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# The APA 7th: learning and application difficulties

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**Background:** Educational institutions promote the development of writing in students, a fundamental competence in higher education, where they face challenges such as discursive genres and academic standards, especially in citation. Many undergraduates are unfamiliar with APA standards, which leads to common errors and frustration, although initiatives such as workshops and feedback have been shown to be effective in improving their learning.

**Aim:** This study aims to assess students' knowledge of APA 7th and to identify common errors in applying it.

**Methodology:** Two questionnaires with 20 questions each were designed and administered to 70 students before and after providing asynchronous resources. The results indicate a low overall knowledge of APA 7th among students.

**Findings:** Undergraduates are found to be more proficient in indirect citations, tables and figures, but less proficient in literal citations and bibliographic references. Asynchronous resources did not have a significant influence on improving the learning of the standards, although there was a slight improvement in the results.

**Value:** It is concluded that it is crucial to reinforce the teaching of APA 7th standards through specific initiatives, such as workshops or assessment rubrics, coinciding with previous studies that highlight this need.

## KEYWORDS

writing, learning difficulty, distance study, intellectual property, quotations, style manuals

## 1 Introduction

### 1.1 Difficulties surrounding academic writing and intellectual property

From an early age, educational institutions, and schools in particular, devote a large part of their efforts and resources to promoting writing in their students. In fact, the development of reading and writing skills is usually a cross-cutting content throughout the curriculum. For example, Spain's Organic Law 3/2020, of December 29, which modifies Organic Law 2/2006, of May 3, 2006, on Education (LOMLOE), details that "oral and written expression," among other issues, must be thoroughly worked on in all areas (Article 19).

This highlights the relevance of writing in the academic, personal and professional trajectory of individuals, because it is considered a social practice (Rodrigues Guimarães et al., 2023). This influence is notable in the higher education context, which is characterized by the acquisition, production and transformation of knowledge by the students. Precisely, this is what writing is concerned about (Rodrigues Guimarães et al., 2023). However, in higher education students must deal with numerous discursive genres (e.g., reports, articles, theses, etc.). Often, students are often unfamiliar with them (Pozzo et al., 2021). This situation is compounded by another added complexity: the learning the conventions of academic writing, which are often unknown to students (Nuñez Cortés and Errázuriz, 2020; Córdova-González and Franco Mendoza, 2022). In this scenario, different authors have warned about the difficulties for writing academic-scientific texts by university students (Gaber and Ali, 2022; Molano Avendaño and Mendoza Afanador, 2023; Mata Ríos et al., 2023).

A fundamental characteristic of science is the substantiation of its ideas and findings. To this end, academic works rely on other authors through citation, which involves allusion to an external document (Pecorari, 2006; Ismail Taiwo, 2019). In this way, a relationship between several authors and works is produced through writing. Moreover, the depth of citation is much greater for several reasons:

- Referencing other works manifests—to some extent—the degree of the writer's knowledge of the topic in question (Jomaa and Bidin, 2017).
- Another relevant aspect of citation is that it entails an ethical-academic commitment on the part of the writer with the work and the referenced author (Pecorari, 2006).
- Finally, and related to the above, it involves a public recognition of the work of other authors (Rezeki, 2018).

Precisely, the final point has a significant relevance from an ethical and legal perspective. Educational institutions, apart from promoting research and education (Nieto Mendoza, 2021), also have a moral obligation to ensure the academic integrity of the work done in them by students (Pecorari, 2006). However, some authors warn that plagiarism is a widespread practice in higher education papers (Valverde González, 2016; Rezeki, 2018; Molano Avendaño and Mendoza Afanador, 2023). These findings are worrying, especially taking into consideration the limited ability of universities and teachers to detect plagiarism, either due to lack of skills (Nieto Mendoza, 2021), the limitations of the anti-plagiarism software used by universities or the excessive workload of the institution. On this issue, Nieto Mendoza (2021) considers that it is necessary to differentiate between voluntary and involuntary plagiarism. The first occurs when a student consciously appropriates the intellectual property of another author to obtain an academic benefit. In contrast, involuntary plagiarism is the result of a lack of knowledge of academic conventions and of citation. In any case, this phenomenon violates the intellectual property of researchers. However, this is a problem shared by undergraduate, master's and doctoral students (Mandernach et al., 2016). For that reason, in recent years there has been increasing academic interest in the study of academic writing and citation in university students (Jomaa and Bidin, 2017). In this regard, it is worth noting that

this paper aims not only to improve students' academic writing but also to raise their awareness of the importance of intellectual property.

