

# Analysis Of Virtual Education And Its Impact On Personal Relationships Worldwide: A Scientometric Analysis

Yahilina Silveira Pérez, José Ramón Sanabria,  
William Niebles Nuñez

Universidad de Sucre (Colombia), Universidad de Córdoba  
(Colombia), Universidad de Sucre (Colombia)

\*corresponding author: [williamniebles@yahoo.com.mx](mailto:williamniebles@yahoo.com.mx)

## Abstract

The present study aimed to conduct an exploration of the literature in order to define trends on the research topic "Virtual education and personal relationships worldwide". The search of the available literature was carried out using the Scopus index database, considering all types of documents published from the years 1997 to 2022. As a result, 520 research papers were obtained, which were downloaded from Scopus in csv file format, which was processed with the Biblishiny application of the statistical software Rstudio, from which all the metrics used in this work were extracted. The findings found were the following: Scientific articles were the most predominant in the search carried out (410), annual productivity showed an increasing trend from the years 2017 to 2022, being the latter the most productive with 178 published research papers and finally the journal, country and authors that have the most impact in the field of study are Frontiers in psychology, China, and Wang Y.

Keywords: Virtual education, Personal relationships, Bibliometric analysis, Literature analysis.

## Introduction

From a social point of view, it is possible to recognize educational institutions as protagonists of the process of growth and development of society, not only allowing to close the gaps of knowledge but to become a space directed to the construction of the individuality of each of the people and the promotion of interpersonal relationships based on respect, coexistence, and plurality (Chang, 2020; Parra et al., 2020; Huang & Do, 2021). Following this perspective, it is possible to identify educational entities as one of the pillars of modern society, making it constantly evolving and developing to adapt to the trends and needs of the context. It is from these so-called needs and expectations that educational institutions are able to adapt and propose new processes and structures according to the reality of contemporary society (Kouatli, 2019; Baptiste et al., 2022; Ramírez-Duran, Niebles-Núñez & García-Tirado, }2023)

In this sense, one of the most important leaps made by the educational community at a general level is the integration of both synchronous and asynchronous virtual modalities in the formative process (Arango, 2021; Hernández-Sánchez et al., 2022). It is undeniable to recognize the great impact that virtual education has had today, which was highly valued from its implementation in almost all countries from the COVID 19 pandemic (Alsoud & Harasis, 2021). This modality allows, among several of its benefits, to optimize the training process, managing to close the gaps related to student mobility and in turn promoting autonomy in learning (Tarc, 2020).

However, this new context of the education system entails the entry of new challenges, several of these related to the technological gaps present in society and also to the effective interactions between the participants (Dung, 2020). From this approach related to interactions between students and teachers it is possible to identify the great challenges that involve the correct generation of spaces for collaboration and

coexistence through effective social relationships (Wilcha, 2020). Certainly, interpersonal relationships are identified as a key point of the formative process today, especially taking into consideration the current trends of society 5.0 where increasingly the presence of digital interactions are the basis of the generation of both academic, professional, and personal activities (Li et al., 2020; Andangsari et al., 2022).

This reality invites the scientific field to generate research processes that allow identifying the present realities so that it is possible to carry out an effective decision-making process in this horizon of the education sector and that it is able to face these so-called identified challenges. Thus, the present study is presented in order to characterize the trends of research knowledge of interpersonal relationships in the field of the education sector through a Scientometric process.

### **Methodology**

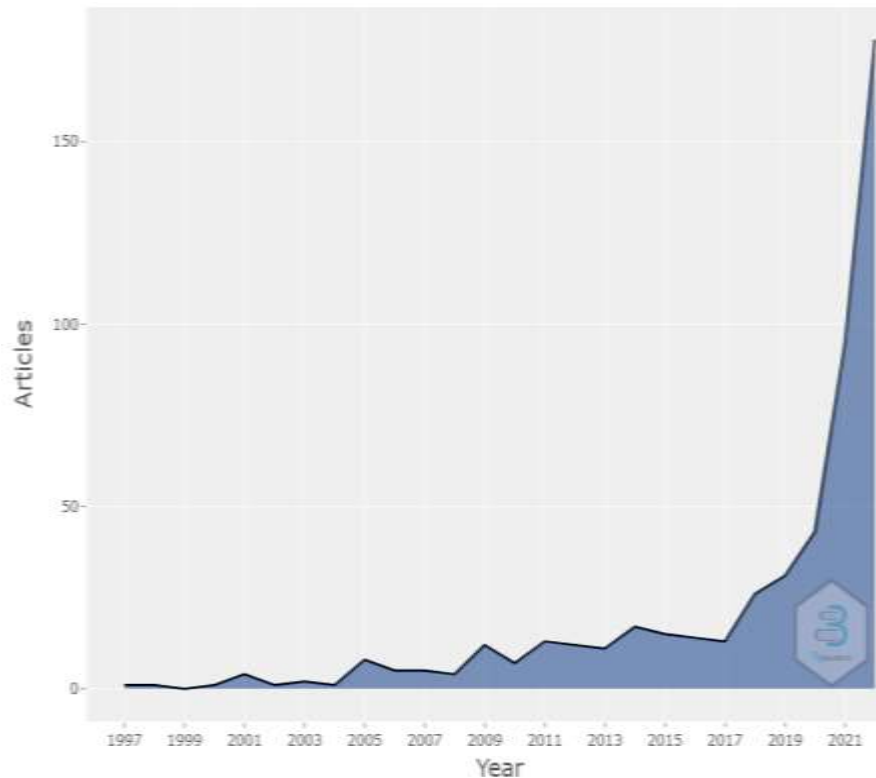
To perform this Scientometric analysis as a first step, the key words or terms to be used to retrieve the information were determined, once it was verified that the terms were appropriate to obtain the best results, then search strategies were applied, such as the use of synonyms, logical operators, filters by areas of knowledge related to the field of research and by languages, the final search equation that reflects these criteria is presented below:

