Pedagogical strategies with technology in the teaching of university academic writing: a systematic review

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Abstract

Introduction. Writing academic texts is one of the most frequent and complex activities carried out at the university. For this reason, it is important to specify which are the pedagogical strategies and tools that teachers use to teach writing. **Objective:** A systematic investigation was carried out on the main research related to techno-pedagogical strategies. **Method:** In this case, 35 research articles on the topic itself and 17 additional articles were consulted to support the methodology and context of the article. **Results:** The analysis focused on pedagogical strategies such as collaborative work, autonomous learning, and competency-based learning. In addition, the tools most used by teachers were virtual environments such as blogs, word processors and virtual platforms. **Discussion:** On the other hand, it is important that teachers use virtual tools and environments according to the learning needs of their students.

Keywords: pedagogical strategies; technological tools; writing process; university; information and communication technologies (ICT).

Estrategias pedagógicas con tecnología en la enseñanza de la escritura académica universitaria: una revisión sistemática

Introducción: Redactar textos académicos es una de las actividades más frecuentes y complejas que se realiza en la universidad. Por ello, es importante precisar cuáles son las estrategias y las herramientas pedagógicas que los docentes emplean para la enseñanza de la escritura. **Objetivo:** se realizóuna revisión sistemática sobre las principales investigaciones relacionadas con las estrategias tecnopedagógicas. **Método:** se consultaron 35 artículos de investigación con respecto del tema y 17 artículos adicionales para sustentar la metodología y el contexto del artículo. **Resultados:** El análisis se centró en las estrategias pedagógicas como el trabajo colaborativo, el aprendizaje autónomo y el aprendizaje basado en competencias. Además, las herramientas más utilizadas por los docentes fueron los entornos virtuales como blogs, procesadores de textos y plataformas virtuales. **Discusión:** Por otro lado, es importante que los maestros utilicen herramientas y entornos virtuales de acuerdo a las necesidades de aprendizaje de sus alumnos.

Palabras claves: estrategia; pedagogía; tecnología; universidad; tecnologías de la información y la comunicación (TIC)

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Estratégias pedagógicas com tecnologia no ensino da escrita acadêmica universitária: uma revisão sistemática

Resumo

Introdução: A redação de textos acadêmicos é uma das atividades mais frequentes e complexas da universidade. Por esse motivo, é importante especificar quais são as estratégias e ferramentas pedagógicas que os professores utilizam para ensinar a escrita. **Objetivo:** Realizou-se uma investigação sistemática sobre as principais pesquisas relacionadas às estratégias técnico-pedagógicas. **Método:** Nesse caso, foram consultados 35 artigos de pesquisa sobre o próprio tema e 17 artigos adicionais para fundamentar a metodologia e o contexto do artigo. **Resultados:** A análise se concentrou em estratégias pedagógicas, como trabalho colaborativo, aprendizagem autônoma e aprendizagem baseada em competências. Além disso, as ferramentas mais utilizadas pelos professores foram ambientes virtuais como blogs, processadores de texto e plataformas virtuais. **Disscussão:** Por outro lado, é importante que os professores utilizem ferramentas e ambientes virtuais de acordo com as necessidades de aprendizagem de seus alunos.

Palavras-chave: estratégias pedagógicas; ferramentas tecnológicas; processo de escrita; universidade; tecnologias de informação e comunicação (TIC).

Introduction

The writing of formal texts is a common activity for undergraduate students in university settings, and a large part of their learning at university is embodied in written texts (Camps & Castelló, 2013). It is important to be able to write appropriately, and, for this, writing requires constant practice (Sabaj, 2009), since it is a complex activity that is immersed in thought processes such as attention, reflection, selection, hierarchization, generalization, and integration of information, in addition to the importance of aspects such as structure and style (Aguilera & Boatto, 2013). Due to this complexity, students must develop writing skills through systematic processes from the beginning of their university activity until the end (López-Cózar et al., 2013).

A student entering university is considered to have a mastery of writing and is expected to be able to build knowledge and produce varied texts inherent to academic life (Clereci et al., 2015; Pineteh, 2014). However, it is observed that written work at university becomes a complex task that demands time and effort, which may even prevent them from completing it (Arnao & Gamonal, 2015; Navarro, 2013). Faced with this problem, some universities in Latin America have incorporated courses or workshops that stimulate reading and writing into their first-year curricula (Álvarez, 2012a). However, this has not been enough to improve academic writing, since it is a more complex problem that begins in school (Fernández & Carlino, 2010).

