Empirical evidence and research perspectives on the use of didactic video: with a focus on the health professions

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Empirical evidence and research perspectives on the use of didactic video: with a focus on the health professions

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Abstract

The article presents a brief overview and a critical analysis of the emerging evidence in international literature regarding the use of audiovisual texts, with a focus on the didactic video to support professional medical education. The study of cognitive artifacts used in the representation of knowledge is not a new phenomenon, but with the Covid-19 emergency there has been renewed interest in this area of research. Evidence highlights how audiovisual texts can perform very diversified, rich and stimulating functions from a pedagogical point of view. In particular, a new direction of research on the significant role of the camera point of view (first person or subjective) in learning complex manual procedures is of great interest in the health professions. A number of critical issues are also clear.

KEYWORDS: Instructional Video, Audiovisual Texts, Procedural Knowledge, Video and Medicine, Subjective Shot.

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1. Introduction

The reference area of the didactic video is video-based learning, a research sector that deals with theoretical and methodological aspects on the principles of knowledge construction through cognitive artefacts based on visual/audiovisual/sound/multimedia languages and network technologies. This broad definition includes both television texts (now a minority, hence negligible) and videos, categorized according to procedures and terminologies not yet standardized at international level. However, each of these is functional to the construction of different types of knowledge, factual, conceptual, procedural, metacognitive: video lessons recorded ad hoc, video lessons that capture the classroom lesson, multimedia presentations (such as PowerPoint) with voiceover, screencasts (with voiceover), live lessons in web conference, educational videos, educational television programs, knowledge clips. The list does not include all the existing forms, and contamination between the cited texts appears to be common (Ganino, 2018).

In recent years, the spread of new teaching methods such as, flipped, blended and MOOCs, alongside different uses of e-Learning, has led to new interest in educational research on audiovisual technology the different textual forms of which seem central to all educational processes supported by the use of telematics. Not to mention the Covid-19 health emergency which resulted in the transfer of all teaching to digital environments within which audiovisual texts were used as the main teaching medium.

Numerous studies carried out over the last 20 years show how videos can be highly effective in training processes if the rules of Instructional design are respected: correct management of the cognitive load; enhancement of cognitive theories of multimedia learning; promoting student engagement; enhancement of active learning. These are all points, especially the first two, which have been widely discussed, but which

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have not yet been actively applied in teaching practices (Sweller et al., 2019).

2. Materials and Methods

2.1 The Method

The analysis of international literature relating to the use of educational videos in vocational health education, proposed in this study, is an in-depth analysis of a wider contemporary review on the use of all audiovisual texts in teaching and learning processes in the university environment. This review, partially reported below (par. 3.1 and 3.2), was carried out according to an adaptation of the six-phase process in accordance with the theory developed by Machi and McEvoy (2016) and integrated, for point 3, with a protocol relating to the Prisma guidelines (Liberati et al., 2015). The study that examined the period 2010-2019 identified 95 articles, analyzed and organized into different themes: video and involvement, video and motivation, video and laboratory teaching, taxonomies and forms, design (duration, segmentation, camera point of view, instructor role in video, the forms of human representation). The evidence obtained is useful understanding more about the communicative and psychological mechanisms whose application can be functional to the improvement of learning processes that make use of educational audiovisual texts. This applies to all areas of knowledge, therefore also professional health education. For this reason, as mentioned, a summary is provided. From the same analysis it appears that one of the texts analyzed, the educational video, is of great interest for learning complex manual procedures in the health professions. We explored this use in this second review on the educational video in the field of health professions referring to the year 2020 performed with the same method as the previous one (Machi & McEvoy, 2016; Liberati et al., 2015).

