studios. This genre is employed when the learning objective is to demonstrate or visualize a topic, concept, or other element that might be inadequately explained or depicted through words, text, and images found in textbooks. In other words, this genre is used to present real-world scenarios and practices to the learner. This particular video genre is not widely utilized in the three online courses examined.

Genre 6: Recording of video meeting

The "Recording of Video Meeting" is a genre primarily defined by its technical properties, typically employed to record learning activities such as teaching, supervision, and group discussions. This genre has been included due to its widespread use during the Covid-19 pandemic, when recording video meetings became a widespread practice. Recording a learning session is straightforward and requires minimal technical skills, indicating that this genre may have a valid purpose. Additionally, recorded learning sessions have become highly valued among learners. For instance, recorded Zoom sessions have gained popularity in asynchronous learning, providing learners with the flexibility to watch at their convenience. Recorded video meetings can also be used to initiate other learning activities; they can serve as documentation, showcases, or discussion starters. They can also be used for repetition or to support collaborative learning processes.

Genre 7: Streaming/conference recording
The "Streaming/Conference Recording" genre emphasizes the synchronous and asynchronous properties of video, particularly aspects related to the ongoing delivery and consumption of multimedia learning content, with the added feature of storage. This genre is of interest as it is increasingly common for educators to conduct live transmissions, either of lectures or conferences. Streaming/conference recordings can also serve a similar purpose as the sixth video genre, facilitating knowledge transfer and group discussions among learners.

Genre 8: Animation / Virtual Reality
The "Animation/Virtual Reality" genre demonstrates how techniques of photography, drawings, models, and alternative perceptions of reality can be utilized in video-based learning. This genre emphasizes that the affordances of digital technologies can be employed to demonstrate and visualize core definitions and key concepts that might otherwise be limited by modalities like text. For instance, animation can be used to create alternative presentations of core topics; artificial intelligence technologies like deepfake video can generate "avatar teachers" in online courses, and 360-degree video can offer more comprehensive experiences of real-life scenarios. However, the production of such videos is time-consuming and requires practical and technical skills, as well as the use of potentially expensive software and hardware.

Genre 9: (Self) Reflection video
The "(Self) Reflection Video" genre emphasizes the idea that educators and students can utilize reflective capabilities for knowledge creation. This genre is based on the premise that reflection is a powerful tool for learning. It enables educators and students to use retrospection to comprehend the pedagogical choices they have made, rather than merely describing their actions. In essence, in reflection videos, students or educators record their reflections and relate them to personal knowledge or skills, thereby exercising meta-cognition. Reflection videos can also be used to understand other learners' perspectives on a given topic and can be integrated into the learning design of an online course.

Genre 10: Professional video recordings
"Professional Video Recordings" refer to a genre where the educator collaborates with professional video producers. In essence, these videos exhibit exceptionally high production quality and typically require substantial resources for production, including competence, planning, time, and funding. In many instances, educators may not have access to such resources. Examples of professional video recordings include informational films, commercials, public instructional films, Ted Talks, documentaries, television productions, etc. Animation could also be categorized under this genre, as it often requires professional skills for production. The research

team deliberated whether this genre should be removed from the taxonomy and included under other genres. However, the decision was made to retain "Professional Video" as a separate genre.

5 Discussion

The aim of this research paper is to introduce a taxonomy of video genres that can serve as a scaffolding strategy, assisting educators in the complex task of creating educational videos. Essentially, the taxonomy is designed to provide a supportive structure that encourages educators to begin producing educational videos and offers guidance throughout the process. However, it is important to note that this taxonomy is not exhaustive and naturally invites further discussion. Like any taxonomy or framework, it is likely to be contested due to its inherent element of classification and boundary-setting in a widely used modality among learners. One potential criticism might be the limitation to only ten video genres; surely, there must be others? Indeed, the ten suggested video genres only emerged due to the constraints of the dataset used. Other genres, such as the video case, could certainly exist. The "video case" genre, closely linked to case-based learning, can ground education in practical applications, especially in practice-oriented fields. It enables students to connect theory with societal context, facilitating a shift from passive to active learning through real-life scenarios. The relevance created can increase student motivation for learning, and the content of video cases can prepare students for the realities of their future workplaces. Other proposed video genres may need to be merged or split due to their similarity or difference. For instance, the genres "Recording of Video Meeting" and "Streaming/Conference Recording" may be more effectively addressed as one due to their overlap. The "Animation/Virtual Reality" genre could potentially be split into two distinct genres. Moreover, each proposed video genre could also have subsections. In short, there are many possibilities to consider and be aware of, which means that the taxonomy is by no means conclusive.