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( TITLE-ABS-KEY ( "Virtual education" ) OR TITLE-ABS-KEY ( "Long distance education" ) OR TITLE-ABS-KEY ( "online education" ) AND TITLE-ABS-KEY ( "Personal relationships" ) OR TITLE-ABS-KEY ( relationships ) OR TITLE-ABS-KEY ( empathy ) ) AND PUBYEAR > 1996 AND PUBYEAR < 2023 AND ( LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "ECON" ) OR LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "PSYC" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) OR LIMIT-TO ( LANGUAGE , "Spanish" ) ) , generating a
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result of 520 documents of different types, such as articles, books, book chapters and abstracts. The search results were subsequently downloaded from the Scopus database in a file in csv format, which was analyzed with the Biblioshiny application of the statistical software Rstudio, which allowed to generate the tables and maps of co-citation networks between authors, documents, and sources.

### **Results**

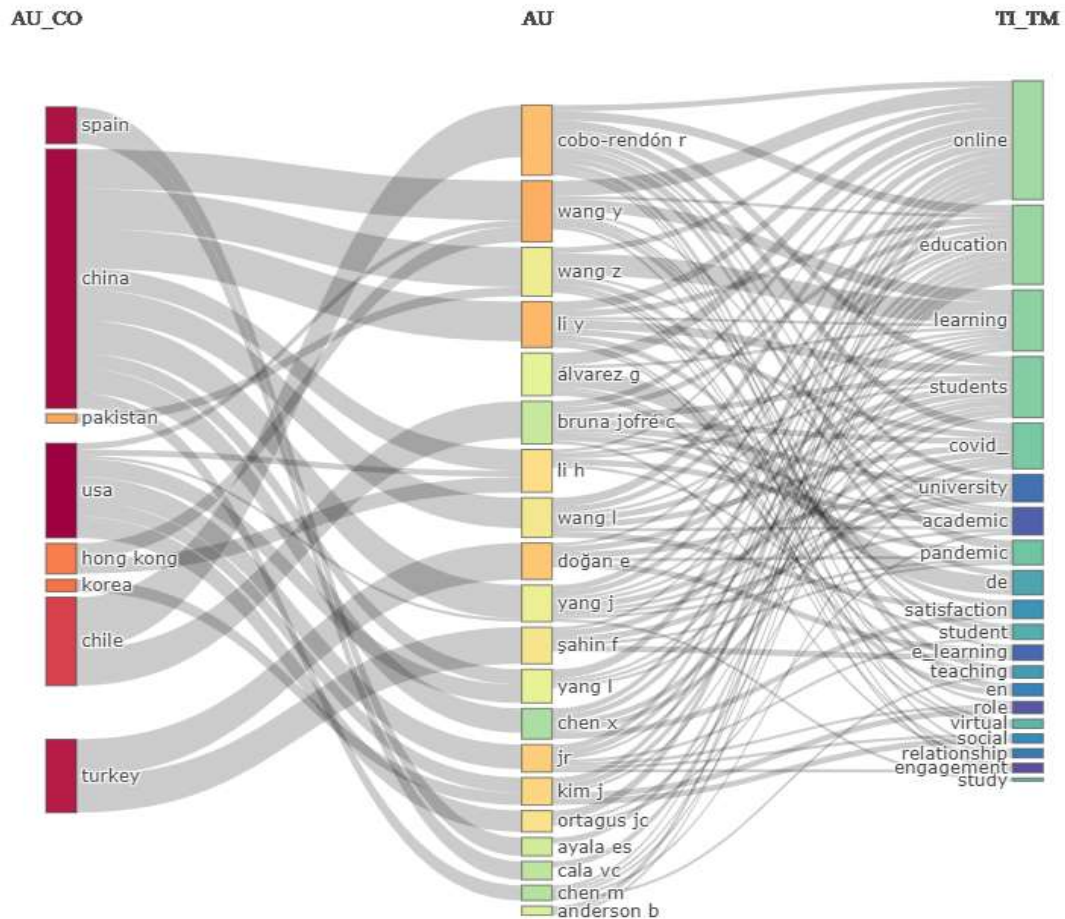
The search carried out in the Scopus database on the research topic "Virtual education and personal relationships worldwide" from the years 1997 to 2022 showed the following central information: 520 documents were obtained in general, of which 410 were indexed journal articles, 31 book chapters, 62 conference papers and 15 reviews. The annual production shown in figure 1 regarding the research topic "Virtual education and personal relationships worldwide" shows an increasing trend from the years 2017 to 2022, The latter being the most productive with 178 published research papers showing greater interest from researchers in the last two years.