2.2 Identification of the topic and definition of the problem to be investigated (Steps 1 and 2)

Starting from the research objective – to verify the use of the didactic video in learning procedural skills in the health professions – the following questions were asked:

Q1. *Is there any scientific evidence relating to the didactic functionality of the video in terms of procedural knowledge learning?*

Q2. *Are there any guidelines that could help with the correct design of educational videos in the medical / health field to facilitate the learning of procedural knowledge?*

2.3 Data collection and organization (Step 3)

For the identification and selection of scientific literature, primary and secondary studies on the subject, the databases were queried through the Library System of the University of Ferrara (cerc@unife, EBSCO Discovery Service):

1. the research and related analysis were carried out in December 2020 and the first half of January 2021;
2. the research was limited to articles published in 2020;
3. Elsevier Science Direct, ISI Web of Science, JSTOR, Open Dissertations, Scopus, SpringerLink, Wiley Online Library, Rivisteweb-Il Mulino / Carocci databases were consulted.

A series of peer reviewed academic publications with links to the full text were selected, through the following search keywords and related Boolean operators: instructional video OR educational videos AND healthcare AND professional. 1544 studies were identified. 24 reviews and research reports have been deleted from these. The research was refined through the selection of contributions aggregated according to the following categories: education (59), learning (13), training (22), flipped classrooms (44), e-Learning (23), online learning (16), meta-analysis (22), medical education (20), teaching methods (19), online education (17), active learning (16), mobile apps (15), instructional film (45), educational technology (22), higher education (12), online education (20), educational films (16), distance education (14), blended learning (12). This trial identified 427 items. The relevance to the goal of our analysis was more precisely identified by reading the abstracts. 44 articles were selected from this process. Finally, through full text reading, seven articles remained. All the studies that did not deal with specific topics with respect to the research questions were eliminated (Figure 1).

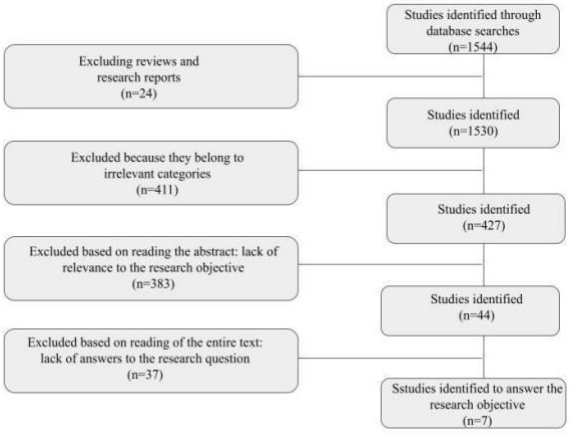

Figure 1 - Flow chart of the studies included in the review.

2.4 Identification and organization of data (Step 4)

Table 1 shows the identification of the data on the basis of which the critical analysis was carried out with respect to the research question.

3. Results

Data analysis and review processing (Steps 5 and 6). As mentioned, before reporting the results of the review on the didactic video used in the health professions (paragraph 3.3) it seems appropriate, for the sake of completeness of the topic, to report evidence on audiovisual texts in general. As these data are not yet published, we prefer to report them in this part of the article rather than in the "Introduction" paragraph. They may be considered complementary to the review on the didactic video in the field of health professions and very useful to researchers, teachers, instructional designers interested in the topic. For the same reason, the analysis of an article on the camera point of view (Boucheix et al., 2018) was included in paragraph 3.3.2 Healthcare perception and learning: use of the dual camera point of view.

The evidence shows how educational audiovisual texts can have a significant impact on learning as long as they are made on the basis of specific theoretical paradigms that constrain their use. Particularly interesting are the studies on the significant role of the integrated camera point of view, objective and subjective, in the context of learning complex manual procedures; on the modalities of representation of the teacher and on his/her communicative attitude; on the increasingly close relationship between educational sciences and neuroscience.

