

Characterizing papers about ‘blended learning’: an unconsolidated field?

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Abstract

Publications and use of hybrid systems in education have increased during the last ten years. This growing field of practice might be analyzed to increase our knowledge and improve present and future experiences. We present a study of 245 academic journal's papers with ‘blended learning’ in the title. The main results, supporting the descriptive statistical analysis, are related to the cluster analyses. It was pointed out three distinguish groups of publications around their most important properties picturing general tendencies: the *diversity of papers*; the *focus on communicational media*; and the *focus on educational practice*. In conclusion, *blended learning* papers showed a practical educational activity more than a separated object of research revealing it as a growing construction field.

Keywords: computer-mediated communication, distributed learning environments, blended learning, teaching and learning strategies

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Caracterización de artículos científicos sobre aulas extendidas blendedlearning: ¿un campo en consolidación?

Resumen

El uso de sistemas híbridos en educación y las publicaciones que dan cuenta de estas experiencias han aumentado en la última década. Con el objetivo de conocer sobre este fenómeno para mejorar las experiencias presentes y futuras, se analizaron 245 artículos académicos con "blendedlearning" en el título. Los principales resultados, apoyando el análisis estadístico descriptivo, refieren al análisis de clusters. Se muestran tres grupos de publicaciones cuyas propiedades más importantes marcan tendencias generales: diversidad depapers; foco en la tecnología de comunicación; y foco en la práctica educativa. En general, se encontró una actividad educativa orientada a la práctica más que un objeto separado de investigación mostrando a este campo en una etapa de construcción creciente.

Palabras Clave: comunicación mediada por ordenador, entornos virtuales, aulas extendidas, estrategias de enseñanza y aprendizaje

Introduction

During the last decade, the publications about blended learning as well as the use of hybrid systems in education have increased, especially at the university level. Sharma (2010), presenting the changes on the definitions, said that the term was first used in the corporate world to refer to a course designed to allow workers to both continue in the work-place and study changing to the actual meaning, the combination of face-to-face and online interaction.

Even though the definition could have changed, nowadays, the idea that "*blended learning* describes learning activities that involve a systematic combination of co-presence (face-to-face) interactions and technologically-mediated interactions between students, teachers and learning resources" (Bliuc, Goodyear, and Ellis, 2007, p.234) seems to be extended. Garrison and Kanuka (2004) claimed that the academic benefit and competitive advantages of *blended learning* were evident from the beginning. They suggested assessing effectiveness in the learning process as a priority.

Rovai and Jordan (2004, p.11) reached the conclusion that the concept of *blended learning* itself, could be considered a synthesis of three main areas of change in education: "thinking less about delivering instruction and more about producing learning, reaching out to students through distance education technologies, and promoting a strong sense of community among learners". Garrison and Kanuka (2004) anticipated ten years ago that higher education institutions would change in a significant way when adopting *blended learning* approaches, centering on learning processes and, therefore, facilitating higher education students' experience.

Halverson, Graham, Spring, and Drysdale (2012) analyzed the high impact of scholarship and publication trends in *blended learning* (articles, book chapters, and books) about *blended or hybrid learning* from 2000 to 2011 using Harzing's Publish or Perish software. They found Garrison and Kanuka (2004)'s article as the most cited one, with almost twice citations per year than any other article. *Blended learning* has such a powerful impact that when implemented, it has a transforming effect.

Halverson et al. (2012) described that the most cited articles about

blended or hybrid learning (with an average of 30 or more citations per year) emphasized pedagogical desire to maximize the benefits of face-to-face and online systems.

The authors listed the articles with an average number of citations per year. They argued that the top 10 list of the most cited papers focused on the definitions of, or the vision for, *blended learning*. The most cited, (in the top cited lists), journals were *British Journal of Educational Technology*, *The Internet and Higher Education*, *Computers & Education*, *Educational Media International*, and *Journal of Educational Media*. Because only two articles from 2009 made the top 50 list, they listed the top articles between 2009 and 2011. The most recent list had titles indicating less definitional and more research-based focus. According to that list, two journals, *Computers & Education* and *British Journal of Educational Technology*, had apparently becoming the forefront of *blended learning* publications. Additionally, they pointed out the diversity of interest in their 60 titles analyzing this issue.

Drysdale, Graham, Spring, and Halverson (2013) analyzed 205 dissertations and masters' theses about *blended learning*; they described the growth and context, methodological and topics trends. Graduate research on *blended learning* has been growing since 2001, especially in 2010, reaching 21% of the sample. Regarding research context and learners' type, 77% of the sample was made of higher education students, while 13% was related to the context of corporation and only 8% was focused on K-12. The majority of their manuscripts, 83%, focused on course-level blends, 10% on program level, 3% on activity, 0.5 on institutional level, and 4% were unidentified.

