Bibliometric Study On Autonomous Learning In Higher Education

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Abstract

This study describes the development of scientific production in the research theme "Autonomous learning in higher education", all research works from the years 1989 to 2023 were taken into account and the documents indexed in the Scopus metasearch engine were used as a source of information, data was interpreted through an analysis of the bibliometrics using indicators of this science that allowed to process 328 documents, from which it was possible to determine the annual scientific production, the productions of the best authors over time, the growth in the annual production of the most cited journals and articles, as well as the correlation between authors, sources and keywords or terms. The variables or key terms used in the exploration were: "Autonomous Learning" with its synonym "self-learning" and "Higher education", generating results that were then filtered by the language and by areas of knowledge related to the field of study, finally leaving 328 research papers which were downloaded in csv format and their processing was executed with the Biblioshiny application, from the Bibliometrix package that is part of the R statistical software.

Keywords: Bibliometric study, autonomous learning.

Introduction

Today's society is in an important period of transition between the so-called era 4.0 and 5.0, significantly impacting the fields of economy, education, among others. (Pereira, Lima & Santos, 2020; Sołtysik-Piorunkiewicz & Zdonek, 2021). Several studies show how the entry of new technologies and knowledge have resulted in an acceleration between generational periods, where

the times between the variabilities and subjectivities present in the social context are shortened. (Parra et al., 2020; Jarvenpaa & Essén, 2023).

These changes so accelerated at the social level bring as a result that the training work must adapt to each generational group from their attitudes and aptitudes so that it responds effectively to the new needs of both students and the external market that will receive them once inserted in the workplace (Castro, 2019; Hernández-Sánchez et al., 2022). In this way, conventional educational models based on lectures are no longer in line with the training process today which invites a closer interaction between teacher and student, after this process of being one-channeled to become a multidirectional dynamic (Poling et al., 2019; Keane & Evans, 2022).

From these new paradigms appears autonomous learning, which is a multidisciplinary issue, approached from different perspectives in fields such as education, psychology, artificial intelligence, and educational technology (Anthonysamy & Singh, 2023; Pratiwi & Waluyo, 2023). Throughout the historical trajectory, research of various kinds has been carried out that has contributed to the enrichment of the understanding about the educational approach of autonomous learning and its transcendental impact on the personal and professional development of students (Ramos Salazar & Meador, 2023; Zhang, 2023). In this context, the purpose of this bibliometric review is to provide a panoramic and updated view of the outstanding academic contributions in this field, while identifying the most influential agents and leading countries in the research concerned.

The bibliometric analysis, to which the works under study will be submitted, will examine in detail those parameters considered essential, such as the volume of publications about autonomous learning in different time periods, the identification of the most prolific authors and co-authors, as well as the identification of collaborative links between institutions and the presence of research of international scope. In addition, a meticulous evaluation of the impact and relevance of the articles will be carried out, making use of vital indicators such as the number of citations received. This approach will make it possible to discern

those investigations that have exerted a greater influence on the scientific community.

In equal measure, particular attention will be paid to the most frequently recurring research topics and approaches in the field of self-learning. Among the transcendental issues that are expected to be found are the fundamental role played by technology in the self-learning process, analysis of self-regulation strategies of learning, understanding of intrinsic motivation in self-learning environments, as well as the challenges inherent in the evaluation of academic progress and achievements within the framework of this learning modality. In this way, through this exhaustive bibliometric analysis, it is sought to contribute substantially to the current scientific body regarding autonomous learning. This educational approach has acquired significant relevance in the contemporary educational landscape, and through this research, it is hoped to promote debate and encourage an increase in interest in this constantly developing field.

Methodology

A systematic literature scan was conducted using the Scopus database, in which search strategies for highly relevant information were then applied to retrieve the research papers that will serve as input to apply bibliometric analysis on the research topic "Autonomous learning in higher education".

One of these strategies was to use the keywords with their synonyms separated by the OR operator in order to expand the number of results obtained in the first terms, then relate them to the second and third term using the Boolean operator AND in order to retrieve documents containing within it two or all three terms together, then it was filtered by the areas of knowledge related to the field of study, such as "Social Sciences", "Administration", "Economics" and Psychology", the key words or terms used were: "Autonomous Learning" with its synonym "self-learning" and "Higher education", The search equation then formed and implemented these strategies was as follows: (TITLE-ABS-KEY ("Autonomous Learning") OR TITLE-ABS-KEY ("self-learning") AND TITLE-ABS-KEY ("Higher education")) AND (LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "PSYC")), recovering a total of 328 academic papers.

These documents were downloaded from the Scopus database in csv format and their processing was executed with the Biblioshiny application, of the Bibliometrix package that is part of the R statistical software, generating the following results.

Results

Table 1. Main data information.