3.1 Taxonomy of educational audiovisual texts

In the face of many studies that show how the use of multimedia documents in certain conditions improves learning, there is still little evidence on the effectiveness of the different teaching formats. Although these formats are normally used in teaching practices, the reference literature appears insufficient. Evaluating how different formats can influence attention, engagement, emotions, cognitive load and learning performance would significantly contribute to the growth of this research area. For this reason, the data reported in this paragraph must be integrated with those on the design of the didactic audiovisual text (next paragraph).

Our analysis highlights the lack of a shared classification of audiovisual texts at international level and this does not facilitate analysis and comparison between studies. The categories (C) identified are listed below. Chen and Wu (2015) report 3 different types of video lessons in their experimental study.

1. *Lecture capture* (C1). Full recording of the conventional lesson, very long for asynchronous use but characterized by the ability to preserve the view of the teacher-student relationship that takes place in the classroom.
2. *Voice over* (C2). Audiovisual text composed of a multi-window template containing the multimedia presentation, the image of the teacher and the index of contents. In this format in which the learning context is lacking, speech takes on utmost importance.
3. *Picture in picture* (C3). Format widely adopted in MOOCs, it shows the teacher according to an integrated solution rather than a separate one, as in the voice over model, within the multimedia presentation.

Other studies report the following formats.

4. *Formats determined by the MOOC platform (C4).* Hansch et al. (2015) identified up to 16 types of video lesson presentation formats within the various MOOC platforms; Thompson the Khan Academy style focused on creating an intimate and close

	Authors and year	Focus of interest	Content	Research's methodology
1	Lim & Hu (2020)	Video-modelling	Autism spectrum disorder	Experimental with blinded evaluation
2	Eimer et al. (2020)	Video and peer education	Abdominal ultrasound, transthoracic ultrasound	Experimental single-blind prospective study
3	Yeap et al. (2020)	Video and procedural skills	Thoracic epidural anesthesia	Prospective randomized study
4	Bajaj et al. (2020)	Open educational resources	Glasgow Coma Scale	Prospective study
5	Tewfik et al. (2020)	YouTube and scientific quality	Regional nerve block	Retrospective observational study
6	Ulmer et al. (2020)	Video and procedural skills	Emergency tracheostomy	Experimental
7	Schmidt et al. (2020)	Role of the camera point of view	Laparoscopic suture	Experimental with blinded evaluation

Table 1 - Summary of the extrapolated data from the identified studies.

relationship between the teacher and the individual student (2011, in Chorianopoulos, 2018); Guo et al. (2014) identified six presentation styles within the edX platform: Classroom, recording of the live lesson with an instructor on the blackboard; Office desk, the teacher's talking head behind his desk; Khan Style, use of digital whiteboard for writing and drawing; Slides, illustration of slides with voiceover; Study, recording the lesson in a television studio in the absence of students; Cood, screencast / computer coding session.

5. *Formats determined by the disciplines (C5).* Santos-Espino et al. (2016) divided the audiovisual texts into two main categories, speaker-centric and board-centric, and identified a preference for use according to the disciplines involved.

These formats provide a general idea of the different possibilities without, however, going into the specifics of their use depending, for example, on the type of knowledge to be activated. It seems useful to report our classification based on structural characteristics (Ganino, 2018) based on the intersection of some categories - modes of use, synchronous or asynchronous; duration, short or long; methods of presentation of the contents, closed and uniconceptual or open and argumentative; paradigm employed, transmissive, interactive, mixed; social presence, of teacher or lecturer and students; type of teaching, conceptual or experiential - and macro categories, video lessons, web conference lessons, didactic videos.