In the review made by Bliucet *al.* (2007) three approaches were identified in terms of methodology. In the first one, *case-studies* were preponderant. They suggested that although the case-studies could provide a deep description of a context, it could be difficult to find abstraction and generalization. The second approach was the *survey-type studies*. The authors argued that this type of research shows the associations among significant variables, but it could be difficult to understand what lies beneath those associations. The third one was the *comparative studies* between blended learning, e-learning, and face-to-face interaction

(with different combinations of them). According to the authors this last approach could provide a useful framework about the components of the systems, but it tended to hinder the whole vision of the interactions between those components.

Also, Bluicet *al.* (2007) described that it was unusual to find substantial qualitative and quantitative research in journal articles. As they mentioned, it could be because journals usually ask for short papers and for philosophical or methodological reasons. So, this type of holistic perspective was relatively scarce compared to other types of studies described, specially compared to case-studies approach. The researchers realized that an important amount of research about *blended learning* had originally been based on face-to-face interactions, adding technologically-supported activity later and taking the form of case-studies. According to them, this could be explained because at the time the paper was written, it was a new field of research and probably the authors of the articles were innovative teachers describing their own practice.

Taken together, the studies described suggest that *blended learning* is a growing field. However, previous revisions identified some characteristics of the papers published; in this article we are interested in generating clusters with those papers' characteristics. The first step for our analysis was to identify general attributes based on the following questions: *Which recurrences and divergences related to language, authors, geographic places, institutions, journals, time of publication, and focus and type of data analysis can we find?* Once we described the general tendencies of the papers, we explored *How could the papers be grouped according to the main characteristics been analyzed?* To answer those questions, we used descriptive statistical measures and multidimensional analysis.

Materials and Methods

Sample

We analyzed 245 abstracts collected from all databases in EBSCO available for research institutions.¹ The search was made on March 21st, 2013. We introduced 'blended learning' on the title field and we obtained 256

results non-repeated. The evaluation criterias introduced were 'Scholarly (Peer Reviewed) Journals' and 'Source Types: Academic Journals'. We eliminated eleven results because they were proceedings, book reviews, an erratum, and those articles which were written from a different concept of *blended learning* than the one this article subscribes.

Design

The sample was analyzed with two kinds of techniques, descriptive statistic and multidimensional analysis. Table 1 describes the variables considered in both analysis.

Table 1. Description of variables

Variables	Description
Language	Language in which the article was written
First author repeated	First author repeated as first author again.
Number of authors	Number of authors responsible for the paper
Country	First author affiliations' country
Continent	First author affiliations' continent
Hemisphere	First author affiliations' hemisphere
Institutions	Number of institutions mentioned as author affiliation in the same paper
Journals	Journals where the papers were published.
Year	Years of publication.
Type of data analysis	Quantitative, qualitative analysis, or both combined.
Object analyzed	Program/course, students or both of them
Review	It was described as a review by the authors
Consequences	There were description of consequences or effects of blended learning in title, abstract or subjects
Satisfaction	There was a description of participants' satisfaction about the process
Subjects	The most used terms for the retrieval information was analyzed.

Methods

According to the variables on Table 1, we used descriptive statistic to count frequencies of language, first author repeated, number of authors, country, continent, hemisphere, institutions, journals, years of publication, type of data analysis and object being analyzed. It was also considered whether authors describe the article as a review or not, whether the consequences or satisfaction were mentioned or not, and whether the subjects as well as the retrieval information given by the EBSCO database was presented. During all the categorization process, double-opinion was involved and all decisions were agreed upon. Disagreements were solved by discussion. When an agreement was not possible, a third opinion was requested. Also, we analyzed the continent and geographic hemisphere of each first author affiliations' country to see the distribution in general and, specially, in America and Asia with part of their territories on two different hemispheres. Besides, we constructed a table crossing the journals in which the papers were published and the years of publication in order to see the changes and concentration of the papers. We grouped the journals according to the number of articles published in each one, using the names in the cases with 11 publications or more. Number 11 was chosen because it was repeated and the next one had only eight papers. Additionally, we crossed the variable 'Type of data analysis' (quantitative, qualitative analysis, or mixed approach) with 'Object analyzed' (focusing on the program, on the students or on both of them), 'Review' (if the paper was described as a review or not), 'Consequences' (effects of *blended learning* mentioned), and 'Satisfaction' (description of actor's satisfaction about the process). Finally, in the descriptive statistical analysis, we counted the subjects proposed by the database repeated 10 or more times in the first five places, and then we included the following ones in the final frequency.

Multiple correspondence analyses were used for data reduction. These techniques are multidimensional exploratory data analysis, which work in a more inductive than deductive way, without previous statistical models, and analyze simultaneously all the variables with graphic representation. The SPAD software procedure uses two different kinds of techniques: *multiple factorial correspondence analysis*, and *cluster analysis*. The first one, specially designed for nominal variables, and the second one, mixed

classification, for cluster construction, giving homogeneous characteristics in each group, but different from the other groups (Moscoloni 2005a; Moscoloni, 2005b). Multiple factorial correspondence analysis works with variables' categories, meanwhile cluster analysis works with the cases, in this article the cases were the papers. Both kinds of analyses are corresponding and they show the relationships between cases' characteristics in two complementary ways. As active variable we introduced: language, number of authors, subjects, journals, and year of publication. As illustrative variables, all the other variables described on Table 1 were introduced. Only the most repeated subjects placed as first five descriptors were used. We also used qualitative approach to illustrate in-depth examples of each cluster analyzed.

