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Article in *British Journal of Educational Technology* · November 2013

DOI: 10.1111/bjet.12070

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Colloquium

Exploring the video-based learning research: A review of the literature

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Introduction and objectives

With the widespread adoption of video-based learning systems, such as Khan Academy and edX, new research in the area has emerged. Even new for-profit companies, such as Coursera and Udacity, have started offering forms of instruction that are primarily video based. To date, universities across the globe offer video lectures on topics from algebra to zoology.

Although the use of learning videos has been widely employed in the past years, recently the interest has been incrementally increased. Millions of learners watch videos from different platforms (eg, YouTube) on a diverse number of terminals (desktop, phone, tablet). Students access academic content via digital libraries, discussions with tutors by email and online courses from their homes. Additionally, massive online open courses (MOOCs) are becoming an increasingly important part of education (Martin, 2012).

In recent years, various video-based learning tools have been developed (Brooks *et al.*, 2011) and empirical studies have been conducted (eg, Giannakos & Vlamos, 2013; Harris & Park, 2008). To explore the future of research on video-based learning, we review past research in order to guide future studies and sketch the research status and directions. One hundred sixty-six peer-reviewed papers were selected from an extensive search of the literature. Key topics included the growth of video-based learning studies, type of research, sample size, technology, disciplines and methodologies. We analyzed research that has been conducted in the last 12 years on video-based learning, specifically concentrating on the following three questions:

- What is the growth of video-based learning research in the last 12 years?
- What are the characteristics/specificities of video-based learning research in the last 12 years?
- Can we observe any shift in video-based learning research characteristics of the last years?

Methodology

In order to examine research concerning video-based learning, two experienced researchers searched the following educational technology journals: *Australasian Journal of Educational Technology*; *British Journal of Educational Technology*; *Computers and Education*; *Educational Technology Research and Development*; *Educational Technology and Society*; *Innovations in Education and Teaching International*; *The Internet and Higher Education*; and *Learning and Media and Technology*. After the search process, the two researchers present their results and proposed a protocol for categorizing these papers. They discussed the protocol for selecting and categorizing the 166 papers (published from 2000 to 2012) (Figure 1).

*This work was carried out during the tenure of an ERCIM “Alain Bensoussan” Fellowship programme. The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement no 246016.

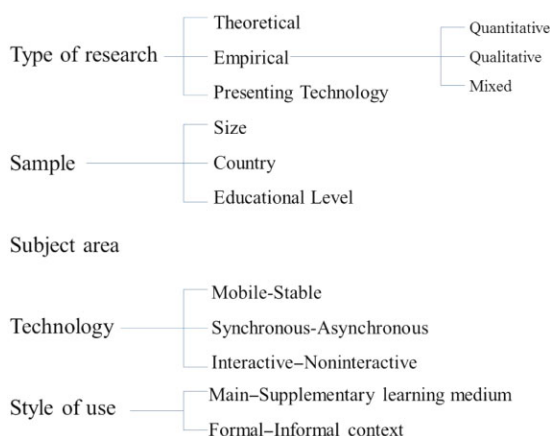


Figure 1: The categorization protocol

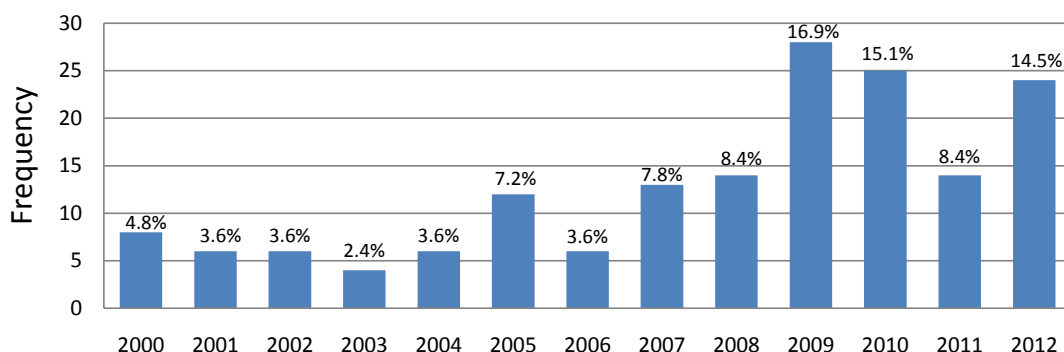


Figure 2: The number of research papers published on video-based learning every year

Based on the categories and subcategories defined (Figure 1), the two researchers coded all the papers, then discussed and solved all the differentiations. After the coding of the papers, a descriptive analysis of the results was performed in order to explore the growth and the trend of video-based learning research. In order to be able to observe any potential shift in the characteristics of video-based learning research of the last years, we divided our papers using two periods of time: the first period was from 2000 to 2006, and the second period was from 2007 to 2012. Afterwards, we individually compared all of the characteristics between the two periods.

