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The Importance of Video Design in Educational Research in Latin America: a bibliometric study

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ABSTRACT

The pandemic increased the interest in studying medicine and the use of videos in education. This reality made evident the problem with health-related videos in daily usage. Therefore, the rationale of this work is to show with bibliometric data that video design is a trend in scientific research, which evidences the necessity of the adoption of standards and good practices to report health sciences research. The data was extracted from the SciELO database providing a non-exhaustive panorama from Latin America. It was possible to verify in scientific literature in Latin America that video design is increasing, that the number one field using video design is education, and that the second is health sciences corroborating the necessity of addressing the issue in medical education. This study intends to convince researchers of the importance of detailing their video design practices, including, when applicable, informing the theoretical foundation that supports their approach, and providing the links to their videos and the supplementary material used to design and produce their videos. Furthermore, the increase in awareness of the issue might induce journals to adopt minimum requirement standards for accepting studies that employ or develop videos.

Keywords: *Bibliometrics; Educational research; Educational video; Instructional video; Video design.*

INTRODUCTION

The COVID-19 pandemic imposed a wide use of videos on education. Popular educational videos caused society to ignore the alarming fact that a massive quantity of ineffective videos had played a central role in education during the pandemic. The grim reality is that the educational process relied too much upon the use of videos that lacked careful design, production, or execution. This was exposed by the results of the United States of America National Assessment of Educational Progress long-term trend reading and math exams called the *Nation's Report Card*:

In 2022, the National Center for Education Statistics conducted a special administration of the NAEP long-term trend reading and mathematics assessments for age 9 students to examine student achievement during the COVID-19 pandemic. Average scores for age 9 students in 2022 declined 5 points in reading and 7 points in mathematics compared to 2020. This was the largest average score decline in reading since 1990, and the first ever score decline in mathematics (NAEP, 2022).

The exams were administered to age 9 students in early 2020 before the pandemic and then again in early 2022 (Levenson, 2022). However, what evidences the startling claim at the beginning of this work was that among students kept home during the 2020-2021 school year, high performers had more frequent access to a computer, a quiet workspace and extra assistance from their teachers. The NAEP noted that higher-performing eighth-graders reported more participation in real-time video lessons with their teachers than their lower-performing peers (Ayyub, 2022).

It would be naive to assume that the same does not happen in higher education. Another aspect of the problem of teaching and learning in this scenario is social engagement in remote learning (Nkoala et al., 2023). Nkoala et al. (2023) verified in a higher education institution – Cape Peninsula University of Technology, in South Africa, that in the ranking of digital tools used for engagement with studies, Whatsapp ranked first with 97.7%, then video conferencing came second with 96.5%, followed by Blackboard course content in third with 95.5%, and in fourth, they had YouTube 77.3%. What is worth noticing is the commonality of digital video availability in these four digital tools. Teachers, instructors, or professors use these tools to show videos to students, and by their initiative, students use these tools to watch videos, except in video conferencing. Therefore, the importance of digital video is well-established directly impacting engaging with students.

Boukhechba & Bouhania (2019) noted that the real reason for selecting Instructional Design as a theoretical framework to integrate technology in a traditional classroom is to design a lesson without the teacher to deliver it. They argued that 'videos can have more appeal than teachers standing explaining the content of a video'. The idea here is to design the lesson using digital video and not video design for educational purposes. The distinction is subtle, almost imperceptible, but the first is to design a lesson as a digital video, while the second means to efficiently design a video for instructing or educating its audience. It could be argued that the result of designing a lesson in digital video format is just one type of educational video, and video design for educational purposes encompasses all types of educational videos. A framework for designing and evaluating instructional videos would be the Cognitive Theory of Multimedia Learning (CTML) (Mayer & Moreno, 2003).

A systematic review verified which of the CTML principles are empirically supported for educational and instructional videos in the scientific literature (Fyfield et al., 2022), and the findings may be understood as design guides. The authors exposed some shortcomings in the literature derived from the diversity of media, methodologies, subject matters, definitions of terms, and learner ages. They verified that a significant number of papers inadequately described the video or the procedure used in the study. Additionally, the experimental conditions were commonly unrealistic learning conditions, the measures among studies were inconsistent, and standardization was required. Nevertheless, these difficulties are not enough reasons for expert researchers not to provide details on the design and development of their videos when reporting their studies.