Results

We found 223 (91%) papers written in English, 13 in Spanish, four in Turkish, three in German, one in Bosnian, and one in Hungarian.

Hsu, Li-Ling was repeated four times, and Bliuc, Ana-Maria, Cooner, Tarsem Singh and Donnelly, Roisin were repeated three times as first authors. Thirteen authors were repeated as first authors twice. Then, 206 first authors were not repeated as first authors again in this sample. As shown in Table 2, the majority of the papers analyzed were written by two authors. Almost the 90% of the articles were written by one to four authors.

Table 2. Number of authors for paper

Number of authors	f	%	Accumulated percentage
2	84	34.3	34.3
1	63	25.7	60
3	45	18.4	78.4
4	24	9.8	88.2
5	16	6.5	94.7
6	6	2.4	97.1
7	3	1.2	98.4
9	3	1.2	99.6
13	1	0.4	100
Total	245	100	

Almost 30% of the articles were written by first authors working in USA or England (see Appendix 1).

As shown in Table 3, only 32% of the papers were written as collaboration work by authors from different institutions. The continent with more publications was Europe, gathering 44.2% of the sample. America and Asia have similar quantity of papers (near 22% of the sample each). Following, America first authors have 52 papers, although South America has only one (Appendix 2). On Table 3, there is a description of the number of institutions mentioned on the paper as author's affiliations: 30.5% of the papers were written in collaboration by authors from different institutions.

Table 3. Number of institutions mentioned as author's affiliations.

Institutions	F	%
1	160	65.3
2	54	22
3	11	4.5
4	6	2.4
5	1	.4
6	2	.8
7	1	.4
Non-mentioned	10	4.1
Total	245	100

The journals with more frequency of publication in the sample (see Table 4) were *Computers & Education* (23 papers, 9.4%); *British Journal of Educational Technology* (12 papers); *Journal of Educational Technology & Society* (11 papers); *Internet & Higher Education* (11 papers) and *Journal of Educational Media* (11 papers). Eighty-three journals had only one paper (33.5%) and 94 journals had two to five papers (38.8%). On 2011 50 papers which had the words 'blended learning' on the title were published, 24 of them were published on different journals.

Table 4. Papers published on journals and years of publication.

	I&HE	EM	ET&S	BJET	C&E	Journals with 1p	Journals with 2-3p	Journals with 4-5p	Total
2003	-	8	-	1	-	1	-	3	13
2004	1	3	-	-	-	2	2	3	11
2005	2	-	-	2	-	4	5	-	13
2006	-	-	-	1	-	4	6	-	11
2007	2	-	2	1	-	4	6	2	17
2008	2	-	1	-	3	7	7	3	23
2009	2	-	2	3	-	7	6	5	25
2010	-	-	1	2	8	13	8	5	37
2011	1	-	2	-	5	24	14	4	50
2012	-	-	3	2	2	11	5	6	29
2013	1	-	-	-	5	7	3	-	16
Total	11	11	11	12	23	83	63	31	245

Note: *I&HE* is *The Internet & Higher Education*; *EM* is *Journal of Educational Media*; *ET&S* is *Journal of Educational Technology & Society*; *BJET* is *British Journal of Educational Technology*; and *C&E* is *Computers & Education*.

According to the online platform for Taylor & Francis Group content (n.d.), the journal currently known as *Learning, Media and Technology* (2005-current) –with two articles published with ‘blended learning’ on the title- was formerly known as *Journal of Educational Media* (EM on Table 4) (1996 - 2004) and *Journal of Educational Television* (1975 - 1995), and it had incorporated *Education, Communication & Information* (2001 - 2005) –with three more articles published in our sample. Summarizing, all those journals together had 16 papers published in this sample, with more items than all the other journals, except for *Computers and Education*.

In this sample (Table 5), 164 papers (67%) utilized quantitative analysis, 61 of them combined with qualitative analysis (25%). One-hundred and two focused on programs or courses (42%), 78 on the students or teachers (32%) and 42 on both of them (17%). Even though, reviews were discarded on the search, 10 were found in the sample. Regarding

the papers that mentioned effects or consequences, 42 used quantitative analyses (19 of them combined with qualitative analysis) and only 26 of the papers analyzed mentioned actor's satisfaction.

Table 5. Data analysis

		Quantitative approach	Qualitative approach	Mixed approach	essay	non-data analysis access*	Total
Effects or consequences are mentioned	yes	42	5	19	6	8	80
	no	61	27	42	15	20	165
Advantages are mentioned	yes	6	2	2	2	1	13
	no	97	30	59	19	27	232
Satisfaction are mentioned	yes	16	3	6	0	1	26
	no	87	29	55	21	27	219
Review	yes	2	0	1	4	3	10
	no	101	32	60	17	25	235
Object analyzed	program-sor courses	34	17	24	11	16	102
	subjects	43	11	22	0	2	78
	subjects and programs/courses	23	4	13	0	2	42
	other object	3	0	2	10	8	23
Total		103	32	61	21	28	245

*Note: we did not have access to data analysis of 28 papers and the categories analyzed were not mentioned on those abstracts.