## 1.2 Learning and teaching APA 7th standards: state of the art

As indicated above, university works must ensure the protection of the intellectual property of the authors. To this end, depending on the branch of knowledge, one citation model or another is adopted. Some of the most representative are the Vancouver, the Chicago, the Harvard, the Modern Language Association and the American Psychological Association (APA) (Córdova-González and Franco Mendoza, 2022). In the case of the Social Sciences and Humanities, the APA format, which has been present in the field of research since its first manual was published in 1929, has been adopted as a reference (Pecorari, 2006; Gaber and Ali, 2022). Since then, seven editions have been published, the latest in 2019 (American Psychological Association, 2019). It has positioned itself as the reference manual for conducting university work in these branches of knowledge (Kokaliari et al., 2012), because it offers guidelines and recommendations on discursive strategies and on how to cite other works (Talandis and Bailey, 2022). Thus, it has become a very useful resource for researchers (Gaber and Ali, 2022) and students.

However, different studies have corroborated that university students, in general terms, do not know this citation format (Díaz-Álvarez, 2014; Díaz-Donado and Patiño-Niebles, 2017). In several times, they tend to indiscriminately employ and mix the use of several formats in the same academic text (Pozzo et al., 2021). For that reason, citation has become one of the most difficult issues for university students during their study plans in higher education (Mandernach et al., 2016; Venegas et al., 2016; Ojeda Ramírez et al., 2022; Mata Ríos et al., 2023). For example, Nieto Mendoza (2021) conducted a study where he concluded that 86% of students incorrectly employed the APA norms. These results coincide with the work of Díaz-Donado and Patiño-Niebles (2017), which pointed out that for 87.5% of students learning the APA norms was a major challenge, which was also directly related to the difficulty of arguing from other authors (75%). For their part, Nenotek et al. (2022) obtained alarming results, because that 97% of the students did not master the use of these norms. More specifically, some research suggests that university students tend to fail more on the following points:

- The use and form of literal quotations of less or more than 40 words (Díaz-Álvarez, 2014; Mandernach et al., 2016).
- Indirect citation to other works. Usually, they cite only the author's last name or the year of publication of the work (Nenotek et al., 2022).
- The addition of works not cited in the paper in the reference section. At the same time, the opposite happens by omitting some works cited in the body of the text (Pozzo et al., 2021).
- The lack of rigor in the order of presentation of citations (alphabetical or chronological order) (Pozzo et al., 2021).

All this generates a state of frustration and rejection toward the APA norms and, as a result, academic writing on the part of university students (Mandernach et al., 2016). This phenomenon has a deep impact on the learning process. It affects negatively in motivation on the part of the learners toward the content or subject. In more extreme cases, some students reject some subjects due to their lack of competences to cite properly. This matter because is one of the most relevant learning factors (Manzano-León et al., 2022). However, this complexity is also shared by the faculty, who also recognize their lack of mastery in this subject (Rodrigues Guimarães et al., 2023). At the same time, faculty point out that teaching APA regulations is a challenge for them (Mandernach et al., 2016). In turn, other works point out that only 28% of faculty teach APA regulations (28%) and that few teachers make resources available to their students for learning these regulations (Jomaa and Bidin, 2017). However, Molano Avendaño and Mendoza Afanador (2023) concluded that two of the most frequent criteria when evaluating university papers by faculty were the adequacy to APA norms and the argumentation based on other reliable sources, agreeing in this last idea with Akkaya and Aydin (2018).