MAIN INFORMATION ABOUT DATA	
Timespan	1989:2023
Sources (Journals, Books, etc.)	248
Documents	328
Average years from publication	6.02
Average citations per documents	7.049
Average citations per year per doc	0.9793
References	11394
DOCUMENT TYPES	
article	230
book	4
book chapter	21
conference paper	64
conference review	1
review	7
short survey	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	776
Author's Keywords (DE)	1074
AUTHORS	
Authors	904
Author Appearances	933
Authors of single-authored documents	72
Authors of multi-authored documents	832

The main information generated from the exploration carried out in the Scopus metasearch engine is presented in table 1, where it can be seen that the time period analyzed was from 1989 to 2023, 328 documents were recovered, that according to their nature, the articles type stand out with 70%, the average of references per academic work was 7 and 904 authors are related to the study, of which 72 worked individually and 832 together with other researchers.
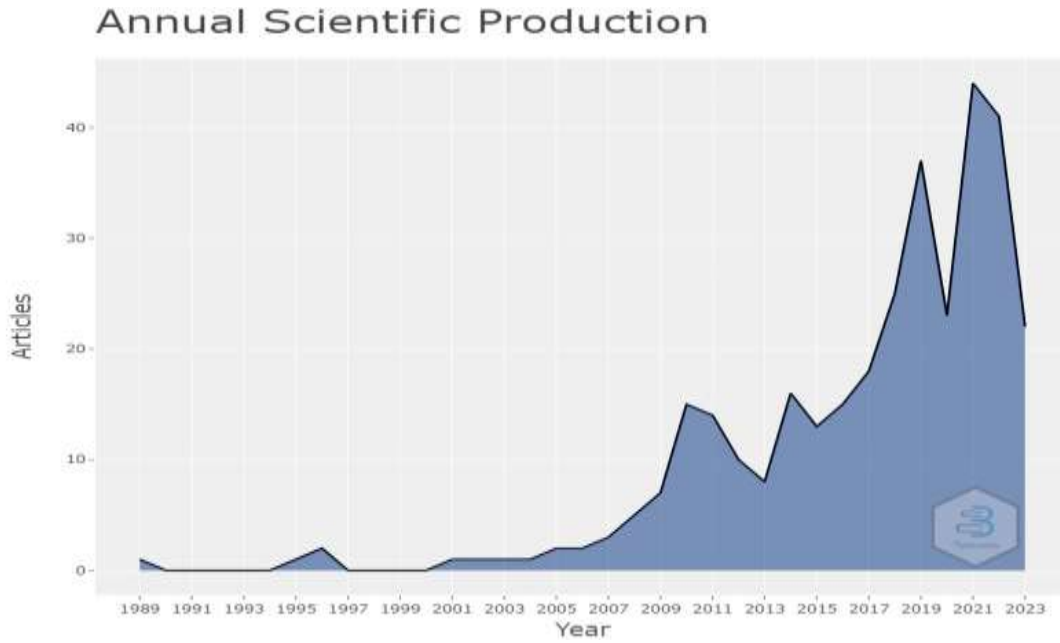
Figure 1. Annual Scientific Production

The evolution of scientific production throughout the period studied (1989-2023) was analyzed, where a growing interest in the study of the research topic can be seen, observing a notable increase between the beginning of the period 2005 until 2009, It is very interesting to note that there are different years where this growing trend is interrupted and there is a decline in production, being especially notable this trend from 2010 to 2013 and then precipitated again until 2021, the latter being the one with the most contributions in the field.
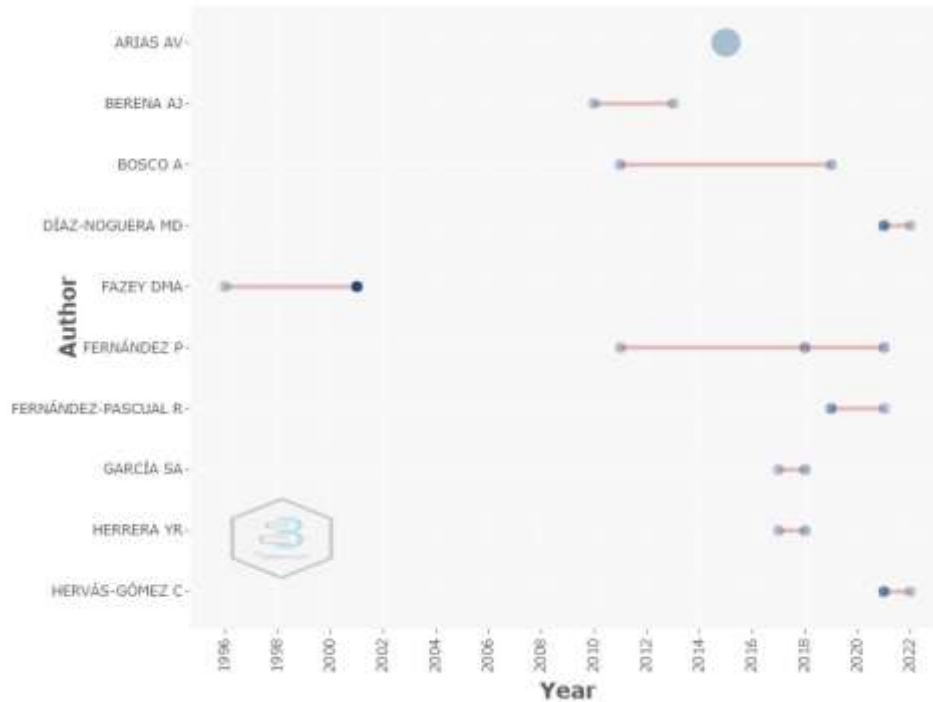
Figure 2. More productive and cited authors over time