6. *Video lesson (C6).* The video lesson macro-category, regardless of its form, is an audiovisual text with a high semantic density which can be used in asynchronous mode. It brings together a sense of social presence and authoritativeness of the contents, through the presentation of the teacher and visual exemplification of the concepts covered, through the correct use of multimedia design principles. In practice, it is a transmissive text based on a behavioral logic: interaction is not normally envisaged during use and declarative knowledge is acquired by the student through self-learning. This didactic resource must be supported by the clarification of a precise didactic objective, a short duration and a uniconceptual structure. In practice it is a rigid cognitive artifact, but which can build the basic factual and conceptual pre-knowledge/knowledge of a discipline, fundamental to the activation of learning through integration with other cognitive artifacts, such as lessons in web conferences and e-tivities, or with face-to-face lessons (as in the flipped and blended models).
7. *Web conference lesson (C7).* The web conference lesson macro-category is a synchronous audiovisual text characterized by an interactive paradigm and a strong social indicator component (teacher and students): this determines effective teaching processes thanks to the possibility of reducing the risks of misunderstandings present in asynchronous communication. The web conference lesson can promote teaching dominated by the concept of openness, which can go beyond rigid definitions or superficial knowledge, based on conceptual reflections, argumentation and the game of mental associations as happens in classroom lessons held by an experienced teacher.
8. *Didactic video (C8).* The didactic video macro-category refers to an audiovisual text which, like the video lesson, is characterized by a didactic objective which is as precise as possible, a single-concept structure and short duration, a transmission model, intended for experiential teaching, which is less conceptual and theoretical and more workshop-based (procedural knowledge). It is an educational resource used to explore information that does not lend itself to being transmitted through spoken or written language: mechanical processes, manual and clinical skills, procedures that take place in inaccessible laboratories, but also images to stimulate emotions and feed imagination and creative thinking. In practice, the result of the viewing must have a significant impact on the student's ability to solve problems or carry out processes and procedures.

3.2 Didactic audiovisual text design

Scientific evidence shows how the audiovisual texts referred to in the previous paragraph can have a significant impact on learning if they are built on the basis of precise theoretical paradigms. Here we report those that seem most significant for the advancement of pedagogical research and useful for identifying new guidelines in the field of educational multimedia production.

Cognitive load and multimedia learning. The design of these texts is based on a series of now classic studies on the theories of cognitive load and multimedia learning (Sweller, van Merriënboer, & Paas, 1998; 2019; Clark & Lyons, 2010; Mayer, 2009) whose application tends to enhance the teaching and learning process through the reduction of the extraneous cognitive load, the improvement of the pertinent one, and the management of the intrinsic one. A series of recent studies in the field of cognitive neuroscience appears to be interesting: some on the techniques for measuring cognitive load and a more general study on the progress of the discipline. Recent research related to classical subjective cognitive load measurement techniques with the use of 9-level Likert scales (Anmarkrud et al., 2019) concerns new physiological assessments (by electroencephalography) of the electrical oscillation activities of the brain during active information processing: in the presence of a greater cognitive demand, the power of the theta band increases and that of the alpha band decreases (Kumar & Kumar, 2016; Soltanlou et al., 2017). The progress of cognitive load

studies and related applications in instructional design, indicated below, are described in a recent publication by Sweller and colleagues (Sweller et al., 2019): variability of the amount of information processed and stored in working memory (Chen et.al., 2018, in Sweller et al., 2019) and overcoming the idea according to which this quantity of information would be fixed (this is considered the "bottleneck" of learning); self-regulation by the student of their own learning resources; the influence on the cognitive load of environmental factors such as stress, emotions and cognitive insecurity (Choi et al., 2014, in Sweller et al., 2019).