However, there are some teachers who, aware that students need explicit guidelines in this area (Kokaliari et al., 2012), carry out different initiatives that have shown to be effective in the learning of the APA norms by students. Among these proposals, one of the most frequent is the teaching of specific workshops on APA regulations stands out (Córdova-González and Franco Mendoza, 2022; Gaber and Ali, 2022; Ojeda Ramírez et al., 2022). Although there are other initiatives that have also had a positive impact on students, such as evaluation rubrics and formative feedback (Mandernach et al., 2016). Based on this, the objectives of this research paper are:

- To evaluate the degree of knowledge of university students about APA 7th.
- To identify the most common mistakes made by students when using APA 7th.
- To improve students' mastery of APA 7th through asynchronous resources.

This research aims to reinforce scientific knowledge on this subject. On the one hand, although studies have been carried out in various Spanish-speaking countries (e.g., Argentina, Colombia, and Peru) (Díaz-Donado and Patiño-Niebles, 2017; Córdova-González and Franco Mendoza, 2022; Pozzo et al., 2021) and other languages (e.g., Turkey, Indonesia.) (Akkaya and Aydin, 2018; Nenotek et al., 2022), no specific articles on Spanish and/or European context have been found in the literature. In turn, some studies have carried out interventions in experimental and control groups (Córdova-González and Franco Mendoza, 2022; Nenotek et al., 2022), but no pre-post research has been found in the same group of students. Also, APA standards have usually been worked on in workshops, but not through microlearning. This is an initiative that in the current context, where students have difficulties maintaining attention, this type of format (pills) may be more attractive to students (Mateus-Nieves and Moreno-Moreno, 2021). Finally, the asynchronous format helps to promote flexibility, autonomy, and inclusion in learning (Taylor and Hung, 2022).

## 2 Materials and methods

### 2.1 Research design

This study employed a quasi-experimental pretest-posttest design with a single group to evaluate the effect of an educational intervention on participants' knowledge of APA 7th edition citation standards. No control group was included, and the focus was placed on assessing within-group changes before and after the intervention.

The methodological approach was quantitative, as data were collected using structured, multiple-choice questionnaires and analyzed through descriptive and inferential statistics. This allowed for an objective measurement of the participants' knowledge levels and the identification of statistically significant changes resulting from the intervention.

The design is particularly suited for educational contexts in which random assignment is not feasible, yet it still enables the assessment of instructional effectiveness in real-world settings.

### 2.2 Participants

The study population consisted of 70 university students. Of the 70 participants, 72.9% were men and 27.1% were women. The mean age was  $33.41 \pm 8.25$  years. Table 1 details the nationalities of the study participants. Of the participants, 83.1% were of Spanish nationality compared to 9.8% of South American nationalities (Chile, Colombia, Dominican Republic and Ecuador) and 5.6% from European countries (Germany, Russia, France and Romania). With respect to mother tongue, 94.3% of the participants have Spanish as their main language while 1.4% respectively have German, French, Romanian and Russian as their mother tongue. The percentage of participants whose first language is not Spanish could be considered an intervening variable, as it may affect their comprehension of the questionnaire items and, consequently, the accuracy of their responses. Language proficiency can influence how participants interpret questions, especially if the items contain technical or nuanced language. If this factor is not controlled or accounted for, it could introduce bias and threaten the validity of the results.

Regarding the academic background of the participants, 61.4% of them have a university degree or bachelor's degree, 35.7% have a master's degree and 2.9% have a PhD.

### 2.3 Instrument

Two *ad hoc* questionnaires were used to analyze the degree of knowledge of the participants with respect to the APA 7th standards. The questionnaire was designed and validated by two experts and consists of 20 multiple-choice questions (only one of which is correct) in which various aspects of the regulations are proposed. Experts evaluated the following aspects. First, the objectives of the study. They also assessed the relevance of the items incorporated into the questionnaire, both sociodemographic and the relevance of the specific questions on APA 7th. These were assessed using a Likert scale consisting of four levels. Finally, they

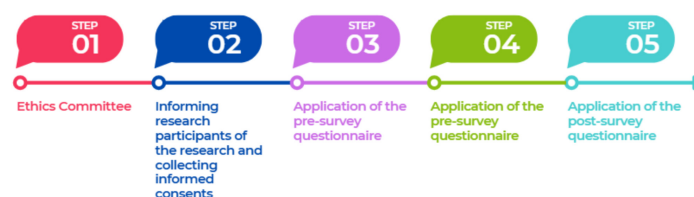


FIGURE 1

Information collection process. Note: Own elaboration.