The more frequent subjects were 'blended learning' mentioned on almost half of the papers, 'learning' in near 25%, following by 'internet in education', 'computer assisted instruction' and 'educational technology' in near 20% of the sample (see Table 6).

Table 6. Subjects

Subject	f	%
BLENDED learning	122	49.8
LEARNING	61	24.9
INTERNET in education	48	19.6
COMPUTER assisted instruction	47	19.2
EDUCATIONAL technology	44	18
WEB-based instruction	37	15.1
DISTANCE education	27	11
CURRICULA (Courses of study)	23	9.4
HIGHER education	18	7.3
STUDENTS	18	7.3
MOBILE communication systems in education	14	5.7

Category clouds, which are interrelated by the weight of their constitutional factor, are grouped into opposite ends (see Figure 1 and Appendix 3). Journals with many publications of *blended learning* (four to five papers, *Internet & Higher Education*, and *British Journal of Educational Technology*) are located on one end of the first factor; as well as papers with two to five authors and the subjects 'curricula (course of study)', 'web-based instruction' and 'learning'. The other side of the first factor gathers journals with one to three papers published, infrequent subjects (named as 'missing category'), Spanish as prototype language, and papers written by just one author.

On the vertical axis (see Figure 1 and Appendix 4) are grouped *British Journal of Educational Technology*, *Computers & Education*, and *Journal of Educational Media*, journals with 2 or 3 papers (in 'Journals' variable); 'web-based instruction' and 'blended learning' (as subjects), papers with two to five authors. On the horizontal axis, the categories grouped are journals with just one paper and journals with 4 or 5 papers; one author and six or more authors; 'distance education', 'curricula (course of study)', and infrequently categories (missing category).

Multiple factorial correspondence results shows the distributed variables' labels in the multidimensional space graphed in Figure 1 where are categories interrelated by their weight in the constitutional factors opposite and grouped into ends. Besides, the cluster analysis gathered the papers in three groups of clouds following their weights also in mul-

tidimensional space in Figure 2. These clouds have not clear limits and they are distributed around a center of gravity.

Figure 1. Active categories labels in multidimensional analysis

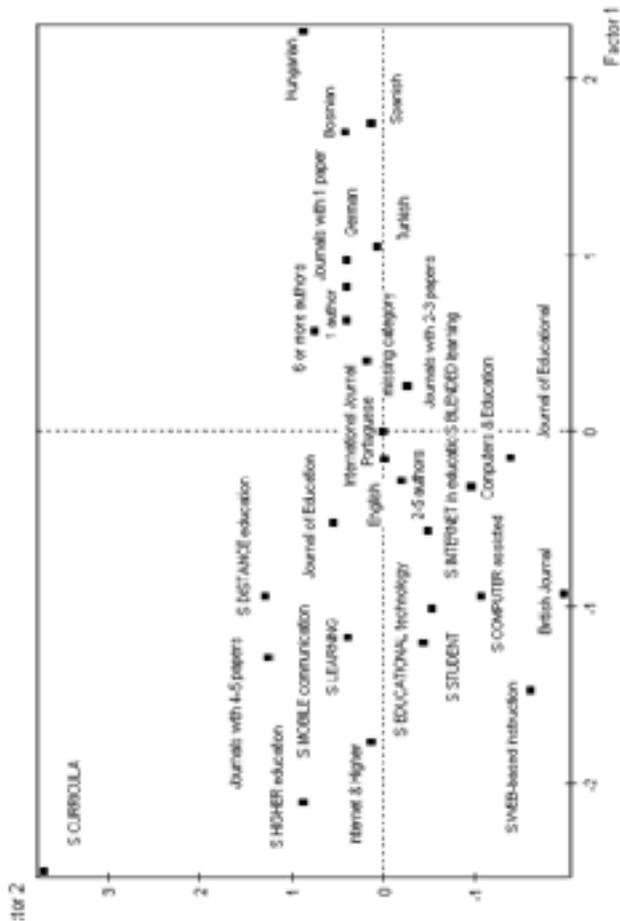
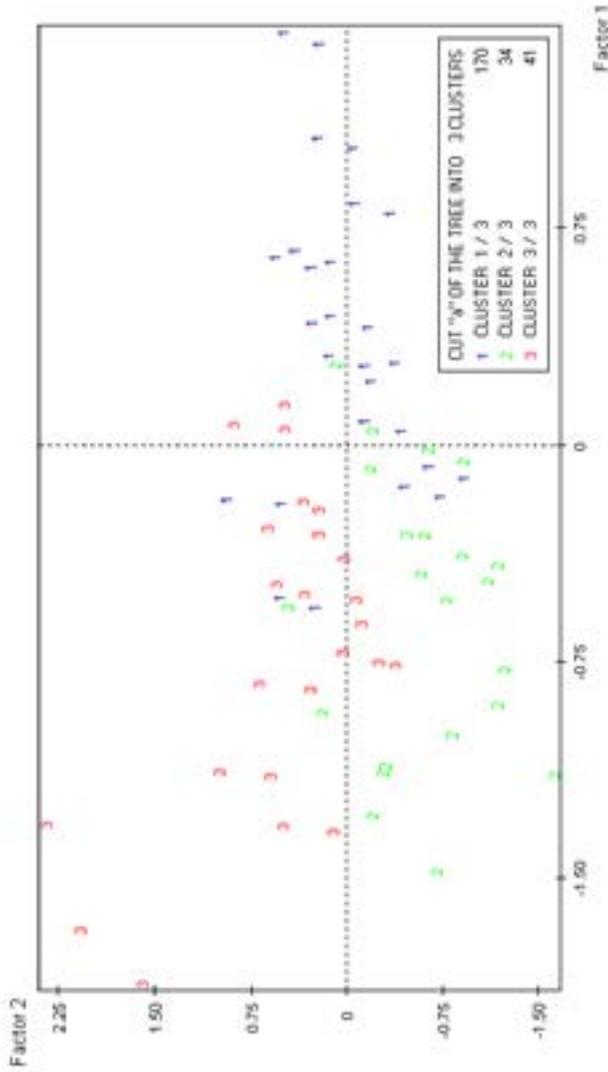