Video representation of the instructor. A second area of advancement of the research concerns the representation of the instructor in videos according to design principles based on the function of complementarity between the talking head and the visual message: specifically, the significant enhancement of the teacher's image in terms of the functional use of gestures, looks and mode of representation. Naturally, the first aspect to consider concerns the presence or absence of the so-called "talking head" in relation to two reference theories, social presence and cognitive load. The evidence related to the paradigm of social presence refers to greater involvement that determines the student's motivation, interest and willingness to cooperate. This results in greater student satisfaction and the student's perception of having learned more (Kizilcec et al., 2015; Lyons et al., 2012; Wilson et al., 2018, Guo et.al., 2014) hence classifying the audiovisual texts in which their professors are present as more effective than those of other suppliers (even in the case of comparable content in quality). However, this is not always the case; other experiments have not found any obvious advantage due to the presence of the instructor (Kizilcec et al., 2014) and highlighted obstacles to learning (Wilson et al., 2018). For example, many studies based on eye tracking and linked to cognitive load theory see the image of the instructor as a cause of divided attention (Kizilcec et al., 2014; Wang & Antonenko, 2017). For these reasons, as mentioned, it is very important for the design principles to attribute a complementary function to the communicative and significant processes resulting from the actions of the talking head (principle of gestures, gaze, dynamic design) and the overall visual message. Gestures can play a significant role but only when they have a clarification and extension function, highlighting of the content with the aim of positively influencing conversational exchange and the multimedia didactic message (Fattorini & Paoletti, 2017; Poggi & Caldognetto, 1997). In this sense, illustrative and significant gestures promote both the learning process, in terms of greater propensity to remember (Feyereisen, 2006 in Fattorini & Paoletti, 2017), and the teaching process, in terms of better expressive ability and reduction of pauses associated with lexical retrieval difficulties (Cook et al., 2012 in Fattorini & Paoletti, 2017). Research also indicates that the gaze can play a role in multimedia learning where it operates as a visual guide to the student's attention, thus preventing divided attention phenomena. A very useful tool for putting into practice this mechanism capable of enhancing the paradigms of social agency and the reporting principle seems to be the transparent board (Mayer, 2014). Hand movement (Fiorella & Mayer, 2016) and the connected principle of dynamic drawing (Mayer et al., 2020) are to be understood in the same direction. The former can reduce extraneous cognitive load by directing attention towards relevant information, continuously and at the right time (as in the signaling principle). The latter, that is the composition of the didactic message through the technique of dynamic drawing, promotes a greater spirit of cooperation as indicated by the social agency theory (Mayer, 2014) and a greater sense of self-referentiality in the perspective of the theory of incarnation (Robbins & Aydele, 2009).

The camera point of view. A new research topic in the field of educational video design concerns the complementary use of the double camera point of view, objective or in the third person, subjective or in the first person. This use would lead to an increase in the activation of the neuron system (Theory of mirror neurons) and positive phenomena on learning processes. This implies greater involvement and an improvement in the processes of memorization and subsequent recall of information (Garland & Sanchez, 2013; Jannin et al., 2017), greater effectiveness in remembering and putting into practice subjective processes thanks to psychological self-reference factors (Bugaiska et al., 2015) and incarnation/personification (embodiment theory) according to which people learn with the body beyond the mind (Robbins & Aydele, 2009). The subjective point of view creates a state of self-reference (what the student sees refers to himself) and identification with what is being observed and therefore a greater propensity for deep learning. This likely simulation of the media-based learning experience makes it easier to put the observed procedure into practice (transfer).

3.3 Procedural didactic video and health professions

In the review of the literature referring to the year 2020 we identified seven articles with clear reference to the use of the educational video to support the health professions. Six of these made general reference to the category and were then categorized according to their potential in the health sector. One, on the other hand, dealt with a subject of extreme novelty and certain interest for the health profession sector, namely the combined use of the dual point of view of the camera, the subjective or first-person point of view and the objective or third person point of view. This data confirms what appeared in the 2010-2019 review. In this paragraph, in the part focusing on the double point

of view of the camera, we propose the analysis of the two studies: that of Boucheix et al. (2018) identified in the more general review and that of Schmidt et al. (2020) identified in this review more specific to the health sector.