**Figure 1. Annual productivity**

According to Bedi (2023) “Student engagement is a key factor in promoting learning and academic achievement. This study explores the factors underlying student engagement and best practices advocated by students and faculty for engaging students. Results revealed that students' motivation to learn and self-efficacy are positively associated with student engagement. In addition, self-efficacy partially mediated the relationship between motivation to learn and student engagement. Finally, both teachers and students suggested diverse and inclusive techniques for engaging students. Online education can become our new reality, and adjusting to this new world requires shifting to a new pedagogical paradigm”. The previous paragraph is one of the most relevant research published in China, this being the country that contributes the most in the area of study and is related in turn to authors such as Wang Y, Wang Z., Li Y. and Li H., these researchers also

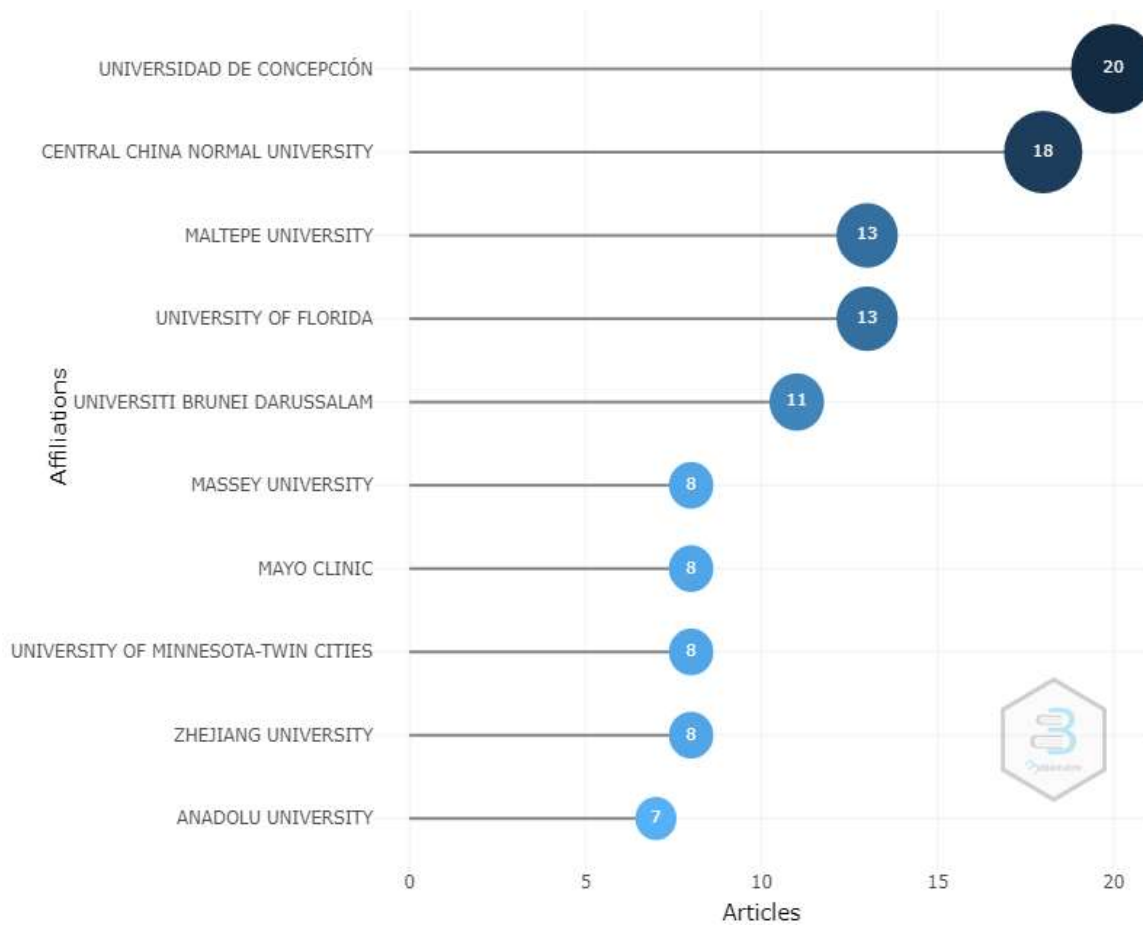
show a relationship with the key terms of the study indicating that their line of research is on education, online, learning, e-learning, students, university and academic.



