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# The scientific research competencies among postgraduate students in Omani universities

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## Abstract

Research competencies are among the most important skills required for students in higher educational institutions worldwide. This study aimed to determine the level of postgraduate students' research competencies in Omani universities. It also sought to identify differences among students based on gender, university type (public or private), and the interaction between these variables. The researchers adopted the scientific research competency scale developed by Al Musawi [1]. The study sample consisted of 220 postgraduate students from various Omani universities, including 143 females and 77 males. The results indicated that the research competencies of Omani postgraduate students were high, with defining the research problem being the most developed competency. No significant differences were found between male and female students regarding research competencies. However, students in public universities demonstrated higher research competencies than those in private universities. This study provides valuable insights into the research competencies of postgraduate students in Oman. The findings could assist higher education institutions in developing targeted research competency programs for their students.

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## 1. Introduction

Scientific research is not a new phenomenon. It has been around since humans began their existence in the world. Over the past several decades, scientific research has become a significant way to ensure accuracy and improve the methods people

use to solve problems in their daily lives. Research is considered an essential source of knowledge, especially in higher educational institutions that aim to grow, develop, and expand their academic standards. Learners in academic institutions can acquire scientific knowledge by mastering research methods [2, 3]. Consequently, academic institutions need to pay continuous attention to training and improving the quality of their research. It is necessary to train and encourage teachers and lecturers to share their experiences with one another in conducting and publishing research, especially in electronic journals [2, 4].

It is widely agreed that students in higher education need to develop their research skills. For instance, Article [5] emphasized that students need to develop their research skills, especially their methodological and technological skills. They also suggested that higher educational institutions need to apply for a project that aims to develop students' competencies in research, which is considered the ultimate aim of education by some educators [3]. Similarly, many researchers, such as [2, 6], suggested that higher educational institutions should update and develop their policies to be able to increase the quality of research. They need to continuously measure research quality to decide on the required updates. It is expected that students in higher educational institutions will receive a basic program in research methodology skills. They need to be aware of the standards that are applied in their institutions, which should focus on the students' research competencies and have research courses. Some institutions merge research skills within their teaching and learning programs [7]. These programs tend to continuously prepare students to be good researchers by teaching them basic research skills [5].

Many higher educational institutions require students to publish research papers as a requirement for their graduation. This makes students pay more attention to acquiring research skills to meet journals' standards when their papers are evaluated. For example, students need to meet the standards of the methodology and the style of writing that are followed in journals [4]. Furthermore, students must also verify their research to ensure it is free of plagiarism. Therefore, higher education institutions should evaluate their programs that prepare students to become researchers and meet additional requirements. Some researchers in Oman have attempted to gain better insights into variables related to students' research skills in higher educational institutions. They have found that learners' culture, gender, specialization, educational level, and the nature of learners influence students' academic progress and the development of their research skills. For example, Al-Balushi and Ambusaidi [8] found that students' performance in higher educational institutions was affected by social and cultural factors such as language, age and religious beliefs. While Daniels and Kennedy [9] indicated that PhD students' production of published scientific papers is higher than that of students studying lower degrees. Thus, it is important to consider the factors that affect the level of students' reactions to any program that aims to improve their research skills.

Moreover, some other researchers, such as Al-Balushi and Ambusaidi [8] argued that higher educational institutions in Oman have increased their attention to the qualities of research conducted by their faculty and students, especially in terms of managing and planning research activities. This is consistent with the standards that were approved by the Omani system of quality assurance in higher education. However, the volume of scientific research was low [8]. Thus, some institutions, such as the Ministry of Higher Education and universities, try to encourage researchers at different levels to increase their research output by introducing funding and prizes for research. For instance, the Ministry of Higher Education and Scientific Research has introduced a number of research programs, such as the National Research Award and the Strategic Research Projects Program [10]. Moreover, Sultan Qaboos University introduces different clusters of supply for researchers. These efforts help to increase the volume of research [11].