Another motivation for introducing the taxonomy of video genres concerns the authors' experiences regarding the role of video making in the complex task of designing and creating online courses or MOOCs. The authors of this research paper have produced and operated several online courses covering various topics and subjects, including but not limited to introduction to ICT, pedagogical use of digital technologies, professional digital competence, online pedagogy and teaching, and online course production. These online courses are offered to teachers in schools, educators in higher education, and individuals who work with training in work life. The students take the courses because they wish to enhance their digi-

tal competencies. While the authors' online courses are research-based, they also conduct research on them. A question that emerges from this research is how they design online courses and what their core characteristics might be. The authors contend that their online courses are generally built on four pillars: text, video, assignments, and quizzes, although they acknowledge that there might be additional ones. The process of creating these courses frequently utilizes the concept of "backwards design", as advocated by Wiggins and McTighe (2005) [34]. Their instructional design process begins by identifying what the students are expected to learn. Following this, they select the appropriate learning materials, activities, and assessment methods. A critical question in this design process is deciding the most suitable modality to deliver the learning materials and structure the learner's experience. Often, during the design process, one can quickly gravitate towards "video" as a way to deliver the learning material to students, but this can pose challenges. For example, educators new to video making may start producing many videos, but when they compile these and set up a digital learning environment, it can create a passive learning experience that simply replaces the traditional lecture. However, effective use of video for professional practitioners in education is indeed a complex task, something that is often only fully understood in retrospect. This raises the pertinent question: How can students, who are professional practitioners or teachers, be taught to design and create videos suitable for their practice? In response to this, the authors propose the taxonomy of ten distinct video genres as a starting point for this conversation.

There might be substantial justification for such a statement. In traditional classroom teaching, a plethora of research and diverse pedagogical directions are available to aid teachers in selecting teaching methods that enhance the teaching and learning process. Constructive alignment [4] and understanding by design [34] serve as notable examples. That being said, there is also a need for a similar discussion concerning effective teaching practices when utilizing video in education. During the COVID-19 pandemic, for example, many educators were forced to make a quick transition to online teaching with little time or no adequate training. The authors argue that this lack of time and expertise may have resulted in numerous unrefined pedagogical choices, particularly in the usage of video for online teaching. Many educators embraced video-based learning, but due to a lack of skills and personal competence, the effective use of video proved challenging. This raises the crucial question: when will the education system empower future teachers to make pedagogical choices that enhance their ability to use videos in a manner that fosters learning? The authors contend that educators and students require tangible guidelines or frameworks to aid them in making appropriate pedagogical choices when using video. This need arises, in part, due to a lack of awareness about the various methods and possibilities in video production. Therefore, a framework that supports teachers' understanding of video production is indeed necessary. One

approach among many is to provide a taxonomy of video genres, which can serve as a guiding structure, or be applied as part of a general scaffolding strategy.

The justification for a taxonomy of video genres becomes more apparent when considering the frameworks available. For instance, Mayer and colleagues' influential work [21, 22, 23] has significantly impacted the design of multimedia learning content. Mayer's research is centered around understanding specific aspects of multimedia learning contents, focusing on the brain's capabilities to process intricate details in video frames. However, creating high-quality videos that align with Mayer's outlined learning principles necessitates access to professional video production facilities and TV studios – resources often inaccessible to many professional practitioners. Another researcher who expands on Mayer's cognitive theory is Koumi (2015) [16]. Across several papers, Koumi has presented a taxonomy of 34 pedagogic video design principles for video production. Koumi convincingly presents a set of tools that could be used by video producers for pedagogical communication. While Koumi and Mayer's work is essential when creating effective teaching videos, the authors of this paper believe their tools may be too complex for professional practitioners to integrate into practical teaching routines. In other words, there is a need for more abridged and practical frameworks.

Such frameworks can potentially be found in recent research on the use of videos in MOOCs. For instance, Chorianopoulos (2018) [10] has outlined an intriguing taxonomy of various asynchronous instructional video styles, which is akin to the taxonomy of video genres proposed in this paper. Chorianopoulos advocates for a focus on video formats rather than production styles, a viewpoint the authors agree with. In doing so, Chorianopoulos provides various examples, emphasizing that video format or style classification should be determined according to the degree of human presence and type of instructional media. In essence, the type of video format is determined by how centered the video is on the board and the human. The authors of this paper acknowledge the significant work done by Chorianopoulos in developing this taxonomy and were inspired to outline their own. They adopted a genre approach, positing it to be more useful and meaningful, as it enables the capture of the pedagogical communication mediated in the video. Focusing on communication conventions may provide a more suitable and accessible tool to support educators in their use of videos in professional practice.