Consequently, it has been deemed necessary to include information and communication technologies (ICTs) for professors to improve their strategies for teaching writing skills at the university (Márquez & Gómez-Zermeño, 2018). Nowadays, the importance of ICTs as a tool is that it provides autonomy and responsibility in the learning process. In addition, it strengthens collaboration and creativity to contribute to equitable and quality education, since its capacity as to time and distance benefits students and professors (Paucar, 2019). For this reason, Unicef, Unesco, and other global institutions are working

to improve education through the use of ICTs and to introduce them integrally into curricular plans. In the Peruvian context, there has been significant progress since one of the first experiences introducing technology in education with the television broadcast in 1961 by Father Felipe Mc. Gregor (Paucar, 2019). Currently, the aim is to improve ICTs in public universities, since the substantial change in the teaching and learning processes must be taken into account.

Virtual learning environments are highly conditioned by the constant use of technology and its updates (Gros et al., 2009). In addition, ICTs are a pedagogical tool with a capacity to attract young people. Therefore, they can effectively contribute to develop critical capacity in a person, because it can encourage search, review, and classification of information during the writing process (Salazar, 2019). Therefore, through some didactic actions with technology, students could produce texts of a high academic level (Valverde, 2018). This encourages the existence of new spaces of writing. Tools for communication and group work are required to develop online courses with this type of teaching (Valverde, 2018).

However, in order to design strategies that encourage ICT-supported writing (Ekholm et al., 2017), one must consider their characteristics to ensure their proper functioning, that is, to provide clear and precise instructions to students and, in turn, to select platforms or software with dynamic interfaces and graphics that help students in the process of learning to write. In addition, the professor will have to guide this process through dialogues or discussions among students so that, at the end, they raise relevant topics for them and thus encourage their writing (Monsalve, 2015).

Considering the above, the purpose of the present study was the systematic review of the pedagogical strategies such as collaborative work, autonomous learning, and competency-based learning. In addition, these strategies are used by university professors to teach academic writing using technological tools such as virtual platforms, blogs, Drive, Facebook, *Moodle*, etc. Due to the amount of research related to the teaching of academic writing and techno-pedagogy, only sources published in the last ten years (2009-2019) were selected. For this reason, a systematic review was necessary, as this paper answers the following question: What are the pedagogical strategies that include technology in the teaching of academic writing at the college level used in the last ten years? Also, a methodology was used to select and critically evaluate the sources in order to analyze their content.

On the other hand, it is important to highlight that there is no research that reviews the literature of the pedagogical strategies and tools used in the teaching of academic writing, although we identified the paper "Academic Writing with Information and Communication Technology in Higher Education" (Valverde, 2018). This research is a critical review of the literature on tools for digital production of academic texts.

Before the detailed description, it is necessary to point out that pedagogical strategies are the procedures and methods used during teaching, since they lay the foundations for learning in the short, medium, or long term. In this case, it refers to those pedagogical strategies that are used during the teaching of academic writing. In addition, ICTs are incorporated to support the teaching of writing, since it allows extending and rethinking the way they organize, share ideas and information, and the time to function efficiently (Márquez & Gómez-Zermeño, 2018). Likewise, the strategies to teach academic writing are accompanied by some technological tools that help improve writing, since the use of ICTs as educational tools attract students and motivate their learning (Álvarez, 2012b).

Thus, the inclusion of ICTs in the pedagogical strategies for teaching at the university would help increase and make the interaction between professors and students more flexible, generating new learning opportunities, especially as support for academic writing (Márquez & Gómez-Zermeño, 2018).

Design

This is a systematic review paper; that is, "it is the result of a study conducted on published literature (papers in academic journals)" (Suárez, 2017, p. 5). This type of methodology synthesizes the results of research already conducted to extract and compile the relevant and necessary information for the research work (Torres-Fonseca & López-Hernández, 2014).