The problem transcends the realm of higher education. Medical education research is not an exemption, and for research purposes, the design and evaluation of educational or instructional videos would profit from a theoretical framework. For instance, a recent study in medical education is an example of good research without enough information on the video design corroborating the previous statement that medical education research is not an exemption. Barrios, Morales & Dominguez performed a randomized controlled trial on *Cognitive load and information retrieval with two formats of video in an inverted classroom* (Barrios et al., 2023). They used two videos in their study, which they called conventional format (FC) and non-conventional format (FNC). The former *consists of the masterful explanation through the use of slides (PowerPoint, Microsoft Corp)*, and the latter consists of *formats, such as the transparent whiteboard (Lightboard) that offers effects of visually striking lights (Barrios* et al., 2023). Further, for multimedia material, the design, recording and editing of multimedia material in FC and FNC was performed by the 3 authors of the study **in agreement with standardized recommendations**. The information was the same in both formats and presented by an expert through 4 videos on the following topics: 1) thorax unstable, 2) esophageal perforation, 3) mediastinal masses and 4) tracheal stenosis. The duration of each video was 7 minutes on average. The videos were hosted on a virtual platform (Moodle).

Regarding videos in conventional format, the design was in Arial font, size #24, neutral colors, maximum 6 lines of text. The design principle was dual channel, making use of narration and

information written on the slide. The exhibitor was recorded with a medium short image, in a video frame arranged in the lower right corner of the slide.

For the videos in unconventional format, they were made on a transparent board 180 cm wide. by 120 cm high, with LED backlighting. This board was written with fluorescent markers, the interaction of the ink with light produces an intense shine, which results in an increase in sensory load. The video was recorded in MPEG-4 format with resolution 1080i. The camera was located 6 meters from the board. The background was black, as well as the clothing of the exhibitor (Barrios et al., 2023).

However, they did not detail the standardized recommendations. The criticism does not diminish the value of their study or any other study that matters. Because of the pandemic, society as a whole, has significantly increased its demand for educational and instructional videos, and the scientific community was not mature enough in their use and design for educational research. In the medical field, this is a sensitive matter, and Barcala-Furelos *et al.* provide an example of the problem regarding drowning and aquatic incidents, which are mostly disseminated by videos on social networks (Barcala-Furelos et al., 2023). Hence, the importance of disseminating this knowledge to medical educators, practitioners, and researchers, is to counteract inadequate, incomplete, inefficient, or even erroneous medical content in videos that might educate or instruct professionals and even common people both in emergency and normal incidents regarding human health.

In this work, we use the SciELO platform (2009) to support the claim on the increase of the use of educational videos in research. TheSciELO, Scientific Electronic Library Online, is a model for cooperative electronic publishing of scientific journals on the Internet. Especially conceived to meet the scientific communication needs of developing countries - particularly Latin America and the Caribbean countries - SciELO provides an efficient way to assure universal visibility and accessibility to scientific literature and contributes to overcoming the phenomena known as "lost science". In addition, the SciELO model comprises integrated procedures to measure the usage and impact of scientific journals. SciELO was initially supported by the São Paulo Research Foundation (FAPESP) and the Brazilian National Council for Scientific and Technological Development (CNPq), along with the Latin American and Caribbean Center on Health Sciences Information (BIREME). SciELO provides a portal that integrates and provides access to all of the SciELO network sites. Users can search across all SciELO collections or limit the search by a single country collection, or browse by subject area, publisher, or journal title (www.dlib.org, 2000).

SciELO is a well-established source of information for market professionals, educators, professors, and researchers, because the entire content is open-access. We understand that a bibliometric study on this basis is representative enough to clarify the current situation of video design in research in Latin America.

METHODOLOGY

The protocol established to conduct this bibliometric study was first to determine the specific area of interest, which is *the design of instructional video*. A brief search and scanning reading revealed that the search query should be expanded. Then, all identified papers were registered, the inclusion criterion was to be listed in at least one query, and the exclusion criterion was to eliminate duplications. After inclusion and exclusion, the queries returned 84 papers and all the statistical description was generated using SciELO's functionalities.

The queries as follows were up to the year 2021 because of the pandemic:

(i) ["educational video script"], which is one expression, and it returned a null result (0 paper);

(ii) (ii) because of the disappointment of the first search, a second search was conducted with the union of the 3 words as independent expressions [educational + video + script], which returned 23 results;

(iii) (iii) still disappointed with the second search, aiming to increase this number, and assuming that a large amount of information was missing, the word *educational* was eliminated from the search, and [video + script] returned just 38 papers;

(iv) (iv), not trusting the search engine, we attempted to restart the search using the word *instructional*, then we started with ["*instructional video script*"] but it also returned 0 results;

(v) (v) then we used ["instructional video"] hoping to increase the number of papers included in this review and including all relevant information, the elimination of the word script resulted in 6 papers;

(vi) (vi) [instructional + video], the expression "instructional video" was substituted by a 2 independent expressions search, as done before, and it returned 67 papers; finally

(vii) (vii) roteiro + video, to complete the search the word script in English was substituted by its translation in Portuguese "roteiro" (the word video is the same in English and Portuguese), into the search resulting in 31 papers.

