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Effectiveness of a Training Program in Improving Scientific Writing Skills Based on APA 7 Style among Postgraduate Students

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Abstract. Scientific writing is the final product of research and can take the form of a master's or doctoral thesis or a peer reviewed journal article. It must follow the appropriate format and style of scientific writing. We verify the effectiveness of a training program in improving the scientific writing skills of 26 postgraduate students at King Faisal University's College of Education. A quasi-experimental approach was used. The sample was divided into 13 experimental group and 13 control group. A scientific writing skills scale and training program (both developed by the researchers) were used. The results showed that there was a statistically significant difference between the mean ranks of the experimental and control groups on the post-test in favor of the experimental group. The results also revealed a statistically significant difference between the mean ranks of the experimental group on the pre-and post-tests in favor of the post-test, the findings of the study indicate that the training program was effective in improving the scientific writing skills of the participants.

Keywords: scientific writing skills, postgraduate students, College of Education, King Faisal University, APA 7

1. Introduction

Writing is of great importance among the four language arts (listening, speaking, reading, and writing) and writers need special skills to deliver their messages effectively and appropriately to the reader. Scientific writing skills are a requirement for postgraduate students because of their significant and direct

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impact on the quality of written scientific material. They also affect the extent to which scientific material is accepted by international publications.

Scientific research is a set of regular procedures followed by a postgraduate student in order to identify all aspects related to the problem of his study, it was necessary to have a comprehensive guide containing everything related to scientific writing in a clear and organized manner, which achieved in APA 7.

Writing based on the style of the American Psychological Association (APA) is required as a part of the undergraduate psychology curriculum. Little is known, however, about the efficacy of specific techniques for teaching students how to format APA-style citations and references (Boysen, 2019). The APA Publication Manual is a valuable resource for social science students and faculty members. However, many students and academics disregard the significance of APA style in encouraging writing excellence, scientific writing occupies an important position in scientific research, no less than methodology. It serves to translate what has been done in the research into the form of a final product that meets the standards governing style (Daniels & Kennedy, 2019; Muhammad, 2016).

Cooper (2020) has provided practical advice on how to understand the APA Style Journal Article Reporting Standards (JARS) and Meta-Analysis Reporting Standards (MARS) and apply them to quantitative research. These standards specify the information that researchers must report, such as detailed accounts of the methods they used, data results and analysis, interpretations of their findings, and implications for future research. Cooper (2020) examined examples from APA journals, providing readers with advice on how to implement the revised standards in their writing and adhere to the guidelines in the 7th edition of the APA Publication Manual. Updated chapters provide more detailed guidelines for reporting statistical analyses and distinguishing features of various types of research, such as replication studies, clinical trials, and observational studies.

Scientific writing refers to the final product of a research project; its expression in an appropriate form that is accepted by various international scientific circles. This also entails following the scientific writing style. Therefore, it is important to teach the scientific writing style based on APA 7 to post-graduate through a training program that include many scientific writing skills.

Writing ability is essential for success in academic and professional pursuits. APA style is a set of guidelines for clear and precise scholarly communication that assists both new and experienced authors in achieving writing excellence. It is used by millions of people worldwide in psychology, as well as in fields such as nursing, social work, communications, education, business, and engineering, to prepare manuscripts for publication, student papers, dissertations, and theses, the APA Publication Manual is the authoritative resource for this style (American Psychology Association, 2019).

Haryono and Adam (2021) conducted a mini-research project in animal ecology to enhance the scientific writing and communication skills of undergraduate

students. This descriptive quantitative research utilized two cycles of action-research technique. The information gathered was analyzed both descriptively and quantitatively. Based on the results, the increase in students' scientific writing scores was 0.6 (moderate). Moreover, as tested during a presentation session, students' communication abilities improved from Cycle 1 to Cycle 2 as a result of the second cycle. The study's findings show that implementing a mini-research project in this course helped students develop their scientific writing and communication skills.

Deng et al. (2019) examined the evolution of Chinese undergraduates' scientific writing competence. Twenty-two undergraduate students participated in this investigation. They were instructed to compose scientific articles based on the researcher's experience with them. Their academic writing was evaluated. The results showed improvement in their scientific writing development.