The top 10 authors with the highest production per year and with the most citations are presented in graph 2, of which the following researchers are highlighted: Arias A.V., who in 2015 was the one with the highest number of contributions with 2 contributions and Fernández P., which, according to what was observed, published during the years 2011, 2019 and 2021 in total 3 documents; in terms of citations, the author Fazey D.M.A. stands out during 2001 and can be identified because the circle that represents him has a darker color than the others, a representative work of this item is the one that aimed to "analyze perceptions of belief in importance (BI), self-efficacy (SE), and preferred source of learning (SL) of information literacy (IL) competencies among psychology students in Spain and Portugal, It concluded that: motivation (BI and SE) regarding AI competencies is a key asset for future psychologists. Interest should focus on some emerging motivational factors. Students' appreciation of the library should be enhanced through appropriate improvement initiatives. This method could be complemented by qualitative studies. Originality/value: This is probably the first diagnostic-comparative study on perceptions of AI competencies among future psychology professionals" (Pinto, et al. 2021).
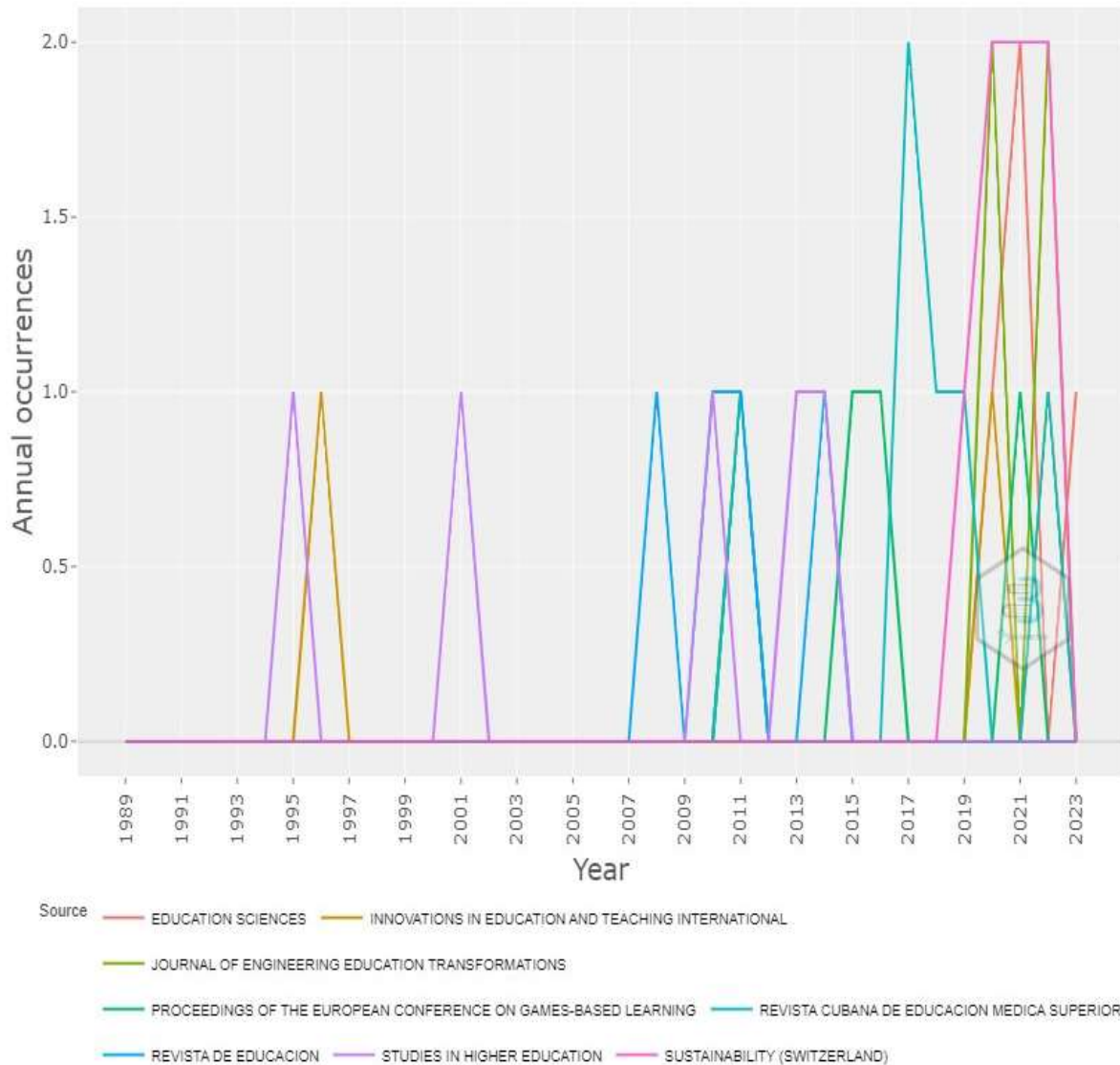
Figure 3. Growth of journals.