Figure 2. Cluster analysis



The cluster analysis (see Figure 2 and Table 7) shows the characterization of three groups of papers. According to the main characterization by categories of the three clusters, subjects and journals were the variables chosen by the software as the most determinant in all of them in the grouping process.

The cluster 1 almost represents 70% of the sample. It is characterized by *the diversity of papers*, for example, on the variable 'Subject 1' the 'missing category' (infrequently subjects) and 'blended learning' are the representative labels there. Besides, the journals with one to three papers are usual. The typical language of publication is Spanish, grouping the marginal as the trend. So, the diversity of articles in cluster 1, specially represented by the low number of publications about the issue in each journal and the variety of subjects, could be related with a lack of consolidation in this field of research.

The second cluster is characterized by *the conceptual unity focused on communicational media*. They are published on specialized journals, being *British Journal of Educational Technology* the most representative of all, with a clear emphasis on technology. Also, the most representative subjects are related with the media: 'internet in education', 'web-based instruction', and 'computer assisted instruction', the three of them illustrating technology stress. Besides, the typical first author affiliations' country is England.

The last cluster is characterized by *the focus on educational practice*. It is distinguished by two main journals: *Journal of Educational Media and Internet & Higher Education*, and the typical first author affiliations' country is USA. The main subjects are substantially related: 'distance education', 'learning', and 'curricula (course of study)', the three of them associated with instructional issues.

Table 7. Characterization by categories of the three clusters

Group: CLUSTER 1 / 3 (Count: 170 - Percentage: 69.39)				
Variable	Characteristic categories	Test-value	Weight	
Subject 1	missing category	8.08	126	
Subject 1	BLENDED learning	4.71	58	
Journals	Journals with just one paper	3.92	83	
Journals	Journals with 2-3 papers	3.24	63	
Subject 2	missing category	2.73	166	
Language	Spanish	2.43	13	
Group: CLUSTER 2 / 3 (Count: 34 - Percentage: 13.88)				
Variable	Characteristic categories	Test-value	Weight	
Subject 1	INTERNET in education	7.05	15	
Journals	British Journal of Educational Technology	6.75	12	
Subject 1	WEB-based instruction	6.05	10	
Subject 2	COMPUTER assisted instruction	2.96	15	
First author affiliations' country	UK. England	2.66	31	
Group: CLUSTER 3 / 3 (Count: 41 - Percentage: 16.73)				
Variable	Characteristic categories	Test-value	Weight	
Subject 1	LEARNING	6.28	14	
Journals	Journal of Educational Media	6.03	11	
Subject 1	DISTANCE education	4.58	7	
Journals	Internet & Higher Education	3.96	11	
Subject 1	CURRICULA (Course of study)	3.70	5	
First author affiliations' country	USA	2.86	41	
Subject 5	LEARNING	2.41	6	

Cluster 1, *characterized by the diversity of papers*, has many examples of articles about *blended learning* published in specific disciplines journals non related to education as a general focus, like, for instance, *Cyberpsychology, behavior, and social networking*, *Journal of public affairs education*, *Archives of disease in childhood*, *Journal of teaching in travel & tourism*, or *Library management* (e.g. Bailey and Morais, 2004; Fontanin, 2008; Ho, Lu and Thurmaier, 2006; Stewart, Inglis, Jardine, Koorts, and Davies, 2013; Tsai, 2011). So, the main purposes of those papers were related to the topic learnt, besides *blended learning*.