The research problem originated from our observation of the weak scientific writing skills of postgraduate students in several departments in the College of Education at King Faisal University. We attended scientific seminars in the Departments of Special Education, Education & Psychology, Curricula & Teaching Methods, and Physical Education. We also analyzed examples of scientific writing: 19 research proposals, 18 research projects, and 10 theses. We observed clear weaknesses in the scientific writing of this sample; the level of weakness was 63.83%. This was supported by the results of previous research and studies of postgraduate students in the Faculty of Education. For example, Hussein and Al-Mahlawi (2018) showed weakness in the academic writing skills of postgraduate students in the Faculty of Education. Khatab (2020) also indicated that there is a clear deficiency in the scientific writing skills of postgraduate students at the College of Education. In this study, the skill of expressing the scientific method reached 57.86% and the skill of directing the writing reached 26.31%. Likewise, the postgraduate students at King Faisal University's College of Education have weaknesses in scientific writing skills. As such this research address this problem and specifically attempts to answer the following questions:

1. What are the scientific writing skills needed for postgraduate students at King Faisal University's College of Education?
2. What are the training needs of these students in the field of scientific writing?
3. What is the level of effectiveness of the training program in improving the scientific writing skills of these students?

1.1 Research Terminologies

1.1.1 Scientific writing

Hussein (2018) defines scientific writing as writing related to the field of study in the various departments of specialization, which requires students to practice a set of skills, the most important of which are summarizing, reporting scientific findings, following rules for citations and references, and the basic linguistic skills necessary for writing without errors. Swales et al. (2004) define scientific writing as a linguistic style and format in which scientific theses, research projects, and research are written which has words, structures, connotations, meanings, formulation, and characteristics that make it distinct from other types of writing.

The researchers define scientific writing skills theoretically as the skills that enable researchers to use a distinguished academic method through which they translate what they have done in their research into a final product that meets the quality standards. They are reflected in the current study in terms of the score the graduate student obtained on the scale of scientific writing skills. This assessment is defined as a set of written performances that reflect a series of mental perceptions and show postgraduate students' ability to choose correct and formal procedural words, construct sentences correctly, link sentences appropriately, formulate paragraphs in a clear scientific manner, summarize quotations without violating their meaning, document them in the text, and cite references properly according to APA 7.

1.1.2 Training program

Shehata and Al-Najjar (2003) define a training program as an integrated series of activities that aim to prepare individuals, train them in a specific field, and develop their knowledge, skills, and attitudes in line with their educational experiences, growth, and needs. Procedurally, the researchers define the training program in this study as a set of structured and sequential training sessions that include a set of experiences and activities designed with the aim of developing scientific writing skills according to APA 7.

2. Literature Review

The Scientific Publication Guide APA 7 helps postgraduate students with the tasks required from them as they write their thesis, such as helping them coordinate their citations and their list of references (Griffith University, 2022). Explicitly in the section of the paper's body where they are paraphrasing or quoting. Because they will provide summaries of the work in parenthesis, this is also known as an in-text or parenthetical citation. Near the end of the manuscript, on the References page, they should include all the details required to track down a copy of the sources they consulted for their paper (Northeast Wisconsin Technical College, 2022). An "author-date" citation is used in accordance with APA 7. The author's name and the resource's publication date are cited in-text, and at the end of the paper, a reference list with more comprehensive item information is used. This multidisciplinary referencing technique is highly popular. This guide was created to show researchers how to properly cite the many sorts of sources they frequently utilize for their assignments using the APA 7 referencing style. They can also find examples using a variety of other resource types in the APA 7 Guide (Mutawa & Al-Khalifa, 2014).

There were a number of studies that showed the effectiveness of training programs in improving academic writing skills among postgraduate students at College of Education. Such as the study of Al-Ahwal (2015), which showed that the training program was effective in developing the academic writing skills of the students in the research sample.

Greenberg (2015) evaluated the use of a thorough rubric intended to assess APA-style empirical research papers to improve students' scientific writing. Students who applied the rubric produced higher-quality reports. In addition, students

improved their reports after utilizing the rubric to grade a classmate's. These data show the usefulness of rubrics in formative assessment. Another study aimed to determine which aspects of APA formatting college teachers find most difficult in student writing. Using a Likert-style poll, the researchers determined that concerns with documentation, particularly citations, references, and quotations were the most common source of worry. Numerous style and format mistakes were of little consequence. There were 135 responders, the majority of whom were faculty members teaching undergraduate classes at universities where the APA style is mandated across fields. Whereas the APA Publication Manual is the official source, numerous tools, resources, and tactics can assist students in mastering APA-style rules (Mandernach et al., 2016). The effectiveness of a training program in developing scientific research and innovative thinking skills was verified among postgraduate students, with a clear improvement in the performance levels of the target group, with statistically significant differences between the average scores on the pre-and post-test (Al-Ahwal, 2016). Ali's (2017) study concluded that all of the average scores of the research sample (writing a good title belonging to the field of precise specialization) ranged between 40% and 42.67%. "Accuracy in selecting words" was met by the highest percentage of the sample 42.67%; the lowest proportion 40% achieved "clarity of the relationship between research and summarizing variables in words without tampering or disturbing the meaning." This indicates a significant shortcoming in academic writing skills.