**Figure 2. Analysis of correlation between countries, authors, keywords of the title**

The production by institutions shown in Figure 3 indicates that the one that contributes the most to the field of study is the “Universidad de Concepción” with 20 published documents, followed by Central China Normal University with 18, Malpete University and University of Florida with 13 contributions each, of the most relevant research in this discipline stands out that of the authors Kim, Merrill, Xu and Kelly, (2022) where they explain that “Technological advances have

made AI instructors, or more broadly machine masters, a lived reality. However, there is limited information available on how students will perceive an AI instructor providing educational content. Therefore, the present study examines the effects of an AI instructor's voice and experience on an AI instructor's perceived credibility through an online experiment with a design of 2 (Voice: Machine vs. Human) x 2 (Experience: Beginner vs. Expert) between subjects. The findings indicate that students perceive greater credibility from an AI instructor with a human voice than those with a machine-like voice. The study also finds that social presence mediates the relationship between an AI instructor's voice and the perceived credibility of an AI instructor. Finally, the perceived credibility of an AI instructor positively influences students' intentions to enroll in future AI instructor-based online courses. These findings highlight the importance of developing AI instructors who are perceived as credible”.

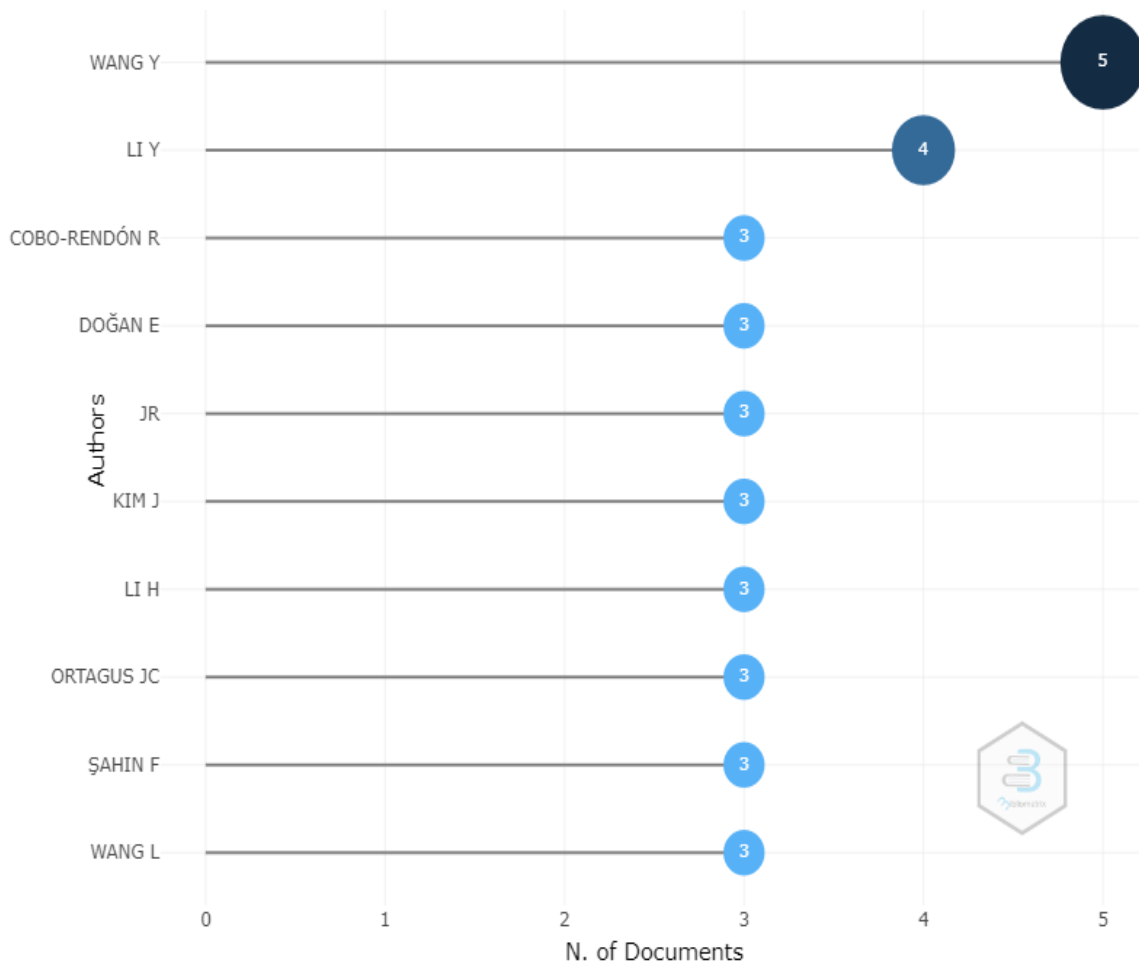


**Figure 3. Productivity by institutions**

Figure 4 shows the top 10 of the most relevant authors in the area of study, of these stand out Wang Y. and Li Y., with 5 and 4 publications each, the second author highlights the study that indicates that “Student attitudes and satisfaction are important predictors of educational quality, especially in such a special situation as large-scale online homeschooling during the COVID-19 epidemic. Objectives: This study investigated high school students' attitudes and satisfaction about online homeschooling during the COVID-19 epidemic and potential influencing variables. Methods: Survey data were collected from 788 high school students in two typical Chinese public schools. Multinomial logistic regression analysis and