Figure 3 shows the growth that journals have had over the years, of which the journals are highlighted Sustainability (Switzerland) that, in the years 2020, 2021 and 2022 was the one that had the highest number of contributions with 2 contributions in each of them and the Cuban Journal of Higher Medical Education, which, according to what was observed, published during the years 2017 and 2018 in total 3 documents, of the first journal highlights the article that had as objective "to determine the scenarios of adaptation to post-pandemic learning from the perspective of university students of the Faculty of Education Sciences of the University of Seville (Spain) based on the competencies identified in the context of digital transformation. This was a descriptive,

non-experimental study that used a short version of the Scale of Attitudes on the Perceptions of Future Teachers towards the New Post-Pandemic Educational Scenarios (SANPES). (Martín-Gutiérrez, et al. 2022)
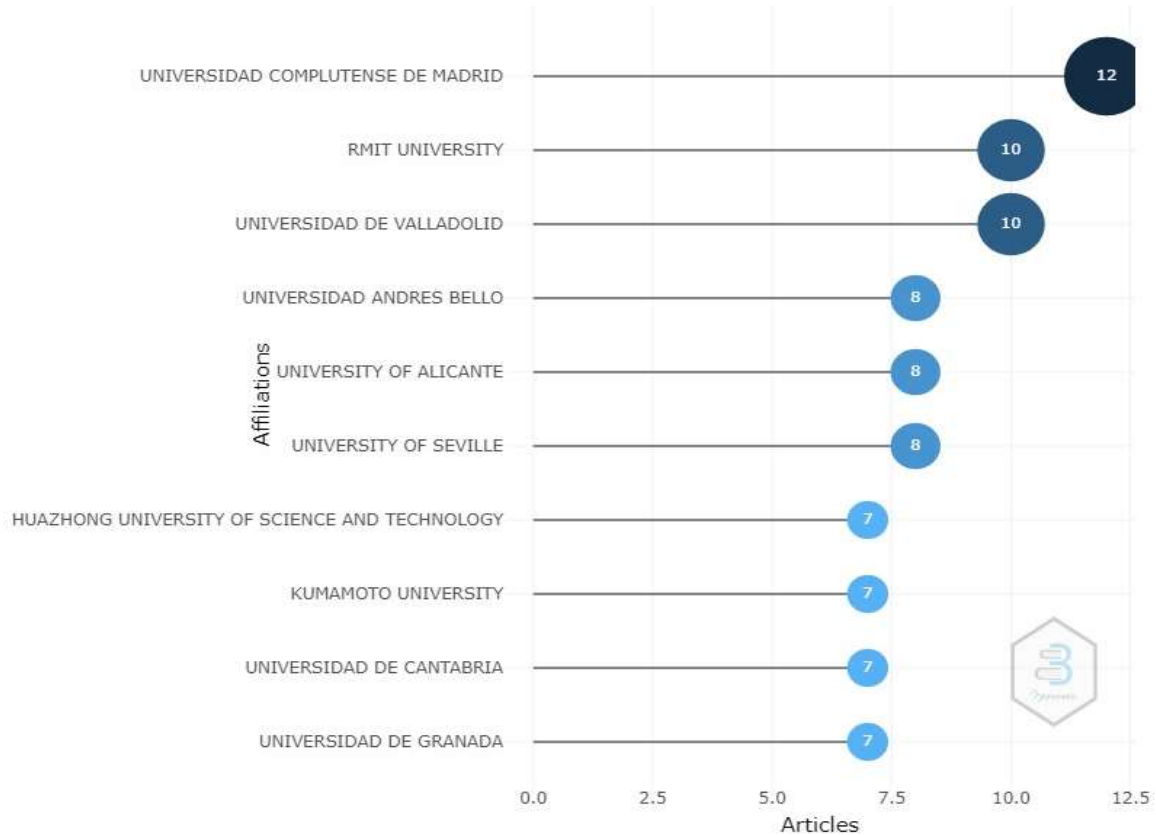