Based on its purpose, this research is fundamental since it evidences the pedagogical strategies and technological tools used in the teaching of academic writing in the last ten years (2009-2019). In such circumstances, a documentary analysis with a qualitative approach was conducted because it aims to discover the purpose of previous research concerning the latest methodologies in techno-pedagogy in an interpretive way (Suárez, 2017). The guidelines of the PRISMA statement for systematic reviews were also considered (Urrútia & Bonfill, 2010).

The documentary analysis consisted of the search, the reading and the interpretation of various sources of information from studies carried out by other researchers, such as those mentioned below:

Analysis Technique

The following categories and subcategories were used for this information search.

Procedure

This research was conducted using the following keywords in Spanish and English: tendencias pedagógicas (pedagogical trends), proceso de escritura (writing process), universidad (university), tecnologías de la información y la comunicación (TIC) (Information and Communication Ttechnologies [ICTs]).

Also, each document had to comply with the criteria presented below:

1. The document included the keywords mentioned above.
2. Its focus was related to pedagogical trends with technology in academic writing.

3. The paper was at most ten years old (2009-2019).
4. The search for papers was in Spanish and English in different scientific databases.

Study Phases

The research was carried out considering the following phases:

Phase 1. A bibliographic search was carried out and 68 papers were selected from different scientific databases such as Scopus, Ebsco Host, ProQuest, Scielo, Dialnet, Redalyc, among others, and the Google Academic search engine.

Phase 2. The material retrieved was reviewed to verify the quartile in Scimago in the case of the journals and, thus, exclude some sources that would not be considered for the research, such as conferences, seminars, among other documents that did not contribute information for this research. Out of these, 52 documents were selected, with 17 sources providing methodological and conceptual support for the entire paper, and 35 that are based on research in pedagogical strategies and technological tools in the teaching of writing.

Phase 3. We proceeded to read and prepare summaries for the processing of the sources found.

Phase 4. The drafting of the research began with an argumentative sequence, according to the analysis proposed.

A total of 52 papers were selected considering the stablished criteria. In other words, the description of the results from the 35 papers that met the search criteria of the pedagogical strategies and the technological tools used

Table 1

Research Category and Sub-categories

Category	Sub-categories
1. Pedagogical strategies with technology in the teaching of academic writing.	1. Teaching strategies in academic writing 2. Technological resources in the teaching of academic writing.

Source: Own elaboration

was presented. In addition, the 17 research works providing conceptual support for said pedagogical strategies for teaching academic writing are included.

Results

According to the papers reviewed and mentioned above, the pedagogical strategies and technology tools most commonly used in the teaching of academic writing are the following:

First, the **collaborative work** strategy, a type of learning that involves the philosophy of interaction and a way of working—since it implies both the development of individual knowledge and skills—as well as the development of a positive attitude of interdependence and respect for the contributions of the people around (Estrada, 2012). Collaborative learning as a didactic resource is based on the socialization of knowledge in student education through group activities

with the purpose of developing solidarity and exchange (Estrada, 2012). In addition, it involves active participation of students to search for information, analyze it, share it, and thus generate their own learning processes with the support of the professor (Gutiérrez et al., 2011). It also has a series of characteristics that differentiate it from group work and other forms of group organization, since it is based on interdependence with other fellow students, so that the goals are common to all members, in addition to shared responsibility (Echazarreta et al., 2009).

It is also important because collaborative work requires communication skills, reciprocal relationships, and a desire to share the work from participants (Echazarreta et al., 2009). In addition, the professor needs creative planning based on clear educational objectives involving active management of the student and the group (Estrada, 2012).

Collaborative work is characterized by developing interaction with others and, therefore, enhancing the role of technological tools as