6 Conclusion

The Covid-19 pandemic led to a dramatic increase in the use of educational videos in both schools and academia. This surge in video usage prompts a need to bench-

mark good practices and define minimum quality criteria for effective educational videos. The evolution of educational videos began with on-campus lecture recordings and has since expanded into various exciting and multifaceted directions, particularly within online and blended education. Perhaps it is now time to develop research-based frameworks for video, a feasible long-term goal. Existing frameworks such as TPACK [24] and DigCompEdu [27] provide digital competence guidelines for teachers. So, why shouldn't there be one for the use of videos in learning and education? To understand and assess quality, a common framework is necessary. The research-based taxonomy of video genres proposed in this paper might represent a starting point for conceptualizing such a framework. Its utility could lie in providing educators with an overview of possible genres for educational videos, thereby assisting in their pedagogical decision-making process.

References

[1] L. W. Anderson and D. R. Krathwohl. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman, 2001.

[2] S. Aryal, A. S. Porawagama, M. G. S. Hasith, S. C. Thoradeniya, N. Kodagoda, and K. Suriyawansa. "Using Pre-trained Models As Feature Extractor to Classify Video Styles Used in MOOC Videos". In: *2018 IEEE 9th International Conference on Information and Automation for Sustainability, ICIAfS 2018*. 2018. DOI: 10.1109/iciafs.2018.8913347.

[3] T. Bahula and R. Kay. "Exploring Student Perceptions of Video-Based Feedback in Higher Education: A Systematic Review of the Literature". In: *Journal of Higher Education Theory and Practice* 21.4 (2021), pages 248–258. DOI: 10.33423/jhetp.v21i4.4224.

[4] J. Biggs. *Teaching for Quality Learning at University: What the Student Does*. Open University Press; Berkshire, 2011.

[5] F. C. Bonafini, C. Chae, E. Park, and K. W. Jablokow. "How Much Does Student Engagement with Videos and Forums in a MOOC Affect Their Achievement?" In: *Online Learning Journal* 21.4 (2017), pages 223–240. DOI: 10.24059/olj.v21i4.1270.

[6] S. Brinkmann and S. Kvale. *InterViews: Learning the Craft of Qualitative Research Interviewing*. 3rd. Thousand Oaks, Calif.: Sage, 2015.

[7]   C. G. Brinton, S. Buccapatnam, M. Chiang, and H. V. Poor. "Mining MOOC Clickstreams: Video-Watching Behavior vs. In-Video Quiz Performance". In: *IEEE Transactions on Signal Processing* 64.14 (2016), pages 3677–3692. DOI: 10.1109/TSP.2016.2546228.

[8]   C. G. Brinton and M. Chiang. "MOOC Performance Prediction via Clickstream Data and Social Learning Networks". In: *Proceedings – IEEE INFOCOM*. 2015. DOI: 10.1109/infocom.2015.7218617.

[9]   S. Chaiklin. "The Zone of Proximal Development in Vygotsky's Analysis of Learning and Instruction". In: *Vygotsky's Educational Theory in Cultural Context*. Edited by A. Kozulin. Cambridge: Cambridge University Press, 2003, pages 39–64. DOI: 10.1017/CBO9780511840975.004.

[10] K. Chorianopoulos. "A Taxonomy of Asynchronous Instructional Video Styles". In: *International Review of Research in Open and Distance Learning* 19.1 (2018), pages 294–311. DOI: 10.19173/irrodl.v19i1.2920.

[11] J. W. Creswell. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 5th. Thousand Oaks, California: SAGE, 2018.

[12] A. J. Devitt. "Genre". In: *Keywords in Writing Studies*. Edited by P. V. Heilker and P. State University Press, 2015, pages 82–87. DOI: 10.7330/9780874219746.c017.

[13] I. Engeness, M. Nohr, A. B. Singh, and A. Mørch. "Use of Videos in the Information and Communication Technology Massive Open Online Course: Insights for Learning and Development of Transformative Digital Agency with Pre- and In-Service Teachers in Norway". In: *Policy Futures in Education* 18.4 (2020), pages 497–516. DOI: 10.1177/1478210319895189.

[14] P. J. Guo, J. Kim, and R. Rubin. "How Video Production Affects Student Engagement: An Empirical Study of MOOC Videos". In: *L@S 2014 – Proceedings of the 1st ACM Conference on Learning at Scale*. 2014. DOI: 10.1145/2556325.2566239.

[15] J. Kim, P. J. Guo, D. T. Seaton, P. Mitros, K. Z. Gajos, and R. C. Miller. "Understanding In-Video Dropouts and Interaction Peaks in Online Lecture Videos". In: *L@S 2014 – Proceedings of the 1st ACM Conference on Learning at Scale*. 2014. DOI: 10.1145/2556325.2566237.