In addition, the effectiveness of using an educational website based on the theory of brain-based learning to develop academic writing skills has been tested among students at the Faculty of Education, there was a statistically significant difference between the study group members on the pre-and post-tests of writing skills in favor of the post-test (Hussein & El Mahalawy, 2018). Number of errors have been discovered in APA-style citations and references among a sample of students. Material creation resulted in significantly improved achievement on both a prompt quiz and a subsequent test. The activities elicited similar levels of enjoyment and effort, according to student evaluations, However, the majority of students favored the error-recognition task, despite the fact that the production activity led to greater learning (Boysen, 2019). Hilali (2019) verified that the strategy of cognitive travel across the web (Web Quest) was effective in developing the academic writing skills of master's students at the College of Education. An experimental method was used. A list of the academic writing skills needed for master's students at the College of Education was used. The study also employed two tests, one of which was cognitive and the other of which concerned the performance of academic writing skills.

The academic writing skills of postgraduate students at the College of Education were developed and the impact of this on their ability to write research plans was investigated, the positive effect of the training program on the skills required to write a research plan has been found (Khattab, 2020). Stiegler-Balfour et al. (2020) studied the influence of in-text APA-style citations on quiz performance as judged by the Multi-Media Comprehension Battery's structure-building ability. The participants were randomly assigned to one of two conditions (APA or no

citations) and asked to read an expository text, followed by a quiz on comprehension. Less-skilled structure builders did significantly worse on a comprehension quiz and read faster in the APA citation condition compared to the no-citation condition. Skilled structure builders, on the other hand, did similarly well on the comprehension test but were required to slow down their reading speed in the APA citation condition.

Al-Zahrani (2021) determined the academic writing skills needed by students at the University of Bisha from the point of view of a random sample of faculty members in the following areas: content writing and organization, language and style, organizational form, and documentation. A descriptive, analytical approach was used. The researcher prepared a questionnaire regarding the academic writing skills required by students. After making sure of its validity and stability, the researcher presented it to the sample to determine the degree of importance they gave to each item. Then, the researcher developed and proposed a concept to include in the communication skills course. The results of the research determined the degree of importance of the necessary academic writing skills, arranged them accordingly, and built a methodological conception to include them in the communication skills course. Another study has been done to determine the effectiveness of a training program based on the introduction of differentiated education to develop academic writing skills and the trend toward scientific research among postgraduate students in the Faculties of Education, the training program was effective in developing academic writing skills and attitudes toward scientific research among postgraduate students in the faculties of education (Ibrahim, 2021).

Quynn and Stewart (2021) aimed to conduct a study to better understand how postgraduate students implement academic writing productivity techniques. Graduate students who attended more than one retreat per year reported increased writing confidence and productivity. The results demonstrate the importance of non-residential retreats in the thesis writing process. A study by Sari et al. (2021) aimed to verify the influence of problem-based learning on problem-solving and scientific writing. The study employed a quasi-experimental design. In addition, grading rubrics for scientific writing and data from problem-solving and scientific experiments were incorporated. The results indicated that the problem-based learning paradigm had a substantial effect on the problem-solving and scientific writing skills of students.

By presenting the previous studies; It is clear that the studies dealt with the academic writing skills only, as they were concerned with documentation according to APA 6, as well as the scarcity of studies that dealt with APA 7, which gives importance to the current study.

3. Materials and Methods

3.1 Research Approach

We used a descriptive, quasi-experimental method with a two-group design. A training program (as an independent variable) was also used. The goal was to verify its effectiveness in developing academic writing skills (the dependent variable) among those in the study.

3.2 Research Sample

The population of the study consist of all students enrolled in postgraduate programs in the departments of the College of Education. From the given population, the sample was drawn and it consisted of 26 students (13 for the experimental group and 13 for the control group) enrolled in postgraduate programs in the following departments: Special Education, Education and Psychology, Curriculum and Teaching Methods, and Physical Education. Their ages ranged from 23 to 32 years with a mean of 27.36 ± 2.14 . Consent to conduct this study was acquired from the Deanship of Scientific Research and the Scientific Research Ethics Committee at King Faisal University and the students.