Results

Video-based learning research growth

One can claim that the research on video-based learning has seen growth in the last years. Based on our analysis, we can verify this assumption, as we can see from Figure 2 that the number of papers published every year regarding video-based learning research has increased, especially after 2007. As we aforementioned, we divided the period of time under investigation into two sub-periods (2000–2006 and 2007–2012). Although the duration of the first period was 1 year more, the papers published in the second period were over double in quantity of that of the first (48 in the first period and 118 in the second), indicating that research in the field of video-based learning is becoming more and more important in recent years.

Table 1: Type of the research papers

Periods	Theoretical* (%)	Empirical* (%)	Presenting technology* (%)	Quantitative (%)	Qualitative (%)	Mixed (%)
2000–2012	27 (16.27)	131 (78.92)	19 (11.45)	69 (41.57)	27 (16.27)	35 (21.08)
1st period	12 (25.00)	32 (66.67)	10 (20.83)	13 (27.08)	11 (22.91)	8 (16.67)
2nd period	15 (12.71)	99 (83.90)	9 (7.63)	56 (47.46)	16 (13.56)	27 (22.88)

*Few papers belong to more than one category.

Table 2: Characteristics of the sample of the research papers

Period	Sample median	Five countries with more studies						Primary education (%)	Secondary education (%)	Higher education (%)	Work (%)
2000–2012	60	USA = 35	UK = 39	AU = 17	CA = 10	TA = 8	13 (7.83)	10 (6.02)	88 (53.01)	26 (15.66)	
1st period	51	UK = 14	USA = 8	AU = 5	CA = 3	NZ = 2	9 (18.75)	3 (6.25)	20 (41.67)	6 (12.5)	
2nd period	61	USA = 27	UK = 15	AU = 12	CA = 7	TA = 7	4 (3.39)	7 (5.93)	68 (57.63)	20 (16.95)	

AU, Australia; CA, Canada; NZ, New Zealand; TA, Taiwan; UK, United Kingdom; USA, United States of America.

Type of research

One of the most important aspects in educational technology research is the type. By “type” we refer to the distinction among theoretical, empirical and presenting technology papers. Furthermore, empirical papers can be divided into quantitative, qualitative, and mixed method papers. Based on this categorization, we can see from Table 1 that the majority of the papers are empirical and quantitative. We can also clearly see that this difference becomes more intense in later years. The presence of theoretical and especially presenting technology papers is reduced in the second period, though their actual number remains at the same level. On the other hand, mixed method papers increased during the second period.

Sample

The categories of the sample include the sample size, the country of the population, and their status in terms of level of education (ie, primary, secondary) or professional use (work). As we can see from Table 2, the size of the sample remains at the same level in recent years, yet there is a shift among countries with the most research on video-based learning. In the first period, we can see that the UK conducted almost twice as many studies compared with the USA; however, the opposite is the case for the second period. Australia and Canada have also seen high activity in video-based learning research. The majority of the studies involve higher education students, and we can see that this phenomenon intensifies during the second period. Strangely, the second period sees very few studies in secondary education and a reduction of studies on primary education.

Regarding the sample size of the studies, we observe that the median ranges remain at the same level in both periods. Figure 3 illustrates that the sample size did not differ throughout the last years.