Stewart *et. al* (2013) had as main objective to evaluate the *blended learning* approach for improving the newborn examination skills in a group of medical students. Fontanin (2008) had the aim to describe the design and delivery of an English language course for actual librarians reporting the effects of the blended delivery mode on the learning experience. Bailey and Morais (2004) explored the student's satisfaction and performance of online and face-to-face interaction on a *blended learning* tourism marketing assignment.

Usually, the aim of an article could be seen through the keywords chosen by the authors. Keywords made by Varela-Prado (2007) are centered on 'information literacy' and 'development of information abilities' in a paper based on *blended learning* course for the development of information abilities in a library. Some Navas-Granados (2011)'s keywords were 'blended mode' and 'renewable energies' because he analyzed the use of *blended learning* approach in renewable energy subject.

According to the subjects related to the papers in the databases showed the diversity either. For instance, subjects like 'professional and management development training'; 'other general government support'; 'public administration'; and 'continuing education' belong to a paper which evaluated differences in quality of instruction between students with synchronous learning and asynchronous learning experiences in a course with *blended learning* delivery (Ho *et. al*, 2006).

In many cases, the articles had so specific matter blurring the relationship with other papers, such as Aguado, Arranz, Valera-Rubio and Marín-Torres (2011)'s and Kaučič, Ramšak and Krašna (2011)'s. Aguado *et. al.* (2011) evaluated a *blended learning* program on the developing of

teamwork competence. Kaučič et. al (2011) argued that one important factor to be successful in *blended learning* education is the e-learning rich media presentations material.

The terms used by most papers on cluster 2, characterized by *the conceptual unity focused on communicational media*, were most precisely oriented to specific technical vocabulary related to media as well as the names of the Journals.

For instance, in a paper published in *Computers & Education*, Méndez and González (2010) proposed a course based on a web tool called Control Web which included a controller designed to regulate the workload for the students, according their activity and performance.

Tselios, Daskalakis, and Papadopoulou (2011) in their paper published on the *Journal of Educational Technology & Society* used the technology acceptance model (TAM) in order to analyzed Greek university students' attitudes toward *blended learning*.

Cortizo, Rodríguez, Vijande, Sierra, and Noriega (2010), in another paper published in *Computers & Education*, described bases, tasks and methodology for developing an online tool using up-to-date technologies. To test it, they conducted an experimental analysis aimed to quantify learning differences between traditional mode and *blended learning* mode.

In a paper published in *British Journal of Educational Technology*, Davies, Ramsay, Lindfield, and Couperthwaite (2005) presented teaching and learning resources developed in Web Course Tools, combining the tool with video clips of patients to develop students' neurological observational and analytical skills.

A paper published on *Journal of Information, Information Technology, and Organizations* analyzed the impact of social media as Facebook on lecturers' pedagogical strategies and student learning in a blended information systems course (Rambe, 2010).

In another paper published on *British Journal of Educational Technology*, Davis and Fill (2007) presented a course results which examined how to integrate recent technical developments with digital content improved the learning experience. They argued that university teachers often find difficult to adopt new online techniques, partially because institu-

tional practices are still supporting more traditional approaches.

In different way, also in a paper from *British Journal of Educational Technology*, Orton-Johnson (2009) evaluated in a *blended learning* course highlighted an overwhelming patterns of non-use of the materials and evidenced limited and inconsistent engagement with the technological resources using qualitative data.

In cluster 2, software brought together papers with subjects and journals with technological terms. In contrast to this, cluster 3 collected articles with more pedagogical vocabulary. Analyzing the examples in both clusters, we found differences in discourse, scilicet, the way to explain and analyze.

We found grouped in cluster 3, characterized by *the focus on educational practice*, papers centered on criticizing, philosophical debates, advices, and suggestions about *blended learning*. Also, the software came upon articles with analyses based in the environment where pedagogical experiences took place.

We selected some quotations to illustrate the discourse used by the authors when they explained the aim of their own works. Denis (2003, p.1) described "some principles, tools and resources that have been developed within the framework of a postgraduate diploma and that could be extended to similar adult training programmes". Garrison and Kanuka (2004, p.95) said that the purpose of their paper was " to provide a discussion of the transformative potential of blended learning in the context of the challenges facing higher education. Based upon a description of blended learning, its potential to support deep and meaningful learning is discussed". Purvis, Aspden, Bannister & Helm (2011, p. 91) outlined "the experiences of the learners and the tutor and considers the potential for future development of blended learning and assessment".

Ireland (2008) presented a "practice article" with an explanation of "the best of both worlds". The author stated that *blended learning* brought to her course significant benefits and opportunities in legal education because it included flexibility and interactive classes allowing the students to revise material.

Ware (2011), for instance, described the challenges faced by academic librarians with limited staff resource in a case study using a *blended*

learning approach and innovative teaching practice to successfully train information skills to a large group of student.