3.3 Research Instruments

3.3.1. *Scientific Writing Skills Scale (SWSS)*

This scale was constructed to assess the scientific writing skills of postgraduate students. It consist of 30 items and was divided into five dimensions with six statements each. A Likert scale with three points was used; answers ranged from 1 (does not apply) to 3 (applies). External Validity was performed by calculating the correlation coefficient between the developed scale and AlAhwal's scale (2015) as an external criterion. The correlation coefficient was 0.807, and the test-retest reliability was 0.843.

3.3.2. *Training program*

The researchers prepared a training program. They were taught to follow a linguistic style and format that includes words, structures, construction, connotations, meanings, formulation, and characteristics for writing scientific theses, graduate projects, and research, which makes them distinct from other types of writing. We presented the initial edition of the training program to several experts in order to validate its efficacy. Based on their feedbacks, we classified the program's procedural objectives into three areas: (1) the origins and basics of scientific writing, (2) the ethics of scientific research, and (3) the documentation of the text and the references.

We used a variety of techniques, such as lectures, brainstorming, dialogue, discussion, and home assignments. The training program was divided into 12 sessions, with two sessions per week. Each session lasted 120 minutes. Moreover, the program was divided into three phases. The preliminary stage consisted of one session. The subsequent training phase consisted of ten sessions. The evaluation phase concluded with a single session. Table 1 illustrates these sessions in terms of their quantity, phase, objectives, and methodologies.

Table 1. Training Program stages

Stages	Objectives	Techniques
Stage1: Introduction and pre- application (Session 1)	The members of the experimental group familiarize themselves with the program and its content, its benefits, the number of sessions, the time of each session and the total time of the program, and the pre-application of the scale of scientific writing skills.	Brainstorming, dialogue, and discussion
Stage 2: Training on the program's procedural objectives (Sessions 2- 11)	By the end of the program, students will be able to: - understand the basics of scientific writing according to APA 7. - produce scientific writing in Arabic. - identify the components of a scientific thesis, graduate project, or research paper. - accomplish the division of research and its types. - familiarize themselves with the ethics of scientific research. - identify the elements of the title page (cover). - understand the importance of the title and its conditions. - identify the levels of headings. - learn about the concept of the abstract and its types, components, and conditions. - learn about the concept of the body of a study and its sections, and components. - apply the rules of presenting data analysis output such as tables and graphs. - apply the general rules of citation within the text. - implement the rules for quoting an author's words. - implement the rules for citing indirect sources. - apply the rules for the citation of sources that do not include page numbers. - implement the rules for documenting electronic resources. - apply the general rules for creating a list of references and the conditions that must be met.	Lecture, Brainstorming, Dialogue discussion, Cooperative learning, And Homework.
Stage 3: Evaluation (Session 12)	Participants complete the post-application measurement of the academic writing skills scale.	Summary and termination

3.4 Data analysis

All collected data were coded and entered into an excel sheet. Data entry and statistical analysis were performed by using the Statistical Product and Service Solutions (SPSS, version 26.0). Qualitative data were presented using frequencies and percentages, while quantitative data were presented using means and standard deviations. Mann-Whitney and Wilcoxon tests were used to compare between mean ranks.

4. Results

4.1. Scientific writing skills needed for postgraduate students at King Faisal University's College of Education?''.

The results of this study show that there are five basic skills of scientific writing that postgraduate students should be trained on it, which are shown in figure 1.