(viii) It is important to remember that most papers on SciELO have the title, the abstract, and the keywords in English, Portuguese, and Spanish. For confirmation purposes, each search was conducted again resulting in 84 papers after eliminating the redundancies.

RESULTS

It was verified that each identified study is related to educational or instructional purposes. The number of publications by year is presented in Figure 1. As shown in Figure 1 there exists a steady increase in publications by year regarding educational videos, apart from 2016. The exceptionality of the year 2016 is not explained, and it seems to be an outlier year.

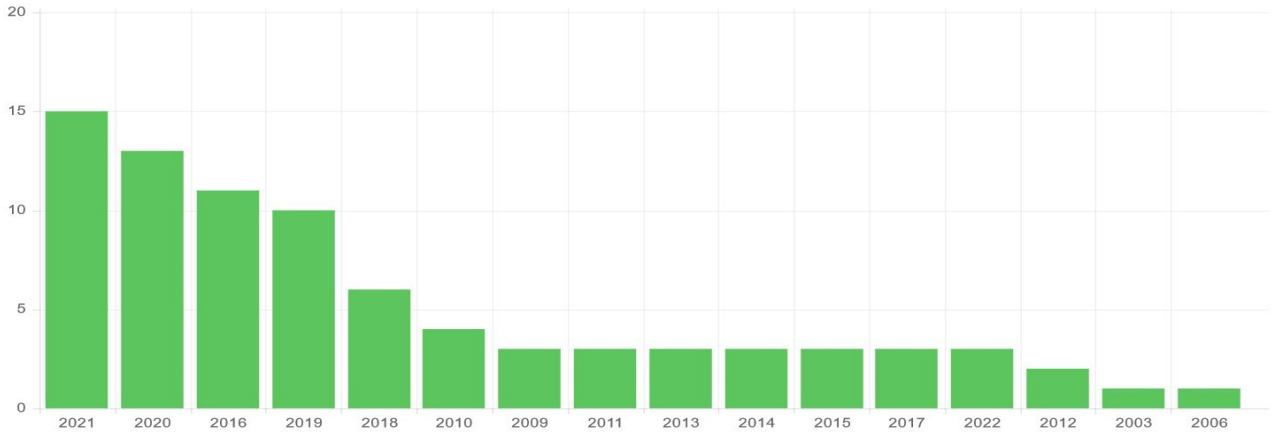

Figure 1: Results of Review divided by year and ordered accordingly to quantity. (Source: From the authors, generated by the SciELO platform)

The results of the review regarding the type of study are presented in Figure 2, and it is noted that there is a concentration of studies in the Article type classification. This might indicate that in Latin America, research with educational videos is still embryonic, but in some sense, from the work of Fyfield, Henderson, & Phillips (2022), it could be argued the same for the entire world.

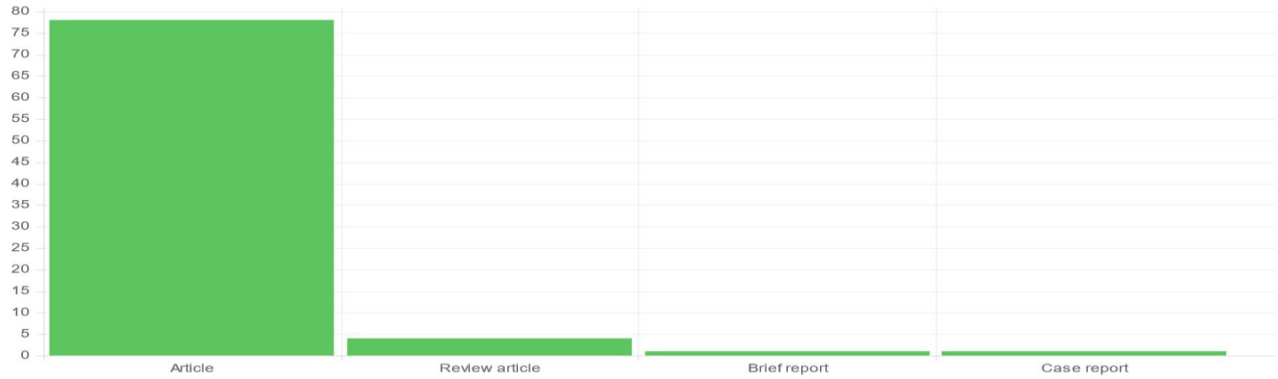

Figure 2: Results of the review divided by type of publications. (Source: From the authors, generated by the SciELO platform).