3.3.1 Potential of the didactic video in the health sector

Lim and Hu (2020) evaluated the effectiveness of a video-modeling procedure (behavior is represented through a role-playing game or in a real-life scenario), including voiceover and lettering, aimed at Chinese operators who work with children with autism spectrum disorder. After participating in four 10-minute video intervention sessions, all the participants reached the criterion of mastery and generalization of the teaching skills learned, also maintained afterwards as demonstrated by the follow-up phase. The effectiveness of the intervention is also certified by the inclusion in the study of five experienced behavior observers.

Eimer et al. (2020) verified the didactic functionality of two videos, on ultrasounds for basic and advanced abdominal ultrasound and transthoracic echocardiography, whose vision was supported by the support of a specially trained student-tutor. The experiment showed that the learning outcomes did not differ from those of students trained in a conventional way, by the teacher without the support of the didactic video. The study highlights an interesting educational scenario, especially in degree courses with a large number of students, within which self-learning with the aid of a multimedia educational resource can be supported by a peer-education model.

Yeap et al. (2020) evaluated the effectiveness of an educational video on the placement of the catheter for thoracic epidural anesthesia by anesthesia specialists. In the research procedure, the control group was subjected to the conventional training method (education in the ward, individual study through resources such as textbooks and online content). Before performing the epidural anesthesia, the experimental group was also invited to watch the video. Contrary to the hypothesis, the use of video did not improve the performance of the trainees (time required to complete the procedure and evaluation of the correct insertion of the needle) compared to those of their colleagues. This in the researchers' indications could be due to the quality of external training resources (perhaps even videos equivalent to that used by the experimental group) used by the control group trainees and not taken into account in the experimental activity. Therefore, further and more in-depth research activities are recommended in this context.

A particularly interesting topic now appears to be the use of open educational resources. Bajaj et al. (2020) verified the didactic effectiveness of a video on the objective evaluation of the Glasgow Coma Scale (SCG), available in open mode online, on the glasgowcomascale.org website. Watching the video resulted in a significant improvement in the SCG score by general surgery residents, assessed through responses given in a series of specific tests within a prospective study and a blinded control by an experienced neurosurgeon.

Tewfik et al. (2020) worked on the correct use of open educational resources. Specifically, the authors indicate a functional methodology for the attribution of scientific validity and educational quality of the videos on YouTube that deal with the topic of education of the regional nerve block, through a comparison with educational sources of recognized scientific quality on the same topic. In these sources, the educational characteristics relating to the seven nerve blocks (indications, volume, anatomy, etc.) have been classified. The presence of these elements was subsequently verified in the five most popular videos on YouTube for each nerve block. The results showed that YouTube videos do not contain an appreciable percentage of the educational features needed in this area. Therefore, it is not recommended to use them as part of the education of the nerve blocks of regional anesthesia.

In a research paper by Ulmer et al. (2020) the learning curve relating to the simulated execution of an emergency trachetomy (eFONA) in the pediatric setting in a didactic video situation was studied. After watching the video, 50 doctors from five different specialisms performed 10 emergency tracheotomies on rabbit corpses. The analysis of their learning curves showed an overall success rate of 94%, with a decrease in execution time from 107 to 55 seconds in 10 attempts. The video instructions allowed rapid acquisition of the skills of this invasive technique. However, it should be emphasized that in the authors' indications, the study does not intend to encourage the practice of emergency tracheotomy in the clinical setting. This is one of the most terrifying situations that a doctor can experience, so it is advisable to cross future research on the use of video texts in this area with the corresponding research concerning the correct management of the intrinsic cognitive load in the presence of environmental factors related to the task, such as stress, emotions and insecurity.

3.3.2 Healthcare perception and learning: use of the dual camera point of view.

The complementary use of the dual audiovisual gaze, objective and subjective, seems to be very useful in the context of procedural learning. The reference scientific theories have already been mentioned. We add how the ability to learn procedures from observation is attributable to the effectiveness of our mirror neuron system and a related neurophysiological circuit that is activated when someone is observed in the act of carrying out an action (Rizzolatti & Craighero, 2004).