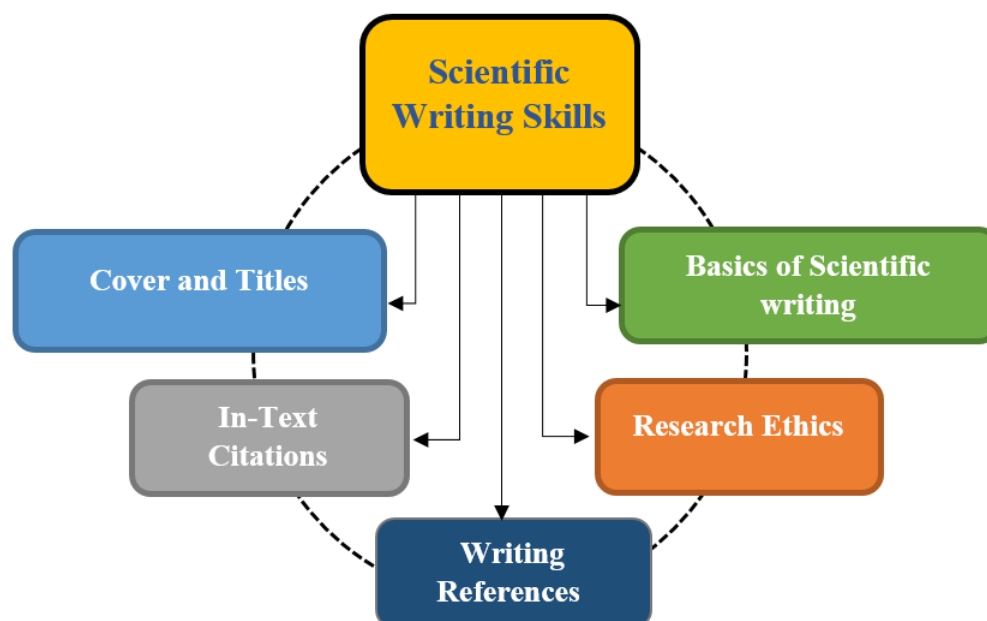


Figure 1: Scientific Writing Skills

4.2. Training needs of these students in the field of scientific writing?''.

Table 2 shows the means and standard deviations of all the items identified. The highest skill was "writing each idea in a separate paragraph and adhering to the specified number of paragraphs per page, according to APA 7." with an average (2.92); then "Ability to summarize a quotation without disturbing the meaning." with a mean of (2.88), then "Preparing the cover page including the basic data required by APA 7." with a mean of (2.85). The lowest skill was "use of clear sentences to express ideas." with a mean of (1.77), then "Avoidance of subjective pronouns such as "I" and "we" and the passive voice." with a mean of (1.81), then "correct use of conjunctions between sentences." with a mean of (1.85).

Table 2. Means and standard deviations for scientific writing skills needs

The field	Training need	Degree of need			Total weights	Weighted mean	Mean	Degree of need
		High	Medium	Low				
Paraphrasing	Use of clear sentences to express ideas.	0	20	6	46	15.33	1.77	MEDIUM
	Correct use of conjunctions between sentences.	2	18	6	48	16.00	1.85	MEDIUM
	Integrity of the grammatical structure of sentences.	1	23	2	51	17.00	1.96	MEDIUM
	Avoidance of plurals and categorical clauses.	2	19	5	49	16.33	1.88	MEDIUM
	Avoidance of subjective pronouns such as "I" and "we" and the passive voice.	5	11	10	47	15.67	1.81	MEDIUM
Scientific method	Commitment to the ethics of scientific research.	20	3	3	69	23.00	2.65	HIGH
	Connecting ideas to each other.	17	5	4	65	21.67	2.50	HIGH
	Ability to summarize a quotation without disturbing the meaning.	23	3	0	75	25.00	2.88	HIGH
	Expressing personal opinions based on evidence.	20	2	4	68	22.67	2.62	HIGH
	Avoid bias when dealing with certain societies.	16	2	8	60	20.00	2.31	HIGH

In-text Citations	Adherence to the rules for citing references in the body of the research paper in accordance with APA 7.	0	24	2	50	16.67	1.92	MEDIUM
	Adherence to the rules of citation in the reference list according to APA 7.	2	22	2	52	17.33	2.00	MEDIUM
Organizing and directing	Preparing the cover page including the basic data required by APA 7.	24	0	2	74	24.67	2.85	HIGH
	Writing each idea in a separate paragraph and adhere to the specified number of paragraphs per page, according to APA 7.	25	0	1	76	25.33	2.92	HIGH
	Writing titles according to their levels in one style according to APA7.	18	5	3	67	22.33	2.58	HIGH
	Putting punctuation marks in the correct position.	19	6	1	70	23.33	2.69	HIGH
	Designing statistical and non-statistical tables according to APA 7 standards.	23	1	2	73	24.33	2.81	HIGH

Figure 2 shows the means of Paraphrasing needs. The highest item needed was "Integrity of the grammatical structure of sentences" with 21%, and the lowest item needed was "Use of clear sentences to express ideas" with 19%.