Figure 1

Phases of Systematic Review. According to PRISMA
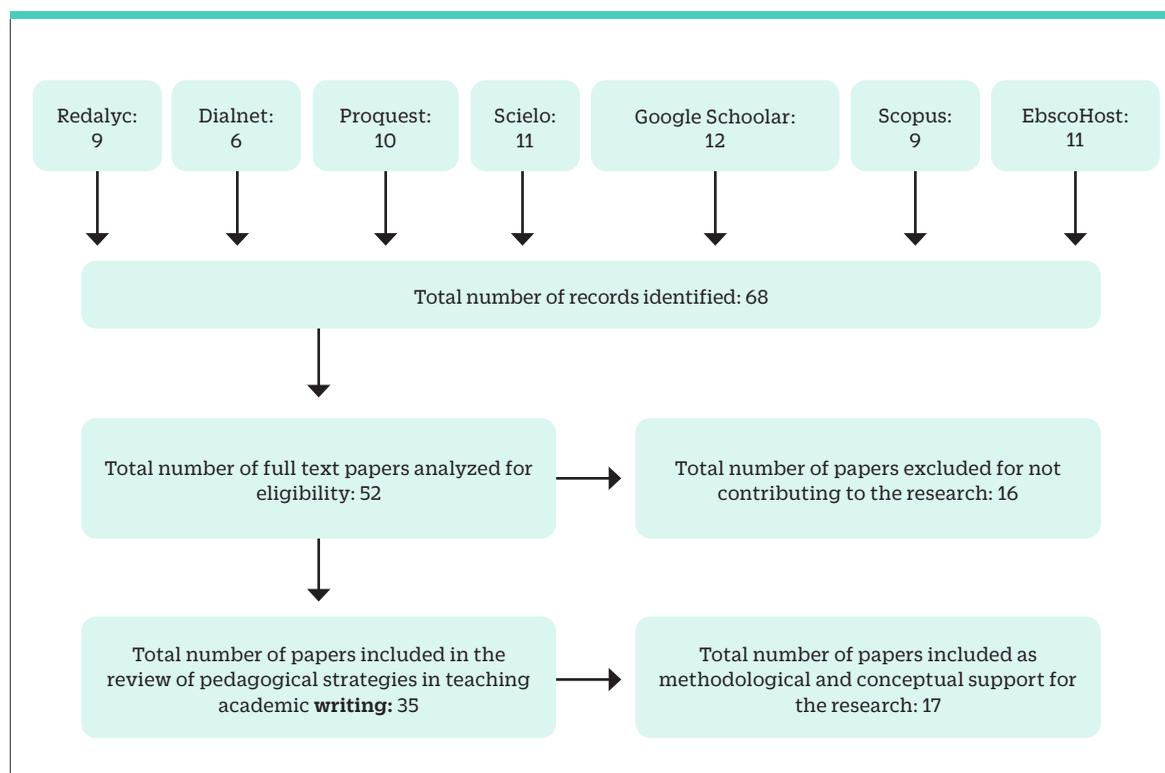
mediating elements in the process of teaching academic writing (Gutiérrez et al., 2011). In this case, the aforementioned strategy is used in most of the research analyzed. For example, Álvarez and Bassa (2013) develop a proposal for collaborative work through the use of virtual environments. In said research, group work is proposed for writing using a content management system (CMS) and the WordPress blogs proposed by professors.

In another case study, Márquez and Gómez-Zermeño (2018) present a proposal for educational innovation that manages to integrate the use of a social network to collaborate in the elaboration of a scientific paper through a virtual group writing at an academic level using ICTs. In this study, the Webex tool was used, a platform that allows recording videoconferences for synchronous participation, in addition to designing activities (Márquez & Gómez-Zermeño, 2018). On the other hand, in another study, Ayan & Seferoğlu (2017) develop the idea of using the Etherpad platform for collaborative work. This is a new way of teaching a traditional class to students with different languages.

Another research on collaborative work was the proposal in which the progress of learning to write was analyzed through a collaborative revision between peers and the professor (Corcelles et al., 2013). The result of this research was an improvement in the methodology used, which favored the continuous revision of the text on formal aspects, coherence, and cohesion. In addition, collaborative work contributed to the social interaction between heterogeneous groups, the existence of interdependence, and the participation through communicative skills (Monzón, 2010).

In another study, collaborative actions through the potential for group writing showed that the blog is a useful technological tool for the production and dissemination of academic writing with a technological language. In addition, it allowed the creation of learning networks through the collective construction of knowledge (Valverde, 2018). Likewise, with the purpose of developing discussion and collaborative work skills, a blogging system was used in the research-intervention of Ethics students from Universidad de México (UNAM). The application

of this tool was aimed at improving pedagogical practice in order to implement writing skills (Monzón, 2011). Finally, with the online versions of word processors, such as Drive or Microsoft online, collaborative writing experiences are also created, where knowledge is fostered in a joint or individualized way (Valverde, 2018).