This is even more effective when at certain times during the process two different points of view alternate, objective or external (otherwise known as third person), subjective or internal (first person). This functional learning mechanism not only in imitation from observation but also in memory, understanding and transfer, points towards the use of video, structured according to this communication mode, in high-risk professional training, such as in the medical field.

This communication modality was tested by Boucheix et al. (2018) for learning a process related to the insertion of a urinary catheter into the human body simulated by a manikin, aimed at 43 French students divided into 3 experimental groups. The researchers made 3 different videos of the same duration but from different perspectives, frontal, subjective, mixed (the video made according to this procedure involved the performance of some steps according to a mixed mode and others according to first- or third-person mode), to verify the effectiveness of the different points of view. The overall procedure was broken down into 25 steps divided into 5 modules in order to analyze the functionality of the different points of view based on the specificity of the various manual operations. The effectiveness in terms of overall highest scores in the verification tests was found to be the video made from the dual point of view. The use of the single, frontal and subjective perspective used in the other videos did not show significantly different scores.

The in-depth analysis (comparison between the individual steps into which the video was broken down) of the results of the use of the video made primarily according to the double point of view (some steps were carried out exclusively in the first or third person, others according to the integration of the double point of view) has also shown how some processes require a representation based on several points of view, others on a single point of view, sometimes in the first person, others in the third: in practice it is suggested how the staging of the didactic video, in terms of analytical breakdown and points of view adopted (mixed, first or third person), depends on the type of task/procedure to be learned. The results of the three experimental groups were finally compared with those of a fourth, control group, not subjected to video viewing. This comparison showed better results for the 3 experimental groups (subjected to video with mixed or single perspective) compared to the control group, confirming the effectiveness of the video in procedural learning (Ganier & de Vries, 2016).

The method of construction of the didactic video according to the double point of view procedure was also applied in a paper by Schmidt et al., (2020) related to a self-training didactic activity on laparoscopic suture and knot tying. The experimental project with the presence of blinded evaluators aimed at medical students and carried out at the University of Heidelberg, in Germany, investigated, on the one hand, the influence on learning curves related to the acquisition of procedural skills (the laparoscopic suture and ligation of the knot according to the C-loop technique) through the use of a didactic video made according to a mixed perspective, in first and third person. On the other hand it investigated the feasibility of a self-training didactic curriculum (or mixed training) through the use of e-Learning methodologies, still in the same context (aspect not investigated in our analysis). Two groups of students watched the instructional video on laparoscopic suturing and knot tying three times before each training session. The first group was subjected to viewing a video made from the mixed perspective, consisting of first person images (view of the hands, instruments and forearm movement) and in the third person (the endoscopic image); the second group was subjected to the viewing of a video composed exclusively of an endoscopic view. Written or oral instructions on how to perform the C-loop technique were not provided in the videos or in person. The results highlighted a positive perception on the use of the first-person perspective by the participants of both groups (after the study all the participants watched the video of the opposite group before giving their subjective opinion). However, the correlation between positive subjective perception and learning outcomes showed no significant differences between the two groups: the average training time to reach the competency required by the protocol was similar.

This partly confirms what has already been identified regarding the work of Boucheix et al. (2018) in terms of appropriateness of the type of manual procedure to be learned and the points of view adopted (mixed, first or third person). Not surprisingly, in the authors' indications, research on this topic recommends the use of third-person images for learning basic laparoscopic skills, and first-person images for learning more complex skills (whose learning would be favored by the possession of good psychomotor skills). This means that laparoscopic suturing and knot tying as an advanced task poses high psychomotor challenges to inexperienced subjects. The contradiction between subjective perception and objective performance by the participants in this study could therefore have been influenced by various factors, aesthetic-communicative, didactic content and pre-knowledge requirements.