Figure 4. Most relevant institutions

The top 10 of the institutions that publish the most on the subject of research are presented in figure 4, in which it can be seen that of them the ones that make the most contributions are, the "Universidad Complutense de Madrid", the RMIT University and the "Universidad de Valladolid", It is striking that of the top 10 5 are Spanish and of these the research work of Barreal & Jannes, (2019) is highlighted, where they indicate that "Gamification consists of modifying the contents of a certain subject or course in a playful way through dynamics, mechanics and components. Through this process, greater motivation and involvement of the student can be achieved, while the development of certain skills is encouraged, as well as autonomous learning. This paper describes the process of implementing a gamification tool for the subject "Statistics Applied to the Tourism Sector" of the Degree in

Tourism with the aim of presenting a dynamic and attractive training process for the student.

The tool is developed from a transversal point of view that allows its implementation in similar subjects of higher education. Specifically, a narrative is developed around the professional promotion of the student within a fictitious hotel company where he will reach a higher professional rank as the game progresses and passes a series of tests and / or events. This narrative fosters the student's intrinsic interest in the activity, while reinforcing the usefulness of the game itself for future professional experiences.
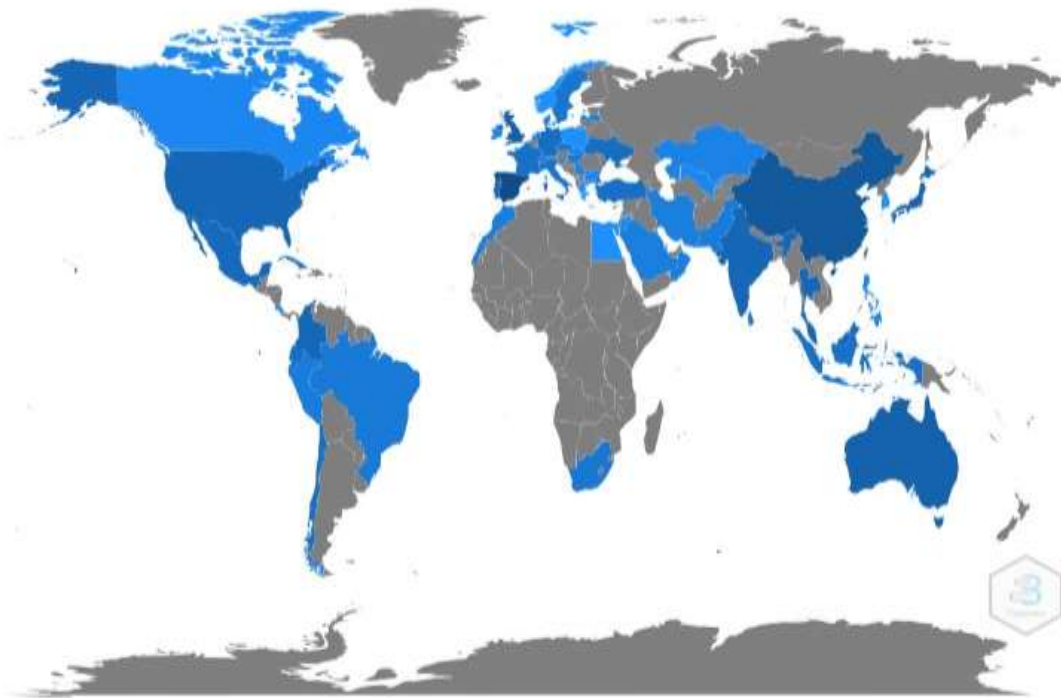

Figure 5. Scientific production by country

The countries with the greatest scientific production are presented in figure 5, this is interpreted according to their colors, where the stronger the color means that it has more contributions, for this case the most representative are: Spain ranks first with 241 contributions, followed by China with 93, the United Kingdom with 50 and Australia with 41. From the Iberian country the most recent research is from of the authors Magaña, et al. (2023), where he explains that "Technologies have an increasing influence on training, being essential to improve the digital competence of the whole society, especially of the agents

involved in education. The objective of this study is to analyze the perceptions of future primary school teachers about their level of digital competence. A quantitative longitudinal panel design (pretest and posttest) was applied, with a descriptive, inferential, and predictive approach. The sample was composed by 185 future primary teachers of the "Universidad de Málaga" (Spain), in the academic year 2021-2022, who answered the "Digital Competences Questionnaire for Future Teachers", in the context of a subject on educational technology. The results reflect positive perceptions about the level of digital competence after completing the subject, with significant differences by gender in favor of men. The variables autonomous learning and motivation were predictors of participants' perceptions, including that of adequate training only for women. In conclusion, it is necessary to further strengthen initial teacher training to improve their digital competence".