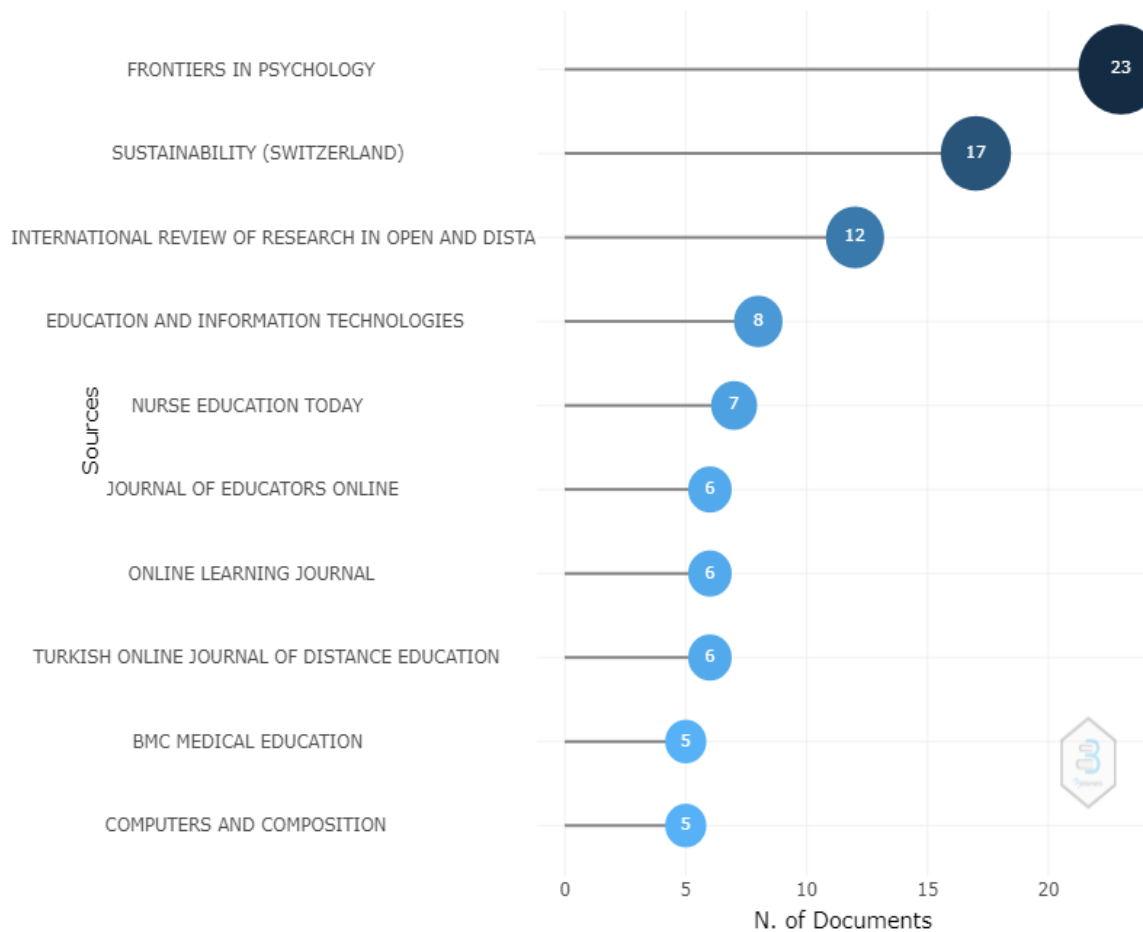
ordinal logistic regression analysis were used to identify influential variables. Findings: We found that more than half of the students surveyed felt that online learning at home was the same (35.9%) or better than (18%) traditional face-to-face learning, while 46.1% felt it was worse than traditional face-to-face learning. More than six-tenths of students surveyed feel satisfied or very satisfied with their online homeschooling, while less than a third maintain neutral attitudes and very few feel dissatisfied or very dissatisfied. Importantly, the study found some influential variables that affect students' attitudes and satisfaction regarding online homeschooling and included individual variables (gender, time spent doing homework, level of learning commitment), organizational variables (type of school) and relational variables (time spent communicating and relating to family members)" (Li, et al. 2022).



**Figure 4. Most relevant researchers**

In light of the global proliferation of the COVID-19 pandemic, virtual pedagogy has gained unprecedented attention as an alternative mode of educational delivery. This spotlight on online instruction stems from the profound influence educators wield over their pupils, with the teacher-student dynamic emerging as a pivotal determinant within the context of language acquisition curricula. Within the domain of virtual classrooms, pupils' willingness to engage substantively in pedagogical activities hinges upon the presence of appropriate challenges and the presentation of stimulating content. It is within this realm of virtual education that the intricate interplay between motivation, active participation, and evaluative methodologies assumes

paramount significance. Al-Obaydi, Ajedrez, Tawafak, Pikhart and Uгла (2023) unveil a discernible nexus between meticulously structured feedback mechanisms and the tripartite facets of participation observable within an online educational milieu, encompassing cognitive, behavioral, and emotional dimensions. The strategic integration of structured feedback, thoughtfully administered upon the culmination of each instructional episode, furnishes learners with a conduit to articulate their existing cognizance, inquiries fueling their intellectual curiosity, and insights culled from the didactic encounter. The research cohort comprises 114 third-year students immersed in the study of English as a Foreign Language (EFL). The empirical findings of this inquiry unveil sanguine and statistically significant associations binding the three facets of learner engagement—namely, cognitive, behavioral, and emotional engagement—to the judicious utilization of structured feedback mechanisms deployed within the realm of virtual pedagogy. Succinctly put, this study proffers both scholastic ramifications and actionable directives, fortified by empirical evidence, to enhance the efficacy of online learning environments (Al-Obaydi, Ajedrez, Tawafak, Pikhart and Uгла, 2023). The above was taken from the most relevant journal in the studied subject, which was *Frontiers in psychology*, with 23 contributions as shown in figure 5, followed by *Sustainability (Switzerland)* with 17 and *International Review of Research in open and distance* with 12.