In addition, some researchers have attempted to examine the actual situation of preparing researchers for the acquisition of research skills or teachers' beliefs about students' possession of research skills in higher educational institutions. Furthermore, some research indicates that institutions should focus on the quality of research rather than the number of published research studies. It is important to generate a learning and teaching environment based on research to engage students with research tasks and activities [2]. On the other hand, some studies have also figured out that there are a number of challenges facing programs that aim to develop students' research skills [7, 12, 13]. Studies also showed that students were not sufficiently prepared for their research roles [7, 12-14]. The current study aims to investigate how Scientific Research Programs (SRP) in selected colleges and universities contribute to training and preparing researchers in the Sultanate of Oman. The study will include both private and public colleges and universities. However, a number of researchers, for example [7, 8], indicated that the volume of research in Oman is not compatible with the context of Oman's views on research. Research institutes, both in public and private universities, have encouraged researchers to effectively participate in the country's development through scientific research. However, the number of papers published by researchers in Oman is still low [8].

The significance of this study lies in the scarcity of research on scientific research programs in Oman [7, 8], which is not compatible with the context of Oman, which encourages researchers to participate effectively in the country's development through research [8, 13]. The current research also provides insights into the preparation of scientific researchers in the Sultanate and proposes some recommendations for decision-makers in Oman.

In Oman, most higher education institutions that offer master's degrees are private, especially in social sciences. The Ministry of Higher Education, Research and Innovation referred to only two public institutions that offer master's or PhD programs. There are more than 15 private higher education institutes that offer master's degrees in social sciences. Both public and private institutions encourage their students to improve their research skills [10]. However, little is known about the differences in research competencies between students in public and private higher education institutions.

The present study recognizes that research methodology programs in Oman neither claim nor aim to prepare researchers. However, due to the lack of research institutions that train researchers, these programs have effectively become the primary means of preparing future scientific researchers in Oman.

It seems that institutions of higher education agree that research competencies are the most vital aspects of preparing students to become researchers and contribute to the production of, or increase in, human knowledge. These institutions should conduct diagnostic assessments of their new students' research skills and abilities. On the other hand, some research has shown that there is an influence of gender on research competencies, while others have found no such influence. Additionally, the influence of gender and the type of higher education institution (public, private) on students' research competencies in Oman remains little known. Moreover, they need to continuously evaluate their learning systems to ensure that their outcomes are consistent with the standards of higher educational institutions. Several studies have been conducted in Oman to examine some research variables. These studies have provided information about students' research skills; however, information about students' research competencies in higher educational institutions in Oman is insufficient because previous research did not focus on all aspects of students' research competencies. Furthermore, there are updated points in research competencies that need to be considered when assessing students' research skills, such as the ability to use new technological tools and online technologies.

This study aimed to determine the level of postgraduate students' research competencies in Omani universities. It also aimed to define the differences among them in their research competencies concerning the variables of gender and university (public, private), as well as the interaction between these two variables. Based on the study's aims, the study attempted to answer the following questions:

- What is the level of research competencies for Omani postgraduate students?
- Are there any statistically significant differences in research competencies among Omani postgraduate students attributed to the variables of gender and university type (public, private)?

## 2. Literature Review

Research at higher educational institutions worldwide has introduced and developed various international models and frameworks for research standards to be followed in higher education. For example, [2] proposed a model for assessing researchers' qualities. This model includes several research skills, such as sampling, formulating research questions, research design, publishing, and addressing research problems. Additionally, [15] emphasized that graduate students should understand and utilize statistical concepts. They also need to be familiar with the statistical tests required for their research. This knowledge helps them to be more precise when answering research questions, testing hypotheses, and interpreting results.

The research competency concept can be defined as a group of motivational, operational, and individual components that are improved at a level that helps one successfully implement research skills and knowledge acquired in practical activities [3]. This definition emphasizes the practical part of training students in research. Besides, [7] indicated that students' acquisition of research competencies can be affected by a number of factors, such as emotional intelligence, emotional self-control, and self-awareness, as well as internal and external motivation. Emotional intelligence can guide students to take positive actions that help improve their competencies. Emotional self-control and self-awareness refer to students' confidence in their abilities to adapt to recent developments in modern competencies. Internal and external motivation also play an important role in students' acquisition of research competencies. Motivation is essential for driving a person to exhibit particular performance or behavior related to a certain competency.