When the studies are divided by country, it is clear that Brazil has the greatest quantity by far lead, and that is shown in Figure 3. This is not a surprise considering the prevalence of Brazilian journals in the SciELO platform, the weight of Brazil in Latin America, not only the largest in size, but three times the size of the second – Argentina (Worldpopulationreview.com, 2021), but also it is the most populous country, with over 215 million people, while the second is Mexico with over 127 million inhabitants (Romero, 2022).

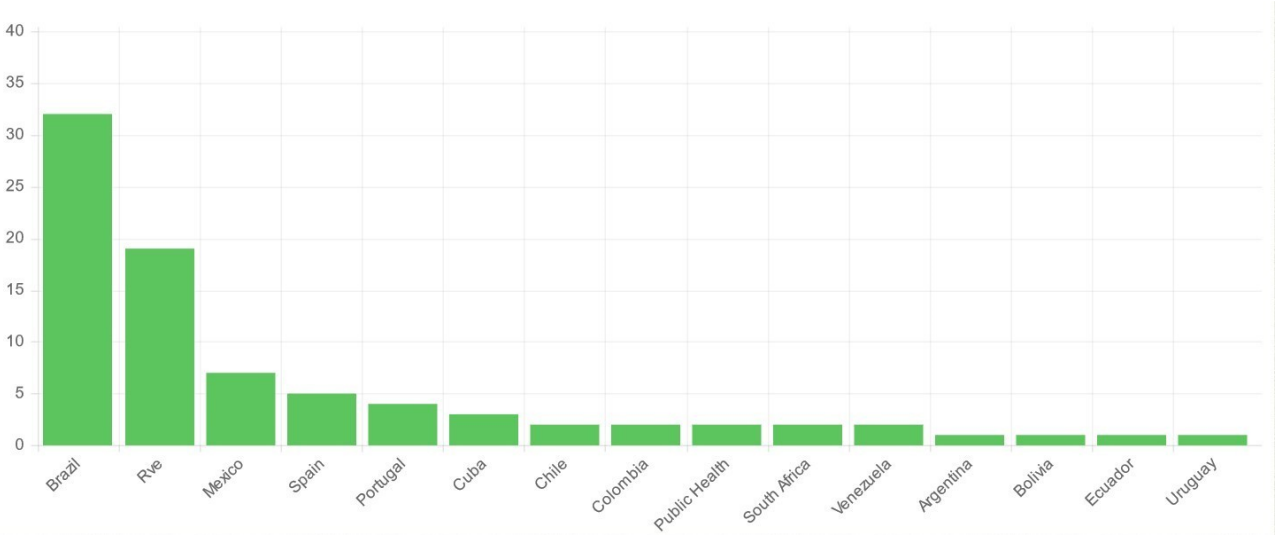

Figure 3: Results of the Review divided by country. Source: From the authors, generated by the SciELO platform.

The classification of the papers by their research field is presented in Figure 4 showing that the three highest scores are in the fields related to education and research. Then, it is noticeable from Figure 4 that second to the field of education is the combination of the fields related to health science.