Table 2. List of most referenced research papers.

Paper	DOI	Total Citations
MARTÍN-GUTIÉRREZ J, 2015, COMPUT HUM BEHAV	10.1016/j.chb.2014.11.093	253
FAZEY DMA, 2001, STUD HIGH EDUC	10.1080/03075070120076309	161
LEE E, 2016, EDUC TECHNOL RES DEV	10.1007/s11423-015-9422-5	134
FERRER-TORREGROSA J, 2016, BMC MED EDUC	10.1186/s12909-016-0757-3	83
BROOMAN S, 2014, STUD HIGH EDUC	10.1080/03075079.2013.801428	73
MACASKILL A, 2010, STUD HIGH EDUC	10.1080/03075070903502703	65
MACASKILL A, 2013, STUD HIGH EDUC	10.1080/03075079.2011.566325	63
HU Z, 2011, TECHNOL PEDAGOG EDUC	10.1080/1475939X.2011.554014	41
ZERGER A, 2002, J GEOGR HIGH EDUC	10.1080/03098260120110377	36
SANCHO P, 2009, EDUCATIONAL TECHNOLOGY AND SOCIETY		35
HENRI DC, 2018, HIGH EDUC	10.1007/s10734-017-0152-y	33
ARDI P, 2017, TEACH ENGL TECHNOL		32
BROAD M, 2004, ACT LEARN HIGH EDUC	10.1177/1469787404043810	31
GÓMEZ GR, 2018, EDUC XX1	10.5944/educXX1.14457	29
COLOMO-MAGAÑA E, 2020, EDUC SCI	10.3390/educsci10100275	27
RUIZ AP, 2011, REVISTA EDUC	10.4438/1988-592X-RE-2011-355-038	27
MARCELO C, 2014, REVISTA EDUC	10.4438/1988-592X-RE-2012-363-191	26

JIN W, 2017, EURASIA J MATH SCI TECHNOL EDUC	10.12973/eurasia.2017.01034a	25
OATES S, 2019, FRONT EDUC	10.3389/feduc.2019.00102	24
PINA FH, 2010, REVISTA EDUC		24

Table 2 includes the 20 papers on the research topic with the most citations, of which the documents of Martín-Gutierrez J. stand out with 253 references, that of Fazey D. with 161 and that of Lee E. with 134. The most cited study is of the article type and deals with "The learning scenarios described in this paper go further than any previous approach. The connections between augmented reality (AR) and traditional textbook-based learning through the well-known augmented books also known as "magic books", are already there. However, they are restricted to a few isolated uses that commonly take place on a PC displaying 3D information with few actions in higher education. In a collaborative and autonomous way, this work combines all the learning processes of the subject of electrical machines in the electrical engineering career. It allows interactive and autonomous study, as well as the collaborative realization of laboratory practices with other students and without the assistance of the teacher. The tools presented in this paper achieve a connection between theoretical explanations and laboratory practices using augmented reality as a nexus. Students feel comfortable about it and find the tools enjoyable, easy, and useful, according to the objective of content learning, performance training and design of facilities and machines". (Martín-Gutiérrez & al., 2015)
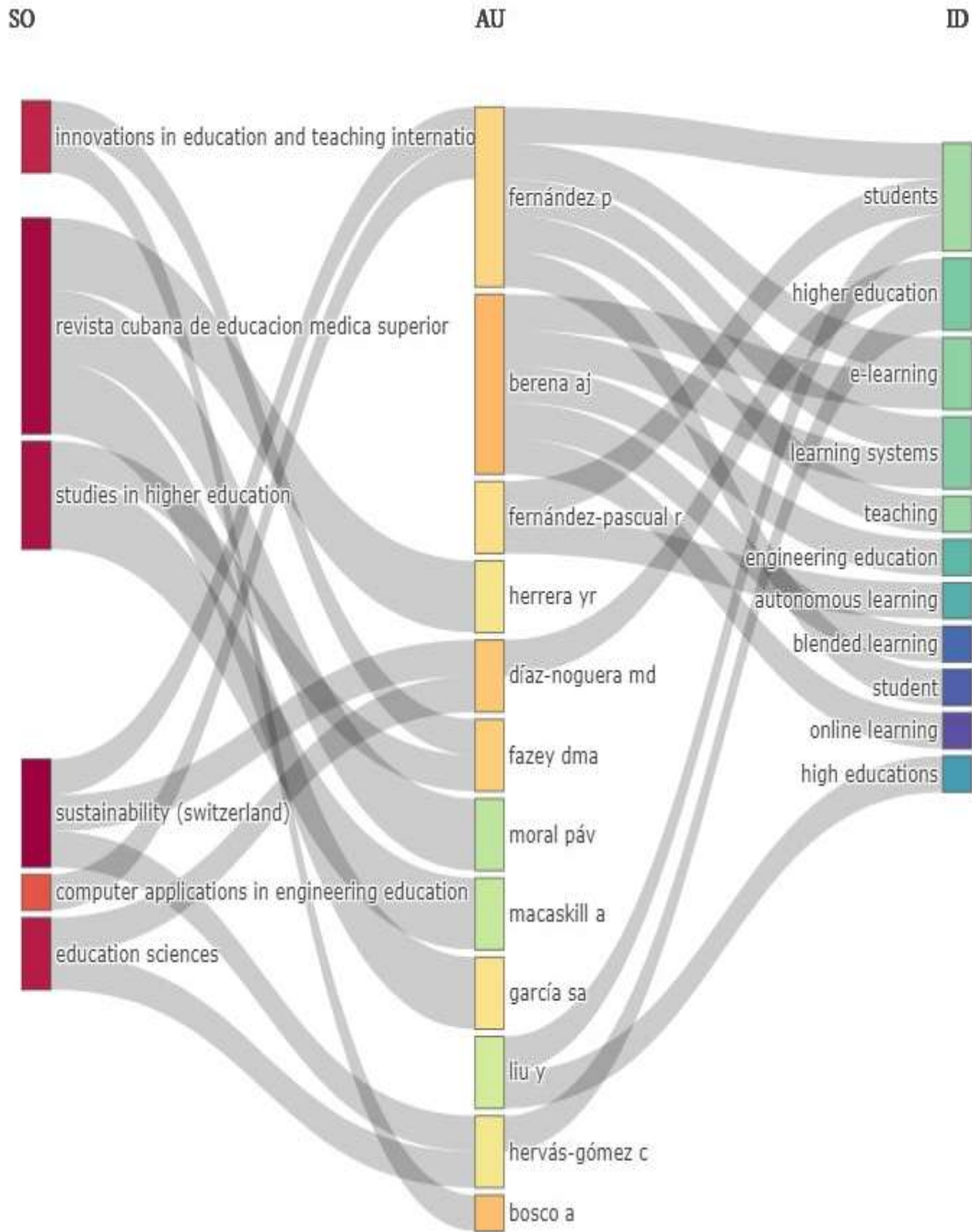
Figure 6. Correlation of three fields.