**Figure 5. Most relevant journals**

“Research has shown that social presence not only affects outcomes, but also student, and possibly instructor, satisfaction with a course [1]. Teachers’ immediacy behaviors and the presence of others are especially important issues for those involved in online education delivery. This study explored the role of social presence in online learning environments and its relationship to learning perceptions and student satisfaction with the instructor. Participants in this study were students who completed the online learning courses of the Empire State College (ESC) in the spring of 2000 and completed the end-of-semester survey (n = 97). A correlational design was used. This study found that students with high overall perceptions of social presence also scored high in terms of learning and perceived satisfaction with the

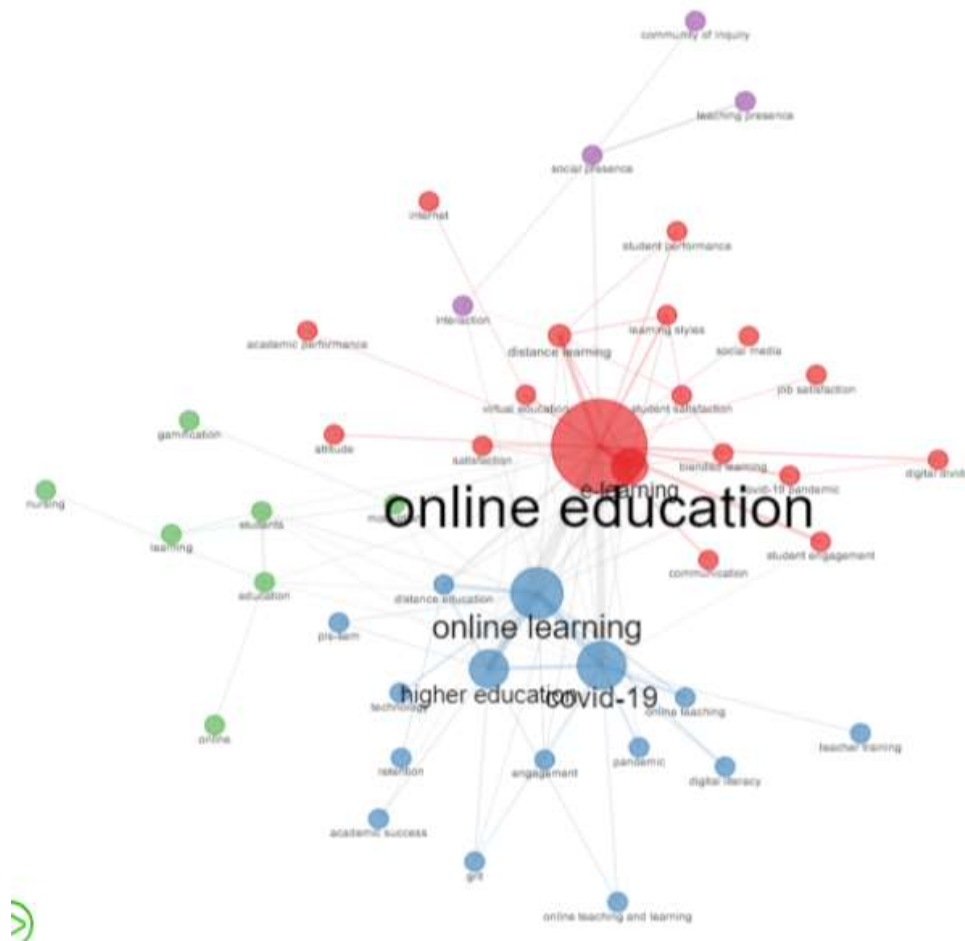
instructor. In addition, students' perceptions of overall social presence contributed significantly to the predictor equation for overall student perceived learning. Gender accounted for some of the variability in students' overall perception of social presence, while age and number of college credits earned accounted for none of the variabilities" (Richardson & Swan, 2003). The document cited above is one of the most referenced works in the discipline of study, which has 960 citations as shown in table 1, it is followed in references by the works of Alavi, Maryam, of the year 2001 published in the magazine Information Systems Research with 423 cites and the work of Dumford A.D., from 2018 in the Journal of Computing in Higher Education with 342 citations.