Additionally, strategies that promote **autonomous learning** in students are observed. Autonomous work is an educational tool that allows for more reflective and less rote learning (Romero & Crisol, 2012). This is the capacity that the student has as a primary characteristic to guide and evaluate his or her way of acquiring knowledge sensibly and intentionally (Llanos & Villayandre, 2014). This type of learning promotes self-management of knowledge to educate oneself, developing spheres of action that incorporate cognitive and metacognitive strategies, which favor the mastery of higher order thinking skills. On the other hand, self-directed learning requires self-regulation that evaluates intellectual and social learning as a means to plan, control, and outline improvements that favor learning strategies that promote a conscious reflection on the way of learning to learn (Chica, 2010).

In this sense, autonomous learning is reinforced if the student has, in addition to the self-assessment activities, some materials prepared preferably by the professor (Delgado & Oliver, 2009). Even in the case of autonomous learning, the student must be guided in some way by the professor. Therefore, it is important to design activities to provide the student with the necessary resources. In addition, there must be a guide with the steps to be followed by the students to achieve the proposed objectives (Delgado & Oliver, 2009).

Autonomous learning is very different from other types of learning because a greater direction and accompaniment by the professor dominates the activities during the class. It is the professor who guides and dynamizes the student's learning, acquiring the role of mediator between the students and the contents (Romero & Crisol, 2012).

In other words, professors design their courses in such a way that students can detect their learning needs according to their objectives and identify the resources they require for writing. Thus, Llanos and Villavandre (2014) mention that,

through the creation of the institutional *Moodle*, a series of multiple-choice questionnaires were developed that served the professor to guide the theoretical explanations and the design of practical reinforcement exercises. In addition, there was a spelling test that included feedback to show students the solution with its respective explanation.

Figueroa and Aillón (2015) also state that the digital writing scheme, as a model to produce texts, and the blog, as the platform for interaction, are considered technological tools of great importance for the effectiveness of the aforementioned strategy. The Universidad de Chile, for example, implemented the self-learning writing platform of the LEA UChile Program, called "LEA lab." With this project, it was proposed to develop the students' communication skills at the institutional level (Gonzalez, 2018).

On the other hand, members of Universidad Complutense de Madrid designed the Redac Text 2.0 platform to guide their students during the process of writing academic texts (Álvarez & Andueza, 2017). In this space, teaching activities were carried out to employ cognitive strategies that facilitate the writing process. For this purpose, a study was designed to work on the writing of texts with the students. These students were divided into two groups, and then their work was compared through a series of indicators with and without the use of the platform (Álvarez & Andueza, 2017). From this study, it is supported that the platform is an effective instrument for improving the quality of some characteristics of the text. In addition, it favors autonomous learning, since it provides a tool of interest to transform the reading and writing experience in university classrooms (Álvarez et al., 2015).

Likewise, in his project "A didactic proposal through learning networks to improve the reformulation skills of pre-university students," Álvarez (2012a) presented two experiences on Facebook and *Moodle*. The purpose of these experiences was for students to improve their process of understanding and producing texts through the training and development of their skills.

Third and finally, the strategy used was **competency-based learning**, whose pedagogical proposal allows for the strengthening of the student's role through the correct fundamentals that can be acquired with the proposed objectives (Cepeda, 2015). In addition, it is understood as the capacity to carry out complex activities and perform them appropriately (Venegas, 2011). This learning consists of integrating the different contents to ensure an effective and strategic application of what has been learned so that the student reaches a high level of performance (Villa et al., 2013). This methodology develops attitudes that are displayed concerning the contexts of the reality in which it is applied (Cepeda, 2015). Therefore, the capabilities and values will allow the student to solve problems or intervene in matters within academic, professional, or even social contexts (Bermúdez et al., 2011).

Unlike other traditional learning models based on content and centered on the professor, the student focuses on his or her responsibility and the development of autonomy (Bermúdez et al., 2011). Therefore, the professor must create situations and problems in which students can develop competencies. To achieve this, the professor's role must shift towards accompanying and guiding students in their learning process. To do this, the student must be seen as an active and self-regulated beginner, who finds the meaning of his or her learning in his or her own experience. Competent professors integrate different knowledge about elements such as content, curriculum, teaching-learning, and students (Villa et al., 2013).