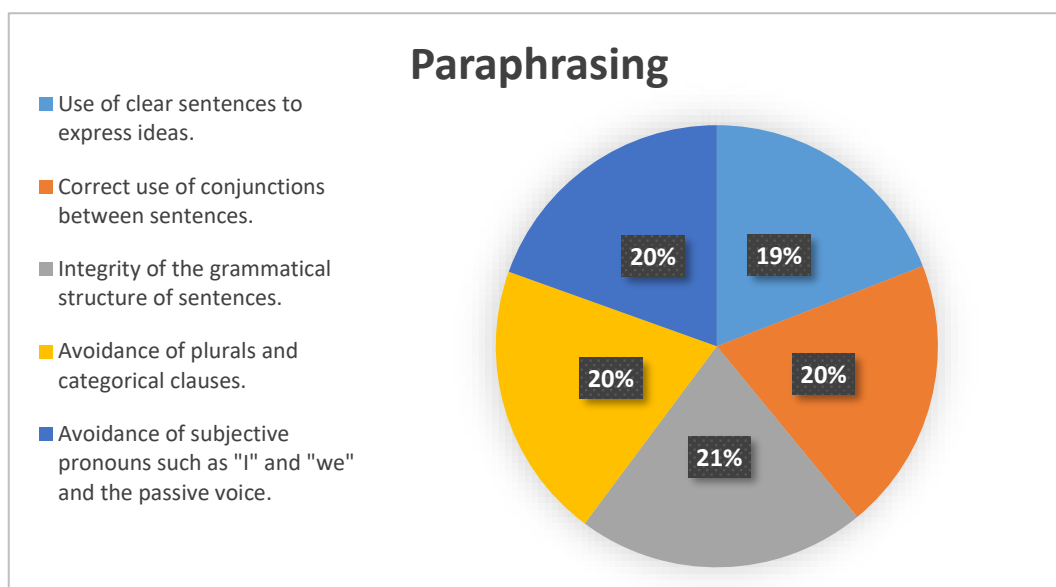


Figure 2: The means of "Paraphrasing" needs

Figure 3 shows the means of scientific method needs. The highest item was "Ability to summarize a quotation without disturbing the meaning" with 22%, and the lowest item was "Avoid bias when dealing with certain societies" with 18%.

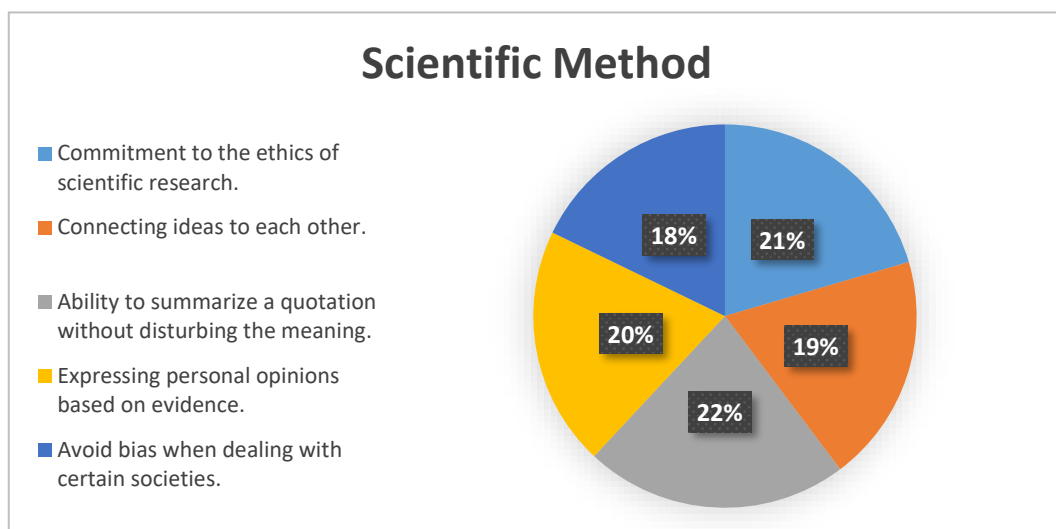


Figure 3: The means of "Scientific method" needs

Figure 4 shows the means of (in-text citations needs). The highest item was “Adherence to the rules of citation in the reference list according to APA 7.” with 51%, and the lowest item needed was “Adherence to the rules for citing references in the body of the research paper in accordance with APA 7” with 49%.