TABLE 1 Contrast of hypotheses between pre-test and post-test.

	Pre	Post
Mean $\pm$ SD	8.15 $\pm$ 3.25	9.74 $\pm$ 4.18
Top score	17	19
Lowest score	2	0

The Wilcoxon test found no significant differences. The unit of measurement of this table is the number of correct answers marked by participants.

were given a space to express their opinion and make qualitative comments on the questionnaire. Once the experts validated the construct of the questionnaire, internal consistency reliability was assessed using Cronbach's alpha, which yielded a coefficient of 0.81, indicating a high level of reliability. This suggests that the items within the questionnaire are homogenous and measure the same underlying concept, thereby supporting the overall validity and coherence of the instrument.

The questions in the questionnaire are divided into four categories: questions relating to literal citation, questions relating to indirect citation, questions relating to the list of bibliographic references, and questions relating to tables and figures. These categories have been adapted from the work of Hernández Infante and Infante Miranda (2021), who differentiate between the following four dimensions: (1) direct citations (long and short), (2) indirect citations, (3) tables, and (4) figures. However, given the relevance of references and their widespread use in academic works, it was considered pertinent to include this category. On the other hand, since the citation format of tables and figures is similar, they have been grouped in the same category. In turn, the questionnaire has a total score out of 20, with each correct question scoring 1 point. Finally, the questionnaire was digitized in the Google Forms platform to facilitate the collection of information by the students, who answered the questionnaire using this platform.

## 2.4 Procedures

As stipulated in the technical report of the research sent to the Ethics Committee of the Distance University of Madrid (favorable opinion contained in the report N02/22\_23). From an ethical point of view, it is relevant to note that the participants were students of the investigators. However, as stated in the Ethics Committee Report, participation in the study was completely voluntary, and impartiality in the evaluation was ensured. Furthermore, all procedures were carried out in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki Declaration and its later amendments or

comparable ethical standards. Before the data collection, informed consent was requested from all participants, informing them of the purpose and procedure of the study and guaranteeing confidentiality. Information on the collection procedure is shown in Figure 1.

The questionnaire was administered at an initial stage in which the participants had not received specific training (other than that given at their respective universities) on the APA 7th regulations. After completing the initial questionnaire, students were provided with a series of audiovisual resources explaining how to reference in APA 7th. These materials consisted of an infographic and 24 videos of less than 1 min in length, detailing, through examples, how to use this regulation in its different forms (e.g., articles, books, literal quotations, etc.). Subsequently, a second questionnaire of the same nature was carried out again, changing the content of the questions with the intention of assessing the effect of the training on the participants' knowledge.

## 2.5 Data analysis

For the quantitative analysis, first, a descriptive statistic was performed using percentages and frequencies to characterize the participants' degree of knowledge of the APA 7th standard.

To ensure adequate statistical analysis of the data, the normality of the data was tested using the Kolmogorov-Smirnov test for one sample, the result determined that the data were non-parametric. For this reason, the Wilcoxon test was used to test for significant differences between the initial test and the post-test and between the test result and the different contextual variables.

## 3 Results

The analysis of the results showed that no statistically significant differences were found between the result of the test and the socio-demographical characterization variables. The level of knowledge of the APA 7th standard seems, in this population, to have no relation with academic level, gender, university, age, nationality or mother tongue. With respect to the differences between the pre- and post-test, no significant differences were found either. However, as can be seen in Table 1, the post-test results are slightly higher in terms of the final score. Although the two mean scores are very similar. It seems symptomatic that, in the case of both, the mean does not reach half the score (score 0–20).

With respect to the answers to each question, Table 2 shows the results obtained by the students in the pre-test. The table shows the different questions divided into the four categories of the test and



TABLE 2 Percentage and frequency of correct answers to each pre-test question.