Consequently, higher educational institutions should focus their attention on improving students' research competencies. This could help students effectively acquire specialized knowledge, attitudes, skills, and values that prepare them for comprehensive training to adequately work and resolve deficiencies arising in the current work environment and to continue learning independently throughout their lives. Research competencies can be implemented by adding some instruments (methodology) to the integration of knowledge, attitudes, and skills. Therefore, developing higher education research competencies will stimulate professional intellect in the future and produce more research. This can influence students' scientific behaviors, depending on their profound knowledge of research as an essential method of their work [5, 16].

Most researchers agree that research competency should encompass skills such as formulating the problem statement, conducting literature reviews, designing methodology, analyzing data, writing research reports, and publishing research papers. These skills can serve as indicators for higher educational institutions to assess students' research competencies [3]. On the other hand, some other researchers, such as Durmusçelebi [17] indicated that research competencies should cover research hypotheses, techniques, statistics, evaluations, and using computers. Besides, he linked the above-mentioned components with some thinking skills, such as critical thinking, reflective thinking, and problem-solving skills. Therefore, research competencies should focus on mental and operational skills.

Research [5] investigated students' research competencies in higher educational institutions. They linked the concept of research competencies with the research process, such as identifying gaps, interpretation, and analysis. They concluded that developing research competencies depends on other skills, such as cognitive, technological, and management skills. They designed a questionnaire to assess students' research competencies. The results of their study showed that students' competencies related to teamwork and cognitive thinking were better than their competencies in technology and methodology.

Besides, Roman [18] examined students' research competencies in higher education institutions. The sample was chosen from both public and private universities. The researcher aimed to develop a predictive model of students' research performance by linking their research competencies with their performance. The model included ten research competencies as predictors, such as problem-solving, literature review, citations, sampling techniques, and data analysis procedures. The study did not investigate differences in research competencies based on the type of university (private or public).

Besides, some researchers have paid attention to the influence of certain factors on students' research competencies. For instance, Camara and Cancino [19] analyzed data related to the research competencies of male and female students. The results indicated that both male and female students possess high research competencies, with females exhibiting higher research competencies than males. However, [14] and [17] found no effect of gender on students' research competencies related to electronic resources. The variation in previous research highlights the importance of studying the effect of gender on students' research competencies. Similarly, Turka, et al. [20] assessed research and other academic competencies of students in private and public higher education institutions. The results indicated significant differences in research competencies based on students' gender and the type of institution. They noted that differences between institutions stem from variations in their policies.

### *2.1. Formulating the Research Problem Statement*

Formulating the research problem statement is an essential competency for students conducting scientific research. Researchers need to understand the problem and then identify it so that it is introduced as an important issue [21]. This means that students should be able to use language to describe the problem using the terms scope, purpose, and structure. They need to convince the reader of the existence of a gap or problem. They should also present the problem by highlighting the important aspects of it, Annamalai et al. [22]. Some researchers, such as Pardede [21], argue that formulating the research problem is the most difficult aspect for researchers. Thus, higher education institutions need to pay more attention to developing students' ability to state the problem clearly, as these students will be prepared to be new researchers.

### *2.2. Research Methodology Competency*

A number of research studies have been conducted to improve students' research competencies. They varied in their focus on developing research competencies. For instance, Prosekov, et al. [3] assumed that developing students' research competencies should concentrate on four levels. The first level has to do with students' internal motivation to apply research skills and tasks. The second level pertains to acquiring essential knowledge and skills in scientific methodologies. The third level involves students' abilities to organize and independently apply various techniques and approaches when conducting research. The final level relates to students' teamwork and responsibility for specific parts of research when working in groups.

### *2.3. Literature Review Skills*

A literature review can be considered a type of survey in which the researcher examines previous sources on a specific issue. Reviewing literature on any phenomenon is a vital skill for any researcher. This skill helps provide the research background. It also helps to define the previous efforts made by other researchers. Researchers can benefit from different aspects of the literature review of the phenomenon under investigation. Furthermore, it introduces information that helps establish a deep understanding of the research concepts and the relationships between the research variables, which assists researchers when discussing their findings [22]. Researchers should acquire skills for literature reviews, such as managing information, critical thinking, analyzing arguments, and mapping ideas. All these skills should be aligned with the research aims [9].

One mistake that seems to be made by researchers when conducting literature reviews is the lack of a critical evaluation of the studies reviewed in relation to the research problem being investigated.