Some of the papers in this cluster had an accent on pedagogical issues without the technological vocabulary, specifically, for instance, about problem-based learning, using as subjects, for example, 'problem-based learning'; 'student teachers'; 'learning communities'; and 'collaborative learning' (Yeh, 2010). Some of the subjects in Park and Park (2012)'s paper were: 'problem-based learning'; 'problem solving'; 'active learning'; 'experiential learning'; 'teaching methods'; 'cognitive learning'; and 'analytical skills'. They discussed the significance of problem-based learning regarded as one of the most powerful instructional models in education which provides opportunities to experience real-life problems in school settings.

All the articles in the last cluster were about instructional and experiential matters related to the 'learning' word as the center of gravity.

Discussion and Conclusion

Previous revisions identified general attributes of published papers in the area. We were interested not only in the general description but also in clustering the papers with a minor handling. So, we decided to describe the papers constructing the variables by mapping simple or basic characteristics. We used descriptive statistic to process the general data collection and, after that, we introduced the same variables to construct clusters –multidimensional analysis-based on the following active ones: language, number of authors, journals, subjects, and year of publication. As it was described earlier, the active variables were the basic description of a paper and not analytic outcomes.

The results of this study were produced based on a database search process, so, it is important to consider the influence of database perspective in the data construction. For example, the subjects are selected by the database and not by the papers' authors. Another example is related to the reviews; thus we eliminated the reviews in the search check points, we found ten of them in the final sample. Also, it is relevant to note that we used just one entrance and we did not use alternative sy-

nonyms like "hybrid learning", and we searched just on the title.

As it was expected, the results indicated that the most frequent language was English, which could respond to two main reasons: the concept introduced was written in English, and also, the most frequent scientific language all over the world is English. Spanish had the second place in our list, nevertheless, it has, for example, the fourth place in the major languages in social science publications worldwide ranking in 2005 (Ammon, 2010, p.154). Those results are consistent with first author country's languages production: the most frequent countries were USA, England and Australia, the three of them Anglophone, followed by Spain, a non-Anglophone country. However, we observed many of Spanish speaking authors writing in English too, and this situation is also repeated with other native languages.

Contrary to our expectations, one over four papers was written by only one author, indicating low interaction between researchers. Supporting that idea, 65% of the papers mentioned just one institution as authors' affiliation, that is, 40% of the papers with two or more authors were written by researchers working in the same institution. So, the collaboration between institutions and researchers seems to be scarce.

An interesting result was that while USA had the major percentage of publications, America had half of publications if compared to Europe.

Halverson et al. (2012), analyzing the impact of *blended learning* publication, found that the most cited journals were *British Journal of Educational Technology*, *The Internet and Higher Education*, *Computers & Education*, *Educational Media International*, *Journal of Educational Media*, four of them incorporated in our sample as the journals with more papers' frequency; including, as well, in our sample, *Journal of Educational Technology & Society*.

The academic benefit and competitive advantages of the *blended learning* use was evident from the beginning of publications in the area (Garrison and Kanuka, 2004). They recommended assess of the effectiveness as priority in this area. In our analysis, 80 papers mentioned effects or consequences of *blended learning*, reaching 33% of the full sample. Nevertheless, authors introduced the *advantages of blended learning* as a point of analysis, in only 13 texts in our sample (5%).

Papers were more commonly designed with a quantitative approach (42%), followed by a mixed approach with a combination of qualitative and quantitative data (25%). Bliuc *et al.* (2007) described as unusual to find articles substantially based on qualitative and quantitative research. In contrast to their findings, we found an important amount of mixed approaches. A possible explanation for this result is that we categorized a paper as a mixed approach when it had both kinds of data, not considering about the substantial axis of data analysis. Besides, we tried to find all the papers which had not a clear methodology approach on the abstract, title or subjects, a few were written in an inaccessible language or we had not access to them.

Regarding the subjects proposed by the database, as it was predictable, *blended learning* was the most frequent one, mentioned in half of the papers. The other most frequent subjects were in consonance with the main changes in education mentioned by Rovai and Jordan (2004) as the synthesis of the *blended learning* concept itself: thinking less about instruction and more about learning; bringing closer technologies to students; and, not so clear, but still there, promoting the sense of community.

Once we pictured the characteristics related to the variables, we described the general tendencies of the papers according to the main characteristics analyzed through multidimensional analysis.

This allowed us to confirm the data analyzed in the previous analysis and, simultaneously, to group heavier variables and items with similar characteristics, constructing an inner identity to each group. The three clusters distinguished the groups quite precisely and were built up by (1)- characterizing *the diversity of papers*; (2)- *the conceptual unity focused on communicational media*; and (3)- *the focus on educational practice*; as the most important property in each group of papers.

The first cluster, which focused on the diversity, collected the majority of the papers in our sample; as well as Halverson *et al.* (2012) pointed out the diversity of interest in their 60 titles analyzed. The cluster 1 had not representative journals as the other two clusters, probably because it joined the journals with lower number of publications. It was characterized by the multiplicity of subjects too, showing the heterogeneous theoretical field of *blended learning* investigation.