In this sense, competence implies the ability to generate applications or solutions adapted to the situation, mobilizing one's own resources and regulating the process until the intended goal is achieved, such as the teaching of writing (Venegas, 2011). This strategy includes the research conducted on the students of Universidad Católica Santo Toribio de Mogrovejo (USAT), which suggests the need to plan each subject of the curriculum by structuring *macro-competencies*. With the results obtained, the Training Program for Innovation of Academic Writing "Digital Research" was designed, the implementation of which allowed the development of competency-based learning during the first semesters in that education institution. This work is based on the alignment of the use of competencies with a communicative,

cognitive, and socio-cultural approach for formal writing (Arnao & Gamonal, 2015). In this research, some tools such as PowerPoint, Mindomo, Bubble.us, CmapTool, Microsoft Word, Prezi, Drive, among others were used. Also, the word processor was used, which became one of the most developed tools for academic writing due to its outstanding features for editing and structuring texts. This resource facilitated adapting the text format to the type of genre chosen, improving text cohesion by using the dictionary, checking certain spelling and grammatical errors in the text with its autocorrect feature, in addition to the advice that could be given online, etc. (Valverde, 2018).

Discussion

The systematic review of pedagogical strategies with technology in the teaching of academic writing at the university level constitutes unprecedented research; i.e., there are no other similar studies. On the one hand, it is essential to highlight that the authors did find papers on teaching experiences with pedagogical strategies for the teaching of academic writing. Also, a paper was found on the review of technological tools used for writing. However, no research was detected that encompasses pedagogical strategies and technological tools as a literature review of different cases. On the other hand, it is worth noting that the teaching of writing using pedagogical strategies with technology is a topic that is progressively developing. This is because writing is a complex task that involves didactic models, strategies, academic support, and technological tools (Figueroa & Aillón, 2015). In addition, writing about some content requires the development of cognitive processes to plan the written text because it is a process that takes time (Alcover et al., 2015). Oftentimes, faculty assume that students possess reading and writing strategies to face the new academic demands (Clerici et al., 2015). However, the quality of the education received at school is not always adequate (Fernández & Carlino, 2010; Troia & Olinghouse, 2013; Ortiz, 2011). In view of this difficulty, three pedagogical strategies are proposed; these are the most commonly used to teach writing at the academic level required at college.

The importance of the use of technology nowadays should also be emphasized (Martín, 2011). In addition, collaboration and interaction

Table 2

Matrix of the Papers Included in the Systematic Review on Pedagogical Trends with Technology in Academic Writing in the Last Ten Years.

	Author(s), Year, Country	Research design	Main results
1	Aguilera y Boatto, (2013) Colombia	*Retrospective design (Cabrero y Richart, 2020)*	*Theoretical contributions on the production of academic texts based on teaching experience are reviewed.*
2	Alcover, et al., (2015) Argentina	Longitudinal design (Cabrero & Richart, 2020)	*The argumentative ability in written discursive production is analyzed through a research project. The ad-hoc technological-educational device is used to promote the production of texts.*
3	Álvarez (2012a) Colombia	Cross-sectional design (Cabrero & Richart, 2020)	*Describes two experiences (in Moodle and Facebook) that were carried out on virtual environments. In these, the students' writing problems can be appreciated.*
4	Álvarez (2012b) España	Cross-sectional design (Cabrero & Richart, 2020)	*The use of blogs is important for developing literacy skills in the university context.*