Subject area

With respect to subject area, it is clear that the language domain is dominant in video-based learning research. Notable domains in video-based learning research include information and communication technology (ICT), economics, medicine and mathematics. Specifically, interest in

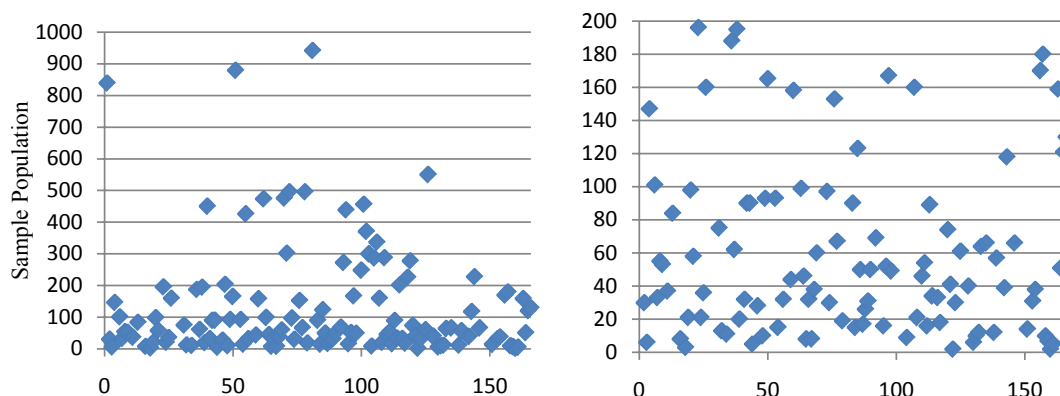


Figure 3: Spread of the sample size on the 166 research papers (chronologically classified); the right graph is a zoomed version

Table 3: Disciplines which are used more frequent in the research papers

Period	Five more frequent disciplines						Other	Nonspecified
2000–2012	Language = 12	ICT = 9	Economics = 7	Medicine = 6	Mathematics = 6		66	60
1st period	Language = 3	Music = 2	Psychology = 2	Medicine = 2	Physics = 2		20	17
2nd period	Language = 9	ICT = 8	Economics = 6	Medicine = 4	Mathematics = 5		43	43

ICT, information and communication technology.

Table 4: Technology of the videos

Period	Mobile (%)	Stable (%)	Synchronous (%)	Asynchronous (%)	Interactive (%)	Noninteractive (%)
2000–2012	24 (14.46)	108 (65.06)	24 (14.46)	114 (68.67)	32 (19.28)	102 (61.45)
1st period	1 (2.08)	33 (68.75)	9 (18.75)	24 (50.00)	13 (27.08)	23 (47.92)
2nd period	23 (19.49)	75 (63.56)	15 (12.71)	90 (76.27)	19 (16.10)	79 (66.95)

the domains of ICT and economics increased in the second period under investigation. Table 3 indicates that there is a general shift from the “Social Sciences” to more applied and technological domains.

Technology

Concerning the technology used, we based our categorization on three pillars: the device used (mobile or stable), the learner–instructor synchronization and the interactivity (or lack thereof) of the system. As we can see from Table 4, stable devices are mostly used more than mobile devices in video-based learning research; however, research with mobile devices saw incremental growth over the second period. This is probably due to the high production of new mobile devices (eg, tablets, smart phones) in the last years. On the other hand, considering the evolution of technology between the two periods, the shift in video-based learning research to more asynchronous and noninteractive systems is surprising.

Style

Another important aspect is the style of video-based learning, which is why we further categorized the studies by taking into account if the video was the main learning medium and if the

Table 5: Style of learning

Period	Main learning medium (%)	Supplementary learning medium (%)	Formal context (%)	Informal context (%)
2000–2012	60 (36.14)	64 (38.55)	91 (54.82)	37 (22.23)
1st period	14 (29.17)	13 (27.08)	23 (47.92)	11 (22.92)
2nd period	46 (38.98)	51 (43.22)	68 (57.63)	26 (22.03)

context was formal or informal. As we can see from Table 5, there is an equal distribution among the number of studies which are using videos as a main and supplementary learning medium. This equality applies to both first and second periods. Regarding the context, most of the studies have been conducted in a formal learning context, probably due to the convenience. In the second period, we can see a growth of this discrepancy.

Conclusions

This paper reviews the status and trend of video-based learning research of the last twelve years based on the papers published in eight major educational technology journals. In summary, this paper shows that:

- the number of papers has significantly increased during the last years;
- the focus of the recent studies is on empirical quantitative and mixed studies;
- there is a lack on studies on secondary education;
- there is a swift move from social science domains to more applied and technological domains;
- research with mobile devices has significantly increased during the last years; and
- the video-based learning research was swift to more asynchronous and noninteractive systems.

These findings could be good references for those who plan to contribute to future video-based learning studies and the emerging area of MOOCs. In addition, the results of our analysis could be helpful to policy decision makers in order to support their educational development.

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