### *2.4. Data Analysis Skill*

Both quantitative and qualitative research require data analysis to achieve their objectives. Researchers with sufficient knowledge of data analysis related to their research are better prepared to control various elements and stages of their research. This is because they can easily decide on the type of instrument and the features they need. Furthermore, acquiring data analysis skills helps researchers be more accurate when selecting samples and applying instruments to them. For example, Hair, et al. [23] asserted that researchers should decide if the research will work with numeric or non-numeric data. Besides, the type of variable must be clear to decide which statistical test is suitable for analyzing the data. Researchers should also be able to use and understand statistical language [15]. Thus, statistical analysis is one of the fundamental competencies for master's and PhD students to achieve the aims of their studies.

### *2.5. Documentation of References in Research*

It is widely recognized that one of the fundamental and essential skills of researchers is to utilize the documentation system approved by the institute, organization, or journal that will publish the research [9]. It is frequently observed that students receive comments on documentation and referencing when their research is assessed. Many students fail to progress beyond this stage of assessment without receiving comments on the documentation of references. The APA standards are the most well-known among a wide range of research institutes and organizations worldwide. Most higher education institutions tend to teach and train their students to follow the APA referencing style [24].

[1] has proposed a framework related to research competencies required to prepare students in higher educational institutions for research. These competencies cover most research skills. Figure 1 shows these research skills.

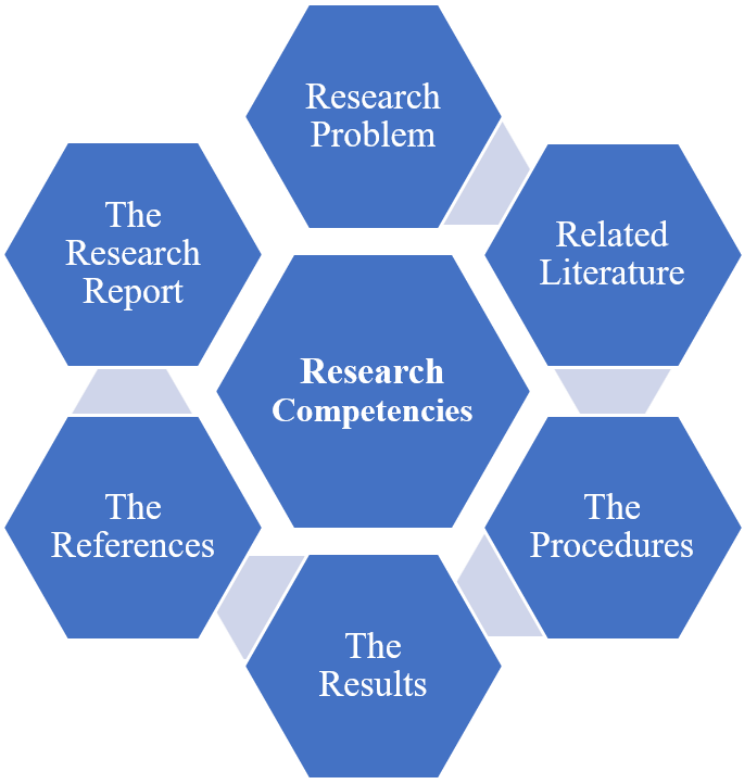


**Figure 1.**
Research competencies adopted from [29].

For the purpose of this research, the researchers used [1] framework to assess the research competencies of the postgraduate students in the Sultanate of Oman

## 3. Methodology

The study employed a quantitative descriptive survey method, which was appropriate for this research as it aligned with its questions and objectives. Participants responded to a self-reported questionnaire that provided quantitative data. The questionnaire was distributed online for participants to complete. The data collected was used to address all research questions.

### *3.1. Study Population and Sample*

Postgraduate students in humanities at Omani universities (public and private) during the academic year 2021–2022 comprised the study population, totaling 823 students. Approximately half of the population attended the public university (Sultan Qaboos University), while the other half attended private universities. The sample for the study consisted of 220 postgraduate students from various Omani universities. Table 1 shows the sample distribution according to their demographic variables.