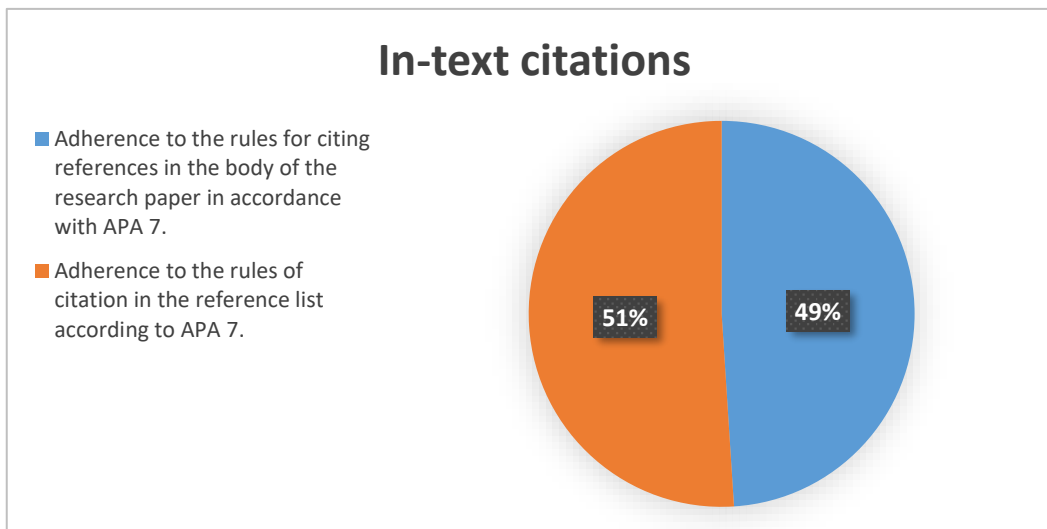


Figure 4: The means of “In-text citations” needs

Figure 5 shows the means of Organizing and directing needs. The highest item needed was “Writing each idea in a separate paragraph and adhere to the specified number of paragraphs per page, according to APA 7” with 21%, and the lowest item needed was “Writing titles according to their levels in one style according to APA7” with 19%.

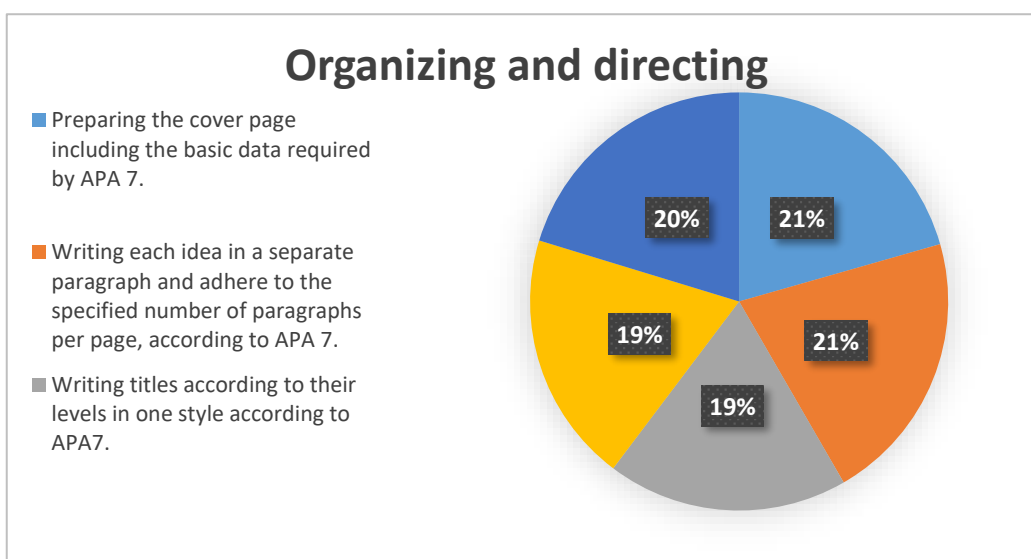


Figure 5: The means of ‘Organizing and directing’ needs

4.3. The level of effectiveness of the training program in improving the scientific writing skills of these students?"

The results indicate that there was a significant difference (significance level ≤ 0.05) between the mean ranks of the scientific writing skills of the control and experimental groups on the post-test in favor of the experimental group. The researchers used the Mann-Whitney test to reveal the significance of the difference between the mean ranks of the scores of the two independent groups, as shown in Table 3.

Table 3. Mann-Whitney test results

The scale and its dimensions	Control group (N=13)		Experimental group (N=13)		Z	P-Value
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks		
Basics of scientific writing	7	91	20	260	-4.369	0.001
Cover and titles	7	91	20	260	-4.370	0.001
Research ethics	7	91	20	260	-4.405	0.001
In-text citations	7	91	20	260	-4.449	0.001
Writing references	7	91	20	260	-4.365	0.001
Total	7	91	20	260	-4.339	<0.001

The value of Z for the total scale was -4.339 (p-value <0.001), which is smaller than 0.05. This difference was in favor of the group with the highest average, which was the experimental group. This means that the program used to develop the scientific writing skills of the postgraduate students (members of the experimental group) was effective.