	Author(s), Year, Country	Research design	Main results
5	Álvarez y Bassa, (2013) España	Longitudinal design (follow-up studies) (Álvarez y Bassa, 2013)	*A specific case of blogs use for collaborative work in textual production is analyzed.*
6	Álvarez y Andueza (2017) España	Repeated measures design (Álvarez y Andueza, 2017)	*The teaching of writing on the RedacText 2.0 platform is carried out with a group of students. A comparison of the writing of two texts is carried out.*
7	Álvarez, et al., (2015) España	Follow-up study (Cabrero y Richart, 2020)	*The experimental design of the interactive platform RedacText 2.0 to help university students write academic texts is shown.*
8	Arnao y Gamonal, (2015) España	Survey design (Arnao y Gamonal, 2015)	*A survey was conducted among 269 graduate students of the Universidad Católica Santo Toribio de Mogrovejo. The results indicate that didactic processes have not incorporated ICTs.*
9	Ayan y Seferoğlu, (2017) Turquía	Diseño trasversal (Cabrero y Richart, 2020)	*A review of the EtherPad platform for online collaborative writing assignments is conducted.*
10	Camps y Castelló (2013) España	*Non-experimental design (qualitative study) (Cabrero & Richart, 2020)*	*Some fundamental concepts in academic writing at the university are defined.*
11	Castelló, Iñesta y Corcelles (2013) España	Cross-sectional design *(Cabrero y Richart, 2020)*	*We analyze how writing intervenes within the educational framework. The perfection of writing in virtual environments is important.*
12	Castillo, (2017) Colombia	*Cross-sectional design (Cabrero y Richart, 2020)*	*The students wrote a description of their interest in research. This is somehow similar to their university work.*
13	Clerici, Monteverde y Fernández, (2015) Argentina	*Descriptive design (quantitative perspective)* (Clerici, et al., 2015)	*A relationship between reading and writing skills and difficulties is stablished from the academic performance of students at the Universidad Nacional de Entre Ríos.*
14	Corcelles, et al., (2013) México	Ex post facto longitudinal design (Corcelles, et al., 2013)	*Analyzes intervention in improving writing quality. Combined collaborative peer review with professor review.*
15	Ekholm, Zumbrunn y DeBusk-Lane, (2018) Estados Unidos	Non-experimental design (quantitative study) (Ekholm, et al., 2018)	*Writing between 1990 and 2017 is systematically reviewed. The writing attitudes in 46 papers are analyzed.*
16	Fernández y Carlino, (2010) Argentina	Non-experimental design (qualitative study) *(Fernández y Carlino, 2010)*	*An analysis of interviews with students and professors is carried out to review the reading and writing problems. They face these difficulties at university because they did not develop these skills at school.*
17	Figueroa y Aillon, (2015) Chile	Design research (Figueroa y Aillon, 2015)	*Its objective is to promote academic writing through the production of a scientific essay with technological support.*

	Author(s), Year, Country	Research design	Main results
18	Gallego-Ortega, García-Guzmán y Rodríguez-Fuentes, (2013) España	Case study (Gallego-Ortega, et al, 2013)	*The results of a research on the written expression of Spanish university students are presented. The writing planning process is analyzed in order to know their skills and identify their limitations.*
19	González, (2019) Chile	Prospective study (Cabrero y Richart, 2020)	*The design model of a platform for writing and teaching in virtual environments is presented.*
20	Hasan y Marzuki, (2017) Indonesia	Cross-sectional design *(Cabrero y Richart, 2020)*	*Analyzes the writing performance of university students through assignments. The use of grammar, vocabulary, punctuation, spelling, coherence, and cohesion were reviewed.*
21	Hernández, et al., (2014) México	Action research strategy (Hernández, et al., 2014)	*It shows the development of academic writing skills in university students. Virtuality is used with individual and collaborative contributions from students.*
22	López-Cózar, Priede y Benito, (2013) España	Cross-sectional design (Cabrero & Richart, 2020)	*Written expression is analyzed as a subject in students from several universities in Madrid to finish their degree.*
23	Llanos y Villayandre, (2014) España	*Cross-sectional design (Cabrero & Richart, 2020)*	*It is a support project for teaching innovation in academic writing. It is created to respond to the problems detected in the work of university students.*
24	Magogwe y Nkateng, (2018) Botswana	Longitudinal design (Magogwe & Nkateng, 2018)	*Writing challenges of students at the University of Botswana are described. Academic topics with teaching and assessment approaches are taught.*
25	Márquez y Gómez-Zermeño, (2018)	*Cross-sectional design (Cabrero & Richart, 2020)*	*Through the virtual academic writing group, contributions can be made to the development of writing with ICTs for the publication of research papers.*
26	Martín, (2011) España	Cross-sectional design (Cabrero & Richart, 2020)	*Reflection on reading and writing as cultural practices and necessary strategies for learning and knowledge construction is developed.*
27	Monsalve, (2015) Colombia	Prospective study (Cabrero & Richart, 2020)	*Some research on teaching academic writing about digital texts is reviewed and analyzed.*
28	Monzón, (2011) México	*Cross-sectional design (Cabrero & Richart, 2020)*	*The importance of technology in teaching is presented through the use of a blog.*
29	Navarro, (2013) Argentina	Cross-sectional design (Cabrero & Richart, 2020)	*Based on interviews, reading and writing at university by professors when teaching is analyzed.*
30	Ortiz, (2011) Colombia	Non-experimental design (qualitative study) (Cabrero & Richart, 2020)	*New research paths are proposed to explain, contextualize, and understand the problems that students show with academic writing.*