**Table 1.**
The Sample Demographics.

| | | N | % |
|---|---|---|---|
| Gender | Female | 143 | 65% |
| | Male | 77 | 35% |
| University | SQU | 112 | 51% |
| | Private Uni's | 108 | 49% |

As Table 1 shows, around two-thirds of the sample were female students. This percentage is similar to the representation in the population, as female students tend to have a stronger desire to pursue postgraduate studies and more free time than male students. Regarding the distribution of the sample among Omani universities, half of the participants came from Sultan Qaboos University, a public institution, and the other half from private universities. Sultan Qaboos University has been offering master's programs in various fields of the humanities for over 30 years and includes a wide range of programs covering most areas of the humanities. In contrast, master's programs at private universities are relatively new, with the oldest program being approximately fifteen years old.

### *3.2. Study Instruments*

The researchers adopted the scientific research competency scale developed by Al Musawi [1], who tested its validity and reliability. The reliability coefficient was verified by using Cronbach's Alpha, which was 0.84. The reliability of the scale

components ranged between 0.93 and 0.78. These are all high reliability coefficients. To check reliability further, the researchers recalculated it, and it was 0.98, which means that the scale is valid for applying within the Omani environment. This scale was used by Al-Wahaibi et al. [26] to recognize the structure of the components of research skills for the Omani students.

### *3.3. Statistical Methods*

To carry out the study and help achieve its objectives, several statistical techniques were employed. Cronbach's Alpha coefficient was used to assess reliability. Means and standard deviations were calculated to determine the average of each item and research competency. A one-sample T-test was conducted to examine differences between male and female students in research competencies. Additionally, MANOVA was applied to determine if there are differences in students' research competencies concerning their gender (male, female) and university type (public, private).

## 4. Results

The answer to the first question: What is the level of research competencies among Omani postgraduate students?
To answer this question, the means and standard deviations of the research competency scale and its components were calculated. Table 2 illustrates these findings.

**Table 2.**
Means and standard deviations of the research competency scale and its components.

| Components | N | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|---|
| Mean | 220 | 4.0057 | 0.77505 | -- | High |
| Defining the Research Problem | 220 | 4.0900 | 0.78879 | 1 | High |
| Reviewing the Related Literature | 220 | 4.0212 | 0.80873 | 4 | High |
| Implementing the Procedures | 220 | 3.8864 | 0.85218 | 6 | High |
| Presenting the Results | 220 | 3.9127 | 0.91083 | 5 | High |
| Documenting the References | 220 | 4.0873 | 0.86093 | 2 | High |
| Writing the Research Report | 220 | 4.0336 | 0.81007 | 3 | High |

Table 2 shows that the research competencies of the Omani postgraduate students are high, with a mean of 4.01. The means of the scale components are also high and range between 3.89 and 4.09. "Defining the Research Problem" ranked first with a mean of 4.09, while "Implementing the Procedures" ranked last with a mean of 3.89. These high means indicate that Omani postgraduate students possess strong research skills, which can be attributed to their coursework in "Approaches to Educational Research" and the role of Omani faculty in enhancing their students' abilities through guidance and supervision.

To further assess the high level of research competencies among Omani postgraduate students, the researchers employed a one-sample t-test to compare the students' research competency levels with the hypothetical population mean of 3.Table 3 illustrates these results.

**Table 3.**
One-Sample T-Test for research competencies.

| **One-Sample Test** Test Value = 3 | | | | | | |
|---|---|---|---|---|---|---|
| **Components** | **Mean** | **Std. Deviation** | **T** | **df** | **Sig.** | **Effect Sizes** |
| Mean | 4.0057 | 0.77505 | 19.247 | 219 | <0.001 | 0.77505 |
| Defining the Research Problem | 4.0900 | 0.78879 | 20.496 | 219 | <0.001 | 0.78879 |
| Reviewing the Related Literature | 4.0212 | 0.80873 | 18.729 | 219 | <0.001 | 0.80873 |
| Implementing the Procedures | 3.8864 | 0.85218 | 15.427 | 219 | <0.001 | 0.85218 |
| Presenting the Results | 3.9127 | 0.91083 | 14.863 | 219 | <0.001 | 0.91083 |
| Documenting the References | 4.0873 | 0.86093 | 18.732 | 219 | <0.001 | 0.86093 |
| Writing the Research Report | 4.0336 | 0.81007 | 18.926 | 219 | <0.001 | 0.81007 |

Table 3 shows that the T-value of the mean of research competencies for a sample of Omani postgraduate students is 19.25, which is statistically significant at a significance level lower than 0.05. Additionally, the T-values of the scale components are high and statistically significant at a significance level lower than 0.05. This confirms that the level of research competencies among Omani postgraduate students is high, with a much higher percentage than the hypothetical mean of the population, which is 3. Moreover, the effect size of the difference between the mean of the research competencies and the hypothetical population mean is 0.78, which is classified as a large effect size according to the Omani standard classification of pragmatic significance indicators [25].
To learn more about the findings of the research competency scale components, the means and standard deviations of these components were calculated. Tables 4 to 9 reveal these findings.