Figure 6 shows three fields, the one on the left side formed by journals, the one in the center by authors and the one on the right by keywords, which are related to indicate which are the researchers who most use the key terms of the study, and which are the journals in which they publish or follow their same line of research. It is observed, for example, that the author Fernández P. is one of those who are most related to the subject, because it

is related to words or terms such as: students, e-learning, learning systems and teaching; there is also evidence of a relationship with the journals Sustainability (Switzerland) and Computer application in engineering education.
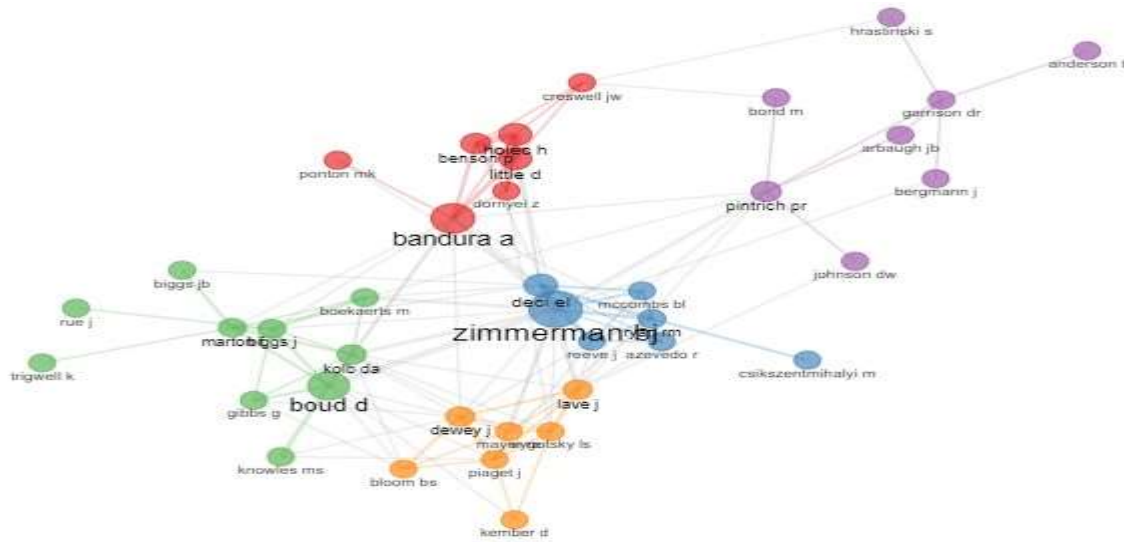

Figure 7. Author-to-author co-citation network.