Differing from the cluster 1 and the literature review, cluster 2 and 3 showed subjects and journals gathering articles. The specialized journals appeared in both clusters were mentioned by Halverson *et al.* (2012) in the most cited list. The second cluster had *British Journal of Educational Technology* as the representative one and, coherently, the most representative subjects were related to the media. The third cluster had two outstanding journals: *Journal of Educational Media* and *Internet & Higher Education* and the main subjects were related to instructional issues, showing the centering on learning processes anticipated by Garrison and Kanuka (2004).

The examples in the last two clusters showed different vocabularies. Software grouped in cluster 2 papers with subjects and journals with technological terms and, in cluster 3, papers focused on suggestions and pedagogical experiences about *blended learning*.

The diversity of issues found as a distinctive trend in this field was, maybe, the most relevant result here. Diversity found and our experience reading the articles, showed the topic as an original higher education matter, spreading different spaces of practice like medical education, organizational learning, occupational training, social work education, among others similar to Drysdale *et al.* (2013) results in dissertations and masters' theses.

Finally, the background examined here showed a practical activity more than a separated object of knowledge revealing *blended learning* as a growing construction field yet defining focuses of research. Findings like Bliuc *et al.* (2007)'s about case-studies supported this idea. They found this kind of studies as the preponderant methodological approach. It seems to them that most papers about *blended learning* had come from teachers as researchers studying their own *blended learning* experiences. The conclusions arrived here were only possible because there were more than ten years of a publications path in the area. Advances in the study of *blended learning* would include variables such as application, reasons to include *blended learning* in the classes, participants' ages, disciplines thought with more use and research, among others, all those categories which were emerging as relevant in the course of the research process. We tried to demonstrate the past in this field of study, as well as the future research which could cast out similar results as the ones found in the present study.

Appendix

1. First author affiliations' country

First author affiliations' country	f	%
USA	41	16.7
UK, England	31	12.7
Australia	21	8.6
Spain	21	8.6
Taiwan	17	6.9
Germany	12	4.9
Turkey	11	4.5
UK, Ireland	9	3.7
Canada	7	2.9
China	7	2.9
South Africa	5	2
Japan	4	1.6
UK, Scotland	4	1.6
Italy	3	1.2
Korea	3	1.2
Netherlands	3	1.2
Sweden	3	1.2
Switzerland	3	1.2
Thailand	3	1.2
UK, Wales	3	1.2
Croatia	2	0.8
Greece	2	0.8
Mexico	2	0.8
New Zealand	2	0.8
Singapore	2	0.8
Others non-repeated countries	19	7.6
Total	245	100

2. Authors' affiliations: Continent and Hemisphere

		northern Hemisphere	southern Hemisphere	Total	
Continent	Africa	f	1	5	6
		%	.4%	2.1%	2.5%
	America	f	52	1	53
		%	21.7%	0.4%	22.1%
	Europe	f	106	-	106
		%	44.2%	-	44.2%
	Asia	f	52	-	52
		%	21.7%	-	21.7%
	Oceania	f	-	23	23
		%	-	9.6%	9.6%
	Total	f	211	29	240
		%	87.9%	12.1%	100%

3. Printout on Factor 1 by the active categories

Variable	Category	Test-Value	Weight
Journals	Journals with 4-5 papers	-7.61	31
Language	English	-7.55	223
Authors	Two to five authors	-6.48	169
Journals	Internet & Higher Education	-5.96	11
Subject 1	CURRICULA (Course of study)	-5.63	5
Subject 1	WEB-based instruction	-4.72	10
Subject 1	LEARNING	-4.48	14
Journals	British Journal of Educational Technology	-3.26	12
Subject 1	DISTANCE education	-2.50	7
Subject 1	INTERNET in education	-2.25	15
Subject 1	MOBILE communication	-2.22	3
Subject 1	S2 HIGHER education	-2.10	1
M I D D L E A R E A			
Language	Turkish	2.11	4
Authors	Six or more authors	2.13	13
Language	Hungarian	2.27	1
Journals	Journals with 2-3 papers	2.36	63
Subject 1	BLENDED learning	2.95	58
Authors	One author	5.77	63
Language	Spanish	6.47	13
Subject 1	missing category	6.48	126
Journals	Journals with just one paper	9.21	83

4. Printout on factor 2 by the active categories

Variable	Category	Test-Value	Weight
Journals	British Journal of Educational Technology	-7,03	12
Subject 1	WEB-based instruction	-5,20	10
Journals	Computers & Education	-4,87	23
Authors	Two to five authors	-4,77	169
Journals	Journal of Educational Media	-4,70	11
Subject 1	BLENDED learning	-4,24	58
Journals	Journals with 2-3 papers	-2,45	63
M I D D L E A R E A			
Subject 1	missing category	2,64	126
Authors	Six or more authors	2,71	13
Subject 1	DISTANCE education	3,42	7
Authors	One author	3,66	63
Journals	Journals with just one paper	4,31	83
Journals	Journals with 4-5 papers	7,45	31
Subject 1	CURRICULA (Course of study)	8,31	5

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