Indirect quotations			Literal quotation			Bibliographic references			Tables and figures		
Question	<i>n</i>	%	Question	<i>n</i>	%	Question	<i>n</i>	%	Question	<i>n</i>	%
1	36	51.4	2	19	27.1	3	10	14.3	5	10	14.3
4	23	32.9	9	2	2.9	12	18	25.7	6	20	28.6
8	2	2.9	11	1	1.4	13	15	21.4	7	31	44.3
10	32	45.1	18	13	18.3	16	7	9.9	14	20	28.6
15	9	12.7				17	2	2.8	19	24	34.4
20	6	8.5									
Total successes	108–153.5		35–49.7			52–74.1			105–150.2		

TABLE 3 Percentages and frequencies of correct answers to each post-test question.

Indirect quotations			Literal quotation			Bibliographic references			Tables and figures		
Questions	<i>n</i>	%	Questions	<i>n</i>	%	Questions	<i>n</i>	%	Questions	<i>n</i>	%
1	20	28.2	2	11	15.5	12	4	5.6	3	13	18.3
4	13	18.3	9	2	2.8	13	3	4.2	5	1	1.4
8	11	15.5	10	3	4.2	14	11	15.5	6	15	21.1
15	7	9.9	11	0	0	16	4	5.6	7	3	4.2
20	18	25.4	18	3	4.2	17	8	11.3	19	4	5.6
Total successes	69–97.3		19–26.7			30–42.2			36–50.6		

the number and percentage of correct answers to each question. With respect to the indirect quotations, they are the ones with the highest percentages of correct answers compared to the literal quotations, which have the lowest percentages of correct answers.

Table 3 shows the same results, but of the post-test questions, as in the pre-test, the questions with the highest percentage of correct answers are those of indirect citations and those with the lowest percentage of correct answers are those referring to literal citation.

Table 4 shows the questionnaire option with the highest response rate for each question. In line with the above, the questions with the highest rate of correct answers correspond to the indirect quotations and the tables and figures in both the pre- and post-test, and in the case of the references in the post-test.

On the other hand, the highest percentages of wrong answers correspond to literal citations, references and tables and figures in the case of the pre-test and to literal citations and tables and figures in the case of the post-test.

In a slightly more specific way, the most common incorrect answers have been compiled according to each of the categories:

- Literal citations: the most common mistakes made in this category are (1) using “pp.” to indicate the page instead of “p.” (2) not adding the page of the citation and (3) not using the abbreviation “et al.” when there are more than three authors.
- Tables and figures: the most common errors made in this category are: (1) considering that figure or table notes start with “obtained from” instead of “retrieved from,” (2) the tendency to left-justify figure notes instead of left-justify them, and (3) naming “image” when a photograph is displayed in the text instead of “figure.”
- References: the most common errors made in this category are: (1) adding the city of the publisher of the books,

(2) not including the name of the University in the references of doctoral theses and (3) including “retrieved from” before the DOI link.

- Indirect citations: the most common errors in this category are those concerning: (1) the use of semicolons “;” to separate the author and year instead of the comma “,” and (2) the use of “&” to join authors in a multiple citation.

## 4 Discussion

Once the results of the study have been presented, it is time to put them in dialogue with the objectives and hypotheses of the research. To begin with, and in response to the first objective, which aimed to “assess the degree of knowledge of university students about APA 7th regulations,” it is possible to conclude that the students’ knowledge of this subject does not reach the minimum recommended levels. In other words, 80% of them obtained less than 50% of correct answers in the pre-test. These results coincide with previous research such as that of Díaz-Donado and Patiño-Niebles (2017), Nieto Mendoza (2021) and Nenotek et al. (2022), where it was found that between 86 and 97% of university students used APA 7th incorrectly. In turn, these data reinforce the idea put forward by other authors, who have stated that the correct use of APA standards has become, for many students, one of the most complex issues during their university studies (Mandernach et al., 2016; Venegas et al., 2016; Ojeda Ramírez et al., 2022; Mata Ríos et al., 2023). On the other hand, the absence of statistically significant differences according to academic level converges with the approach of Mandernach et al. (2016), who point out that this lack of knowledge is a challenge

TABLE 4 Options with the highest response rate.