Figure 7 shows the network of co-citation between researchers, which allowed to identify 5 clusters that involve the most cited authors among themselves, which are grouped as follows:

-Red cluster: I include 7 correlated authors, which were: Bandura A., Little D., Benson P., Holec H., Dornyei Z., & Ponton M., and Creswell J.W.

-Blue cluster: Zimmerman B.J., Deci E.L., Ryan R.M., Csikszentmihalyi M., Azevedo R., Mccombs B.L. and Reeve J.

-Green cluster: Boud D., Marton F., Biggs J., Knowles M.S., Kolb D.A., Boekaerts M., Rue J., Biggs J.B., Trigwell K., and Gibbs G.

-Purple cluster: Pintrich P.R., Arbaugh J.B., Garrison D.R., Johnson D.W., Bergmann J., Bond M., Anderson T., and Hrastinski S.

-Orange cluster: D., Vygotsky L.S., Bloom B.S., Dewey J., Mayer R.E., Piaget J. y Lave J.
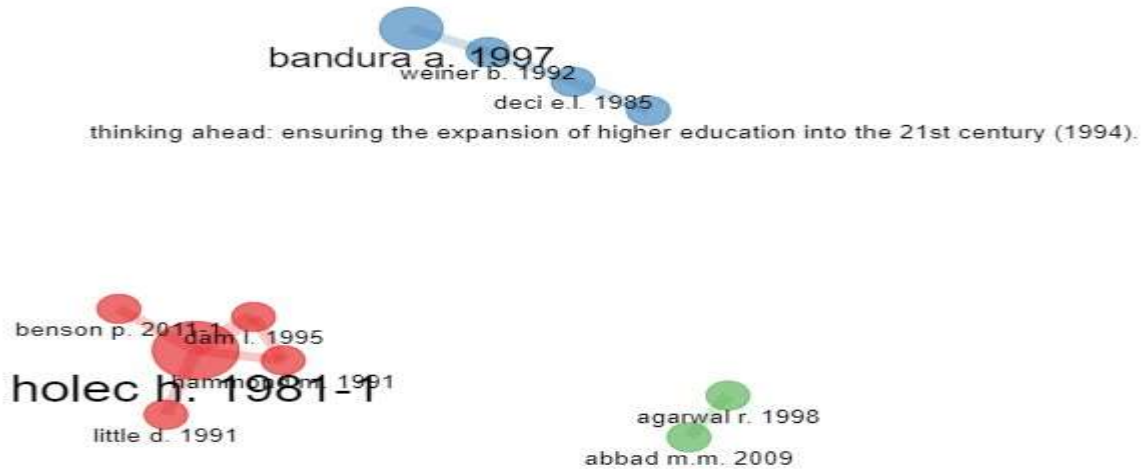
Figure 8. Network of co-citation between documents.

In figure 8 you can see the network of co-citation by research papers, which allowed to identify 3 clusters involving the most cited documents, which are grouped as follows:

-Cluster 1: Included 4 correlated documents, which were: Bandura. A. (1997), Weiner B. (1992), Deci E. (1985) and thinking ahead: ensuring the expansion of higher education into the 21st century (1994).

-Cluster 2: This group brought together the largest number of items, including 5 highly related documents, these were: Holec H. (1981-1), Benson P. (2011-1), Dam I. (1995), Hammond M. (1991) and Little D. (1991).

-Cluster 3: In this group 2 authors were related: Agarwal R. (1998) and Abbad M. (2009).

Conclusions

It is concluded that with the search strategy used in the Scopus database on the research topic "Autonomous learning in higher education", there were found 368 research papers from the years 1989 to 2023 and that mostly (70%) were articles. The results also indicate that scientific production in high-impact journals on the subject has generally had a sustained growth, with 2021 being the most productive year.

Authors with high relevance in the research topic are presented, such as: Fernandez P. and Berena A.J., who in most of their publications use key terms such as: students, e-learning, learning

systems, teaching, and online learning, in the case of the first, it uses as sources of publication the journals Sustainability (Switzerland) and Computer application in engineering education. It is also concluded that the work with more citations is the one from Martín-Gutierrez J., with 253 references and that it is a work closely related to the field of research, the country that contributes the most is Spain with 241 documents and the most representative institution is the "Universidad Complutense de Madrid", This being consistent with the previous data.

At the same time, it is concluded that autonomous learning is one of the trends in the educational context with the greatest impact and growth in recent years., whose localized scientific production allows to show the benefits that this can bring to the formative process developed in educational institutions worldwide both in the face-to-face and virtual or hybrid as well as at the primary, secondary or higher level of the educational system.

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