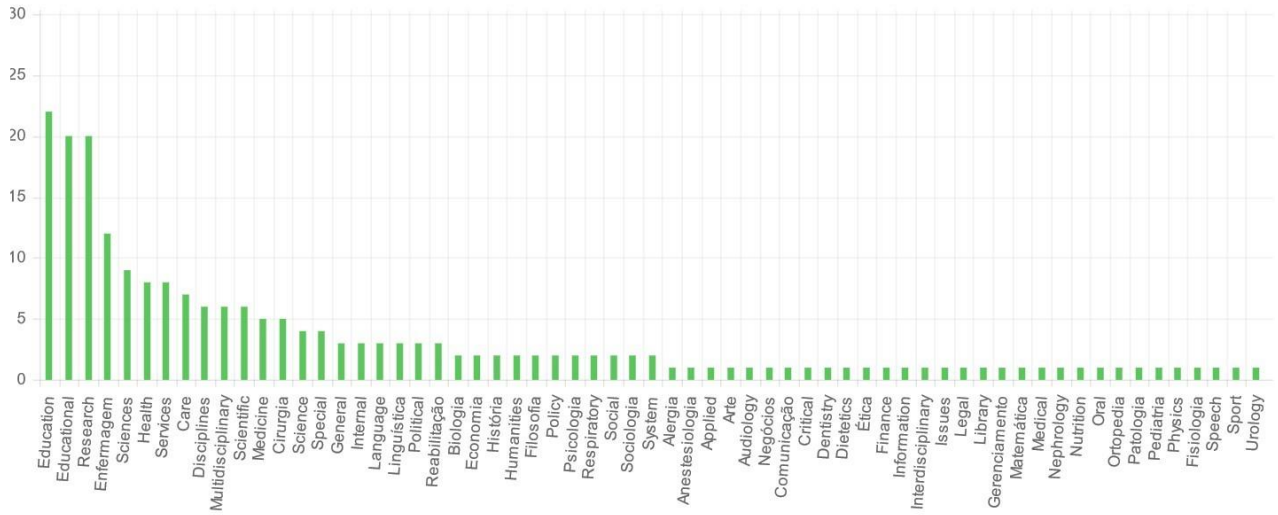

Figure 4: Results of the Review divided by type of publications. (Source: From the authors, generated by the SciELO platform).

DISCUSSION

It is advisable, from our perspective that all researchers, especially in health science, due to the sensitivity of the field regarding human life, should emphasize when reporting their studies, the presentation of the theoretical foundations employed for video design. This assertion is a qualitative evaluation at most, but as a general impression from evaluating the 84 studies identified in this study, Latin American scientific authors would increase their paper's quality by better reporting their video design procedures, and hence, improve their citation probability.

The work of Muñoz & Letouze (2022) supports this claim, too. They made some considerations on educational videos for the elderly based on the systematic review of Fyfield, Henderson, and Phillips (2022) and the CTML scenarios presented by Mayer and Moreno (2003). They performed a brief literature review from 2019 to 2022 of Brazilian journals regarding the inclusion and exclusion criteria from Fyfield, Henderson, and Phillips (2022). They obtained 13 papers, of which only 3 are found in SciELO.

Nevertheless, there exist studies complying with the criteria presented in Fyfield, Henderson, and Phillips (2022). Adam et al. provide such an example – a *Human-Centered Design of Video-Based Health Education* (Adam et al., 2019), which is not found in their systematic review. They made available to the readers the links to their material, including their videos, and this could be a requirement by journals for publication, also making available this material on their websites as supplementary material.

CONCLUSION

The pandemic stimulated the use of videos in education, and more broadly, in everyday life. The rationale of this work was to show that video design is a trend in scientific research, at least in Latin America, and to do this, we used scientific literature bibliometric from SciELO, which provides a non-exhaustive panorama from Latin America. There is no reason to assume that it is not a

worldwide trend, despite the evident limitation of this study for not even encompassing the entirety of publications in Latin America.

The bibliometric data showed that the number one field using video design is education, and the second is health sciences, which shows the necessity of addressing the issue in medical education too. In addition to that, the problem with health-related videos has increased in its daily usage (Barcala-Furelos et al., 2023), and the pandemic increased the interest in studying medicine, at least in Spain and China (Fernández-Rodríguez *et al.*, 2024), but probably in many other countries too. Consequently, this work evidences the necessity of the adoption of standards and good practices to report video-based educational research.

Therefore, we intend to convince education practitioners and researchers of the importance of detailing their video design practices, including, when applicable, informing in their reports the theoretical foundation that supports their approach, providing the links to their videos and the supplementary material used to design and produce their video. Furthermore, the increase in awareness of the issue might induce medical journals to adopt minimum requirement standards for accepting studies that employ or develop videos as a significant part of their work.

RECOMMENDATIONS FOR FUTURE RESEARCH

The pandemic stimulated the use of videos in education, consequently, this work evidences the necessity of the adoption of standards and good practices to report video-based educational research. This recommendation requires further investigation to establish the bare minimum set of guidance. In addition to that, the field of health education research would profit by following this lead, it should incorporate some specific guidance because of the sensibility of the subject in their field, which requires further investigation, too. It must be highlighted that different audiences might necessitate different guidance, as shown by Muñoz & Letouze (2022), nevertheless, it should be emphasized that the systematic review of Fyfield, Henderson & Phillips (2022) and the CTML scenarios presented by Mayer & Moreno (2003) are good starting points. However, it should be noted that different theoretical frameworks might generate different sets of rules, which requires further research. Hence, educational research must take note that using educational video in research is not the same as researching educational video, and it begins with researching video design for educational purposes.

ETHICAL RESPONSIBILITIES

The study used open-access secondary data in SciELO.

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