	Author(s), Year, Country	Research design	Main results
31	Pineteh, (2014) Sudáfrica	Longitudinal design (Cabrero y Richart, 2020)	*Academic writing challenges are discussed, such as the lack of its mastery by students at the Cape Peninsula University of Technology.*
32	Sabaj, (2009) Chile	Longitudinal design (Cabrero & Richart, 2020)	*Errors in academic writing of scientific research papers are described and classified.*
33	Saberi y Rahimi, (2013) Irán	Longitudinal design (Cabrero & Richart, 2020)	*The use of guided tasks to improve writing skills is analyzed.*
34	Troia y Olinghouse, (2013) Estados Unidos	Longitudinal design (Cabrero & Richart, 2020)	*The theoretical content of the writing analysis is summarized to identify strengths and limitations.*
35	Valverde, (2018) España	Critical discourse analysis (Valverde, 2018)	*This is a review of the literature on research experiences in academic writing.*

Source: Own elaboration

through technology make it possible to revitalize the lessons learned when writing. Thus, the potential of technology for academic writing is recognized (Figueroa & Aillón, 2015; Hernández et al., 2014).

On the other hand, while it is true that this research includes a systematic review on the use of pedagogical strategies with technological tools for the teaching of writing, such as collaborative work, autonomous learning, and competency-based learning, it is also important to note that much of the research was immersed in the strategies used at the time of writing. For example, the grammatical approach focuses on the domain of grammatical aspects of the language. Cognitive and metacognitive strategies are explained by professors to address the writing process; these models are currently widely used and are sometimes combined with other didactic approaches, as they seek to teach a variety of textual types that can be adapted to communicative situations that depend on the discourse community (González, 2019). Another important strategy is planning and then writing. In addition, other strategies such as effectiveness, motivation, and process should be taken into account (Gallego-Ortega et al., 2013). For example, doctoral students at the Universitat Ramon Llull have a perspective that analyzes the regulation of writing by reviewing grammatical mechanisms such as punctuation, use of connectors, etc. (Castelló et al., 2013). Another strategy that should also be considered is cohesion to manage grammar when writing (Hasan & Marzuki, 2017). Besides this strategy, there is also the study of foreign languages (FL). This is the case of the students at the Universidad de Bogota: they generated ideas, organized them, edited them, and, finally, sought coherence and cohesion in their writing (Castillo, 2017). Likewise, the writing process proposed by Magogwe and Nkateng (2018) for the students at the University of Botswana has almost the same characteristics of the revision of strategies: planning, organization, presentation, rewriting, and proofreading.

To conclude, the systematic review study described above constitutes a review of the strategies and technological tools used for the teaching of academic writing. In this paper, the review of pedagogical strategies such as autonomous learning, competency-based learning, and collaborative work has been

presented. This last strategy was the most used for the development of the teaching of academic writing, as more research on its use was found.

In addition, some of the tools used in the research reviewed were blogs, word processors such as Microsoft, Office Online, etc., and virtual platforms and environments such as Moodle, Google Drive, among others. However, thanks to the information and communication technologies (ICTs), professors can nowadays access other tools that are more in line with the strategies they use to teach writing and also more targeted, depending on the characteristics of their students. However, it should be considered that there is still a need for the use of other strategies by professors, and with these, for the development of more technological tools.

Finally, given the scope of this paper, its aim is to contribute a basis for future research to identify the strategies and technological tools used in the process of teaching academic writing.

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