Pre (%)	Post (%)
1—Indirect quotations: A* (51.4)	1—Indirect quotations: D* (74.1)
2—Literal quotation: D (32.4)	2—Literal quotation: A (48.1)
3—References: D (32.4)	3—Tables and figures: A* (48.1)
4—Indirect quotations: C (32.4)	4—Indirect quotations: C (25.9)
5—Tables and figures: B (73.2)	5—Tables and figures: D (92.6)
6—Tables and figures: C (38)	6—Tables and figures: C* (55.6)
7—Tables and figures: A* (47.7)	7—Tables and figures: C (48.1)
8—Indirect quotations: D (39.4)	8—Indirect quotations: A* (40.7)
9—Literal quotation: C (77.5)	9—Literal quotation: A (70)
10—Indirect quotations: A* (45.1)	10—Literal quotation: B (29.6)
11—Literal quotation: A (49.3)	11—Literal quotation: C (55.6)
12—References: C (46.5)	12—References: A (63)
13—References: B (40.8)	13—References: B (48.1)
14—Tables and figures: D (38)	14—References: C* (40.7)
15—Indirect quotations: D (32.4)	15—Indirect quotations: C (33.3)
16—References: A (71.8)	16—References: D (55.6)
17—References: C (36.3)	17—References: D (29.6)
18—Literal quotation: C (43.7)	18—Literal quotation: D (40.7)
19—Tables and figures: C* (33.8)	19—Tables and figures: B (74.1)
20—Indirect quotations: A (52.1)	20—Indirect quotations: B* (66.7)

\*Correct answer.

shared by bachelor's, master's, and doctoral students. Thus, the first hypothesis of the study is confirmed.

Secondly, the research aimed to “identify the most common errors made by students when using the APA 7th standard” and the students’ responses yielded the following information. On the one hand, a higher number of successes were observed when using indirect citations, which may be related to a more widespread use and, therefore, greater familiarity with this type of citation. However, this finding contrasts with the results of [Nenotek et al. \(2022\)](#), who claim that indirect citations are among the most difficult for students. At the same time, students also scored higher when it came to citing tables and figures. On the other hand, a lower level of mastery in APA 7th was identified in correctly citing bibliographical references and literal citations. This last finding coincides with previous research ([Díaz-Álvarez, 2014](#); [Mandernach et al., 2016](#)), where it was noted that students had serious difficulties in making literal citations.

Looking in detail at each of the categories in the questionnaire, the most recurrent errors were as follows:

- With regard to literal citations, the most common errors are those involving the pagination of the citation, the most common tendency being to omit said page or to indicate the source using “pp.” instead of the correct form “p.” this fact, may be due to confusion between the use of “pp.” when adding a book chapter to the bibliographical references.
- Another persistent error was the non-use of the abbreviation “et al.” when referring to more than three authors. This error may have been due to the change in regulations from APA 6th

to APA 7th, as in the previous edition, the abbreviation was used for three or more authors.

- With regard to tables and figures, the most frequent errors are those involving the footnotes, with the expression “obtained from” being considered the correct option instead of “retrieved from,” which would be the correct term to indicate the origin of the figure or table when appropriate, as well as the placement of the footnotes in their correct position. To a lesser extent, but also with considerable incidence, there is a tendency to call figures representing photographs or images “Image” instead of the correct term “Figure.”
- In turn, the most widespread errors with regard to bibliographic references are, on the one hand, the inclusion of the cities of the publishers of the books, an error that may be due to the change in the edition of the regulations, as they were included in the previous edition. On the other hand, the addition of “retrieved from” before the DOI link is one of the most repeated mistakes made by students, maybe because the rule changed in the seventh edition. Difficulties have also been detected when referencing doctoral theses, for which there does not seem to be a generalized idea of how to add them. This error could derive from the fact that students make little use of this resource as a basis for their work, with the use of books or journal articles being more common.
- Lastly, as far as indirect quotations are concerned, and although it was the category with the fewest errors, the main errors were concentrated in punctuation marks, using “;” to separate the author and the year of a publication or adding “&” to separate two different quotations within the same parenthesis.