[16] J. Koumi. "Learning Outcomes Afforded by Self-assessed, Segmented Video-print Combinations". In: *Cogent Education* 2.1 (2015). DOI: 10.1080/2331186X.2015.1045218.

[17] G. Kovacs. "Effects of In-video Quizzes on MOOC Lecture Viewing". In: *L@S 2016 – Proceedings of the 3rd 2016 ACM Conference on Learning at Scale*. 2016. DOI: 10.1145/2876034.2876041.

[18] Y. C. Lai, S. S. C. Young, and N. F. Huang. "A Preliminary Study of Producing Multimedia Online Videos for Ubiquitous Learning on MOOCs". In: *2015 8th International Conference on Ubi-Media Computing, UMEDIA 2015 – Conference Proceedings*. 2015. DOI: 10.1109/umedia.2015.7297473.

[19] N. Li, L. Kidziński, P. Jermann, and P. Dillenbourg. "MOOC Video Interaction Patterns: What Do They Tell Us?" In: *Lecture Notes in Computer Science*. Volume 9307. 2015, pages 197–210. DOI: 10.1007/978-3-319-24258-3_15.

[20] N. Mamgain, A. Sharma, and P. Goyal. "Learner's Perspective on Video-Viewing Features Offered by MOOC Providers: Coursera and edX". In: *Proceedings of the 2014 IEEE International Conference on MOOCs, Innovation and Technology in Education, IEEE MITE 2014*. 2015. DOI: 10.1109/mite.2014.7020298.

[21] R. E. Mayer. "Applying the Science of Learning to Medical Education". In: *Med Educ* 44.6 (2010), pages 543–549. DOI: 10.1111/j.1365-2923.2010.03624.x.

[22] R. E. Mayer. "Research-Based Principles for Designing Multimedia Instruction". In: *Applying Science of Learning in Education: Infusing Psychological Science into the Curriculum*. 2014, pages 59–70.

[23] R. E. Mayer and R. Moreno. "Nine Ways to Reduce Cognitive Load in Multimedia Learning". In: *Educational Psychologist* 38.1 (2003), pages 43–52. DOI: 10.1207/S15326985EP3801_6.

[24] P. Mishra and M. J. Koehler. "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge". In: *Teachers College Record* 108.6 (2006), pages 1017–1054.

[25] H. Polat. "Instructors' Presence in Instructional Videos: A Systematic Review". In: *Education and Information Technologies* 28 (2022), pages 8537–8569. DOI: 10.1007/s10639-022-11532-4.

[26] O. Poquet, L. Lim, N. Mirriahi, and S. Dawson. "Video and Learning: A Systematic Review (2007-2017)". In: *ACM International Conference Proceeding Series*. 2018. DOI: 10.1145/3170358.3170376.

[27] Y. Punie and C. Redecker, editors. *European Framework for the Digital Competence of Educators: DigCompEdu*. Publications Office of the European Union, 2017. DOI: 10.2760/1.

[28] M. I. Rahim and S. Shamsudin. "Video Lecture Styles in MOOCs by Malaysian Polytechnics". In: *ACM International Conference Proceeding Series*. 2019. DOI: 10.1145/3345120.3345169.

[29] J. M. Santos-Espino, M. D. Afonso-Suárez, and C. Guerra-Artal. "Speakers and Boards: A Survey of Instructional Video Styles in MOOCs". In: *Technical Communication* 63.2 (2016), pages 101–115. DOI: 10.3390/bs13040330.

[30] K. Sharma, P. Jermann, and P. Dillenbourg. "Displaying Teacher's Gaze in a MOOC: Effects on Students' Video Navigation Patterns". In: *Lecture Notes in Computer Science*. Volume 9307. 2015, pages 325–338. DOI: 10.1007/978-3-319-24258-3_24.

[31] K. Sharma, P. Jermann, and P. Dillenbourg. "'with-Me-Ness': A Gaze-Measure for Students' Attention in MOOCs". In: *Proceedings of International Conference of the Learning Sciences, ICLS*. Volume 2. 2014, pages 1017–1021. DOI: 10.1016/j.ijcci.2021.100414.

[32] L. S. Vygotskij, editor. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Mass.: Harvard University Press, 1978.

[33] K. E. Weick. *Making Sense of the Organization*. Oxford: Blackwell, 2001.

[34] G. Wiggins and J. McTighe. *Understanding by Design*. 2nd. Association for Supervision & Curriculum Development, 2005.

[35] D. Wood, J. S. Bruner, and G. Ross. "The Role of Tutoring in Problem Solving". In: *Journal of Child Psychology and Psychiatry* 17.2 (1976), pages 89–100. DOI: 10.1111/j.1469-7610.1976.tb00381.x.