**Table 1. Most cited documents**

<b>Paper</b>	<b>DOI</b>	<b>Citations</b>
RICHARDSON JC, 2003, J ASYNCHRONOUS LEARN NETW		960
ALAVI M, 2001, INF SYST RES	10.1287/isre.12.1.1.9720	423
DUMFORD AD, 2018, J COMPUT HIGH EDUC	10.1007/s12528-018-9179-z	342
SHEA P, 2009, COMPUT EDUC	10.1016/j.compedu.2008.10.007	334
MORRIS LV, 2005, INTERNET HIGHER EDUC	10.1016/j.iheduc.2005.06.009	269
EOM SB, 2016, DECIS SCI J INNOVATIVE EDUC	10.1111/dsji.12097	193
JOKSIMOVIĆ S, 2015, J COMPUT ASSISTED LEARN	10.1111/jcal.12107	156
AZUBUIKE OB, 2021, INT J EDUCATIONAL RES OPEN	10.1016/j.ijedro.2020.100022	93
KIM HJ, 2018, TOUR MANAGE PERSPECT	10.1016/j.tmp.2017.11.025	93
GLAZIER RA, 2016, J POLIT SCI EDUC	10.1080/15512169.2016.1155994	79
QAZI A, 2020, CHILD YOUTH SERV REV	10.1016/j.childyouth.2020.105582	72
DONAVANT BW, 2009, AD EDUC Q	10.1177/0741713609331546	66
SUN J-N, 2013, COMPUT HUM BEHAV	10.1016/j.chb.2012.08.002	66
SONG H, 2019, INT J HUM-COMPUT INTERACT	10.1080/10447318.2018.1455126	65

NIEUWOUDT JE, 2020, AUSTRALAS J EDUC TECHNOL	10.14742/AJET.5137	65
LANDRUM B, 2020, ONLINE LEARN J	10.24059/olj.v24i3.2066	64
ZHANG Z, 2021, MEDIA CULT SOC	10.1177/0163443720939452	58
KOVANOVIĆ V, 2019, INTERNET HIGHER EDUC	10.1016/j.iheduc.2018.09.001	58
TELLO SF, 2007, INT J INF COMMUN TECHNOL EDUC	10.4018/jicte.2007070105	58
GONZÁLEZ MG, 2003, COMPUT HUM BEHAV	10.1016/S0747-5632(02)00084-5	58

The co-occurrence network shown in Figure 6 indicates that 4 clusters were created, from these, the most relevant is the red color that is made up of the terms: online education (which in turn is the one that occurs most frequently), e-learning, distance learning, blended learning and virtual education, to mention the ones that stand out the most; blue is made up of words like: Covid -19, Higher education, online learning, distance education and online learning; green integrated by terms such as: education, students, gamification, online, learning and nursing; and purple made up of words like: interaction, social presence, learning presence and community of inquiry.



**Figure 6. Network of co-occurrences.**

### **Analysis of co-citations**

The analysis of co-citations begins with the determination of the domain that will be the object of analysis, the selection of the units to be studied (documents, authors, journals, etc.), the choice of the appropriate data sources, and the search and extraction of the records that will make up the set to be studied. Subsequently, the absolute frequency counts of co-citations are made, and the relative frequencies are calculated in order to determine the similarities or distances between the analyzed units. For this, different measures can be used: the Jaccard index, the Salton cosine equation and Pearson's correlation coefficient R, among others. Then, the analysis is performed using different dimension

reduction techniques, in order to convert a multidimensional matrix of numerical data into a visual representation in the form of a map (Miguel, Moya-Anegón, & Herrero-Solana, 2007).

The documents grouped with similar lines of research can be seen in figure 7, where it is seen that there are eight clusters integrated as follows:

Red cluster: Short J. 1976, Marks R.B. 2005, Garrison D.R. 2001, Picciano A.G. 2002 and Swan K. 2005

Green cluster: Fishbein M. 1975, Ajzen I. 1991, and Bandura A. 1986.

Blue cluster: Dhawan S. 2020, Sahu P. 2019 and Aristovnik A. 2020.

Purple cluster: Nunnally J.C. 1994 and Hair J.F.

Orange cluster: Fornell C. 1981, Ajzen I. 1980, Compeau D.R. 1995, Davis F.D. 1989, Venkatesh V. 2008, Wu B., Abdullah F., and Venkatesh V. 2000.

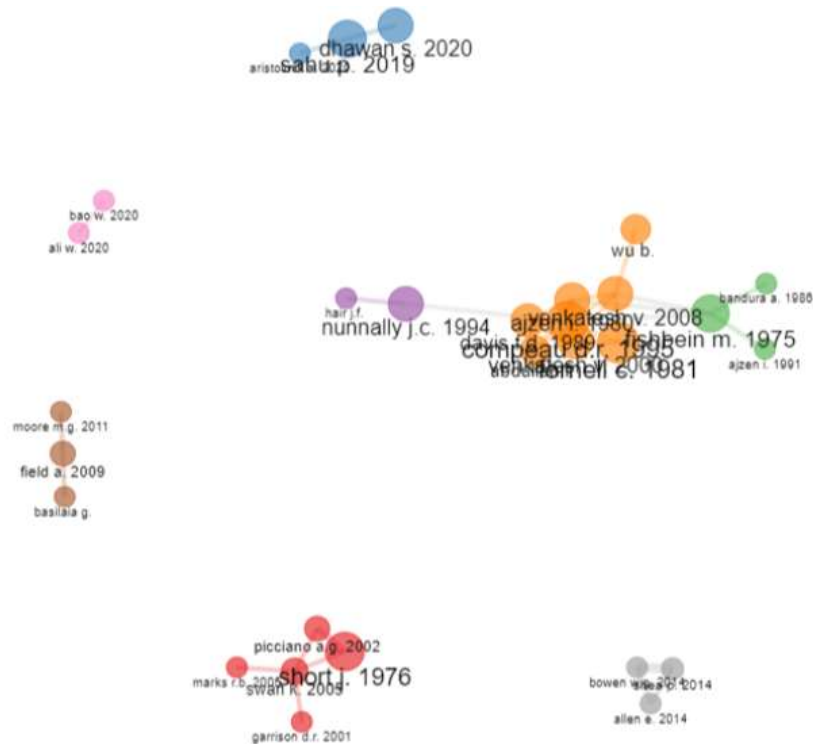
Gray cluster: Shea P. 2014, Allen E. 2014, and Bowen W.G. 2014.