4. Discussion

The evidence identified in the two reviews highlighted how audiovisual texts, if created and used on the basis of specific communicative-didactic paradigms, can perform rich and stimulating functions from a pedagogical point of view. Research is investigating the role of different formats on attention, involvement,

emotions, cognitive load and learning performance, new principles in the field of cognitive load theory and related measurement techniques. Many studies investigate innovative design principles in terms of representation of the instructor on video. In particular, it was seen as a new direction of research on the significant role of the camera point of view (first person or subjective) in learning complex manual procedures of great interest to the health professions. There are also a number of critical issues relating to the discrepancy of the results. For this reason, it is important to underline that, in order to obtain scientific evidence far from positivist attitudes in this area, there is still a need for controlled interventions, in a laboratory situation, and for a greater number of studies, with greater participation of the subjects involved.

Finally, Table 2 summarizes a series of standard indications useful for the creation of educational videos for training or research purposes integrated by the new principles, highlighted in italics, identified in this work, recalling the need for teamwork, given the complexity of the process, which involves, in addition to the

Narrative structure	Introduction: specify the theme and the goals.
	Structure: as unique as possible conceptual and thematic.
	Talk about procedural knowledge aimed at solving problems.
	Stimulate active participation and encourage processes of critical reflection and theoretical elaboration.
	Conclusions: summarize the operations / procedures / skills that must be put into practice (transfer).
Duration	Short. If long, use the principles of segmentation and modularity.
Access modality	Asynchronous / Synchronous
Contents exposure mode	Closed and declarative, functional to a transmission paradigm.
	Lexical and syntax adaptation (short periods, no subordinates, few relative ones, use of active form), syntactic criteria of coordination (parataxis) rather than subordination (hypotactic).
Content adaptation	Consider the optimal density of content, simplification without conceptual reduction, linear exposure without digressions, "stimulation" capable of creating attention and participation.
Design principles	Teacher in video, to foster a sense of social presence and authoritativeness of the content (in front of the real blackboard, behind the transparent blackboard, behind the desk, in a TV studio, in a research laboratory).
	Provide alternation between the presence and absence of the teacher on video.
	Visual and sound message relationship according to a complementary and non-redundant logic.
	Pay attention to the management of the correct cognitive load and active information processing.
	Pay attention to the principles of multimedia learning
	Consider the pace of presentation of contents based on their reading complexity and the characteristics of the users.
	Consider the teacher's communicative attitude: principles of gestures, gaze, dynamic drawing.
	Consider the camera point of view (subjective, third person, mixed) based on the type of task /procedure to be learned.
Technical principles	Importance of voice over recording and live audio without annoying noises. Importance of editing operations (possible soundtrack, insertion, slow motion effects, repetition procedures, time lapse, enlargements, etc.).

Table 2 - Summary framework and guidelines of the didactic video useful for researchers, teachers, instructional designers.

teacher, experts in instructional design and multimedia technologies if sustainable projects from an educational point of view are the intended direction.

6. Conclusion

The analysis carried out shows that we no longer need to ask ourselves whether video technologies improve learning, rather, under which conditions this takes place.
Faced with the forced normalization process of these technologies, in the era of the health emergency, it is necessary to think about an educational model and the corresponding design capable of optimizing the learning potential and minimizing critical elements. We have seen how audiovisual texts, in their versatility, can perform very diversified, rich and stimulating functions from a pedagogical point of view. In particular, the use of the first-person perspective in educational videos functional to learning procedural skills and knowledge has become of great interest in the healthcare professions (Thomson et al., 2017; Fukuta & Morgan, 2018). The improvement and application of this methodology within the laboratory-based teaching of medical degree courses and health professions can respond to needs of a qualitative nature (improving the learning processes of complex manual procedures) and logistics (the number of students in the medical/health area has significantly increased in many Italian universities, making it difficult to attend practical and laboratory activities). But this is also applicable to all post-pandemic teaching: scientifically validated digital educational resources can make an important contribution to the challenges that university education will necessarily have to face in the coming years.

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