The researchers used the Wilcoxon test to detect the significance of the difference between the mean ranks of two related groups, as shown in Table 4. The results also indicate that there was a significant difference (significance level ≤ 0.05) between the mean ranks of the scores indicating the scientific writing skills of the experimental group on the pre-and post-tests in favor of the post-test.

Table 4. Results of the Wilcoxon test

The experimental group (Pre-Post)	N	Mean Rank	Sum of Ranks	Z	P-Value
Negative Ranks	0	0	0	-3.195	0.001
Positive Ranks	13	7	91		
Ties	0				
Negative Ranks	0	0	0	-3.187	0.001
Positive Ranks	13	7	91		
Ties	0				
Negative Ranks	0	0	0	-3.204	0.001
Positive Ranks	13	7	91		
Ties	0				
Negative Ranks	0	0	0	-3.213	0.001

Positive Ranks	13	7	91		
Ties	0				
Negative Ranks	0	0	0		
Positive Ranks	13	7	91	-3.605	0.001
Ties	0				
Negative Ranks	0	0	0		
Positive Ranks	13	7	91	-3.606	<0.001
Ties	0				

Table 4 shows that there was a significant difference between the mean ranks of the experimental group on the pre-and post-tests in favor of the post-test. The value of Z for the whole scale was -3.606 and the p-value was <0.001, which is less than 0.05. This further indicates that the training program was effective in improving the scientific writing skills of the postgraduate students (the experimental group).

5. Discussion

The results of the study reveal that the program was effective in improving scientific writing skills according to APA 7 style (including grammar, scientific methods, reference documentation, organization, and direction) among graduate students in the College of Education. The scientific writing skills of the members of the experimental group was improved. This is due to the scientific activities and practices that were targeted. The participants were given significant training on documenting references within the text and in the list of references so they would be able to do so without the need for specialized programs or websites to help them. In addition, the researchers explained punctuation marks to reduce common linguistic errors in research and studies. The scientific writing skills of the members of the control group did not improve because they were not subjected to any training. Also, few references explain the APA-7 style in Arabic; those that focus only on documenting references and marginalize the other skills. As a result of the student's inability to master English grammar, it is difficult for them to translate the available information about the APA 7 style into English. Similar studies support these results (Al-Ahwal , 2015), (Khattab, 2020), and (Ibrahim, 2021); where these studies showed higher effectiveness of training programs in increasing the ability of scientific writing skills among study samples in favor of the experimental group. Although the results of this study differ from those of Ali's study (2017); where this study showed a lower level of academic skills writing among the study sample.

Moreover, the results of this study also indirectly confirm that the program was effective in improving scientific writing among the students of the experimental group. This was due to the training programs that the students of the control group were not exposed to, which contributed to the development of the targeted skills. The scientific writing skills of the experimental group increased in terms of writing properly, being free of common linguistic errors, avoiding bias, using scientific methods appropriately, and being able to apply the standards of organization and output in the scientific paper. Similar studies support these results (Al-Ahwal, 2015), (Al-Ahwal, 2016), (Hussein & Al-Mahlawi, 2018), (Hilali,

2019), (Khattab, 2020), (Stiegler-Balfour et al, 2020), (Al-Zahrani, 2021), and (Ibrahim, 2021), where these studies showed higher effectiveness of training programs in increasing the ability of scientific writing skills among study samples in favor of the post-test. Although they differ from other studies (Boysen, 2019); where this study showed no improvement in academic skills writing among the study sample.

6. Recommendations

The researchers recommend the following steps:

1. Developing the postgraduate program in the departments of the College of Education at King Faisal University by adding a course on scientific writing skills.
2. Introducing training courses with the aim of developing the practical writing skills of postgraduate students, like those at foreign universities.
3. Reconsidering the course of the "research seminar" in the postgraduate stage so that the content of this course includes some activities and tasks to help students refine their scientific writing skills.
4. Producing a second version of this guide to includes a special chapter on the standards of scientific writing so that students' writing is directed towards specific goals and benefits from the tools of current research in subsequent studies and research when evaluating scientific writing skills.

7. Conclusions

It is necessary to pay attention to the theoretical and applied aspects when teaching scientific writing skills and look at scientific writing as both practical and productive. Furthermore, it is crucial to focus on analyzing methodological and linguistic errors as they are common errors in postgraduate students. Empowering graduate students with scientific writing skills contributes to helping them write research plans, research papers, and scientific theses. All scientific writing skills must be taken into account in all stages of writing research or scientific theses, and not relying solely on documentation issue. As well as taking into account all the data in the statistical tables and graphs according to the APA 7.

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