Brown cluster: Field A. 2009, Basilaia G., and Moore M.G. 2011.

Pink cluster: Bao W. 2020 and Ali W. 2020.



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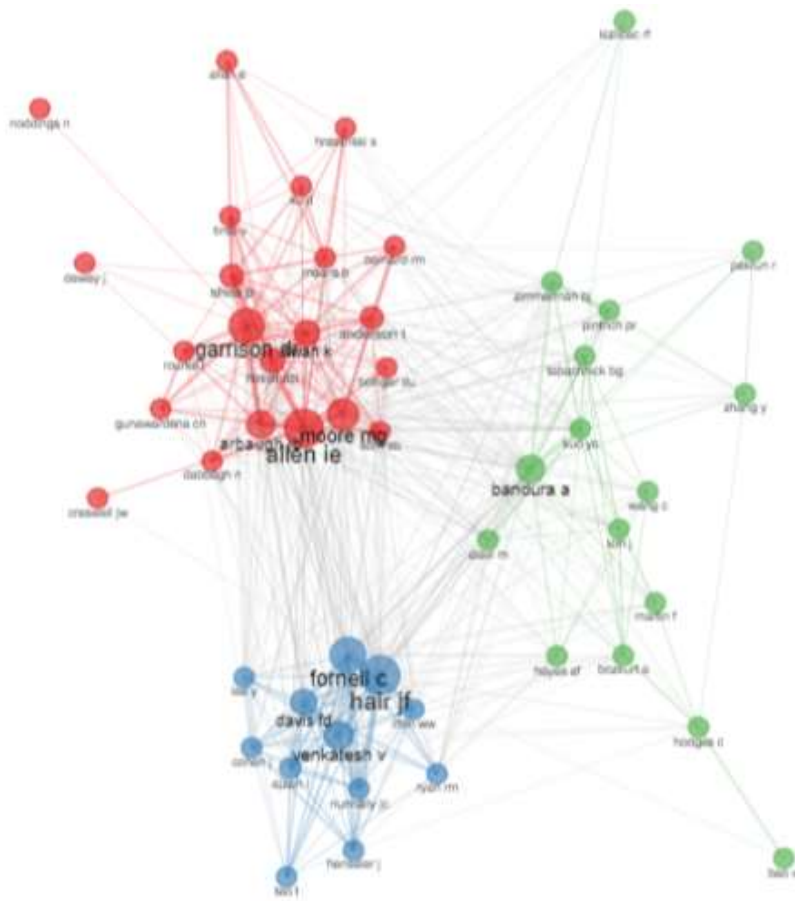
**Figure 7. Papers Co-citation**

Researchers with similar lines of research are shown in Figure 8, where it can be seen that three groups have been formed as shown below:

Red cluster: Garrison D., Allen I., Arbaugh J., Shea P., Moore M., Rovai A., Swan K. and Anderson T., These authors are the most representative of the group and are similar in their thematic line.

Green cluster: Bandura A., Zimmerman B., Kim J., Kuo Y., Tabachnick B. and Alavi M., These researchers share the same discipline of study.

Blue cluster: Venkatesh V., Hair J., Fornell C., Davis F., Ajzen I., Chin ww and Lee Y., they are the most relevant in this group and have in common the same thematic axis.



**Figure 8. Author's co-citation.**

### Conclusion

On the exploration of the literature applied to the field of research "Virtual education and personal relationships worldwide", it is concluded that it is a topic widely explored worldwide, being China the country with the most published on the area of study, followed by the United States and Chile.

According to the analyses of the authors' terms and keywords carried out such as the network of co-occurrences and the Analysis of correlation between countries, authors, and keywords of the title of figure 2, It is stated that the main theme of the study is focused on e-learning and social presence; As a

transversal theme are the terms Online Learning, Online Education and Education.

The descriptive analysis showed that the authors and the sources with the greatest contribution to the field of study are Wang Y. and *Frontiers in psychology*. In accordance with the country that had the most production, which was China, the institution with the most research work contributed to the subject in question was the “Universidad de Concepción”.

In general, it is concluded that the Scientometric analysis carried out using the Scopus index database yielded very favorable results, due to being a topic very explored by the researchers.

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