One circumstance that must be taken into consideration when analyzing these data is that the changeover from the sixth to the seventh edition of the APA regulations has been relatively recent, and given that this occurred in 2019, which also coincided with the interruption of face-to-face classes during the pandemic caused by COVID-19. This could explain some of the errors exposed above, given that the students use some of the rules of the sixth edition, as can be seen below: (1) not indicating with “et al.” when the work is carried out by three or more authors; (2) adding the city of the publisher in the publication of books and, also, (3) “retrieved from” before presenting the link or the doi of the article. Thus, the second hypothesis is partially confirmed, since students confuse the sixth and seventh editions of the APA Style and have difficulties in making literal citations, but not especially in citing tables and figures.

That said, the third objective of the research aimed to improve students’ mastery of APA 7th through asynchronous resources. However, the pre-post analysis shows that these have not had a significant impact on their level of knowledge. Consequently, it has not been possible to confirm the third hypothesis of the study. However, it is worth noting that 12.3% more students obtained at least 50% more correct answers in the post-test than in the pre-test. These data highlight the importance of other complementary initiatives on the part of universities. In this sense, it would be pertinent to reinforce the teaching of the APA regulations by the teaching staff, given that, as [Jomaa and Bidin \(2017\)](#) point out, this is an issue that is little addressed by the teaching staff. At the

same time, it would be advisable to hold specific workshops on APA standards, which have been shown to be effective in other studies (Córdova-González and Franco Mendoza, 2022; Gaber and Ali, 2022; Ojeda Ramírez et al., 2022), provide them with assessment rubrics and offer formative feedback on this aspect when assessing students' activities, as suggested by Mandernach et al. (2016).

Therefore, in future lines of research, it seems appropriate to extend the study by providing students with all these resources, although it may also be of interest to develop them through active methodologies, where the students themselves actively participate in the construction of learning (Manso and Moya, 2019). Gamification, problem-based learning and Service-Learning, through a system of peer tutoring, could be some suitable methodologies to encourage students' motivation and interest in the PLA regulations (Cortés et al., 2021; Calle-Carracedo et al., 2022; Ruiz-Montero et al., 2022), given that, to date, they have shown an attitude of rejection toward them (Mandernach et al., 2016). Likewise, and taking this research as a starting point, it would be advisable to develop audiovisual material and guide the teaching-learning process toward the most common errors that generate the most confusion among students.

However, it should be noted that, as a limitation of the study, the sample can be considered small, especially due to the response rate of the second (post) questionnaire. Another limitation that could have affected the results is the disproportion between the different academic levels, with a low representation of higher academic levels such as people with doctoral studies as opposed to the large majority represented by people with degree or bachelor's studies.

In conclusion, given that the APA standards have become the main reference for citation in the field of Social Sciences (Pecorari, 2006; Kokaliari et al., 2012; Gaber and Ali, 2022), it is essential to improve students' knowledge of them, especially taking into account the difficulties they have in basing their work on academic sources (Pecorari, 2006; Ismail Taiwo, 2019). Solving this problem, together with preventing plagiarism and ensuring ethical practices in universities must be some of the priorities in the coming years, especially considering the ethical challenges facing higher education in the present and the immediate future because of the rise of artificial intelligence: guaranteeing the intellectual authorship of work submitted by students during their training.

The results of this work show several regularly recurring errors in the learning and use of the APA Style. Based on these errors, it will be possible to plan the teaching of the rules in a conscious way and to work directly on those aspects that seem to be more difficult for the students, such as literal citations and changes in the editing of the rules.

The small improvement in the group's use of the regulations seems to indicate that the asynchronous content is not sufficiently effective in consolidating the correct use of APA. However, working on the regulations on a regular basis and focusing on those aspects that represent the greatest challenge for the students could be a way of working on the correct basis for academic work.

## 5 Conclusion

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## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Author contributions

AN: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. AH-S: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

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