*4.1. Defining the Research Problem*

**Table 4.**
Descriptive Statistics (Means and Std. Deviation) for Defining the Research Problem items.

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| Choose a potential research problem that is new, important, and worth studying, with practical applications in the relevant educational field. | 4.05 | 0.877 | 3 | High |
| Identify clearly and meticulously the study problem you have chosen, and demonstrate how it can be measured and its practical feasibility. | 4.01 | 0.936 | 5 | High |
| Phrase the study questions and hypotheses based on common clarity, feasibility, and ethical standards. | 4.04 | 0.913 | 4 | High |
| Identify the study objectives and significance, the proper research design, the study limitations, and the research procedures. | 4.14 | 0.918 | 2 | High |
| Define the main terms and variables in a way that helps the reader understand the meaning of each term clearly. | 4.21 | 0.856 | 1 | Very High |

Table 4 shows that the means of "Defining the Research Problem" items range between 4.01 and 4.21, which fall between high and very high levels. The item "Define the main terms and variables in a way that helps the reader understand the meaning of each term clearly" had the highest mean (4.21) and a very high level. The item "Identify clearly and meticulously the study problem that you have chosen and show how it can be measured, and its practical feasibility" had the lowest mean (4.01) and a high level. This indicates that postgraduate students at Omani universities possess high competencies in identifying the research problem, highlighting its significance, and determining how to measure it.

*4.2. Reviewing Related Literature*

**Table 5.**
Descriptive Statistics (Means and Std. Deviation) for Reviewing the Related Literature items.

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| I look for suitable sources related to the study problem using electronic educational databases. | 4.23 | 0.846 | 1 | Very high |
| I summarize the main points in the primary and secondary sources related to the study problem. | 4.10 | .909 | 2 | High |
| I analyze the previous studies related to the problem of my research topic logically and consistently. | 4.00 | .972 | 4 | High |
| I identify the position of my study in relation to the rest of the studies based on my review of the previous relevant educational and psychological literature. | 3.85 | 1.018 | 6 | High |
| I include a sufficient number of previous studies related to the aspects of my research. | 4.07 | .912 | 3 | High |
| I prepare a report on the literature review correctly (an introduction, the review, a summary, the researcher's inferences, and the references). | 3.90 | 1.022 | 5 | High |

Table 5 shows that the means of "Reviewing Related Literature" ranged between 3.85 and 4.23, which are all at high levels, except for "I look for suitable sources related to the study problem using electronic educational databases," which had a very high level with a mean of 4.23. "I identify the position of my study in relation to other studies based on my review of relevant educational and psychological literature" ranked last with a mean of 3.85. These findings indicate that Omani postgraduate students are competent in reviewing related literature and identifying research gaps for their study topics.

*4.3. Implementing the Procedures*

**Table 6.**
Descriptive Statistics (Means and Std. Deviation) for Implementing the Procedures.

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| Choose a suitable sample that truly represents the original population targeted by the study. | 4.12 | 0.916 | 1 | High |
| Design a suitable data collection tool based on the nature of the study and the research approach followed. | 3.95 | 0.928 | 2 | High |
| Define the validity and reliability of the developed tools before collecting the research data. | 3.78 | 1.006 | 4 | High |
| Apply the study tools that have been designed for the study sample in unified, controlled conditions. | 3.87 | 0.947 | 3 | High |

Table 6 shows that the responses of Omani postgraduate students to the item "Implementing the Procedures" were high, with means ranging from 3.78 to 4.12. However, these responses were lower than those to the previous two items, "Defining the Research Problems" and "Reviewing the Related Literature." This suggests that postgraduate students have better skills in preparing the theoretical part of their study than in the practical aspects of choosing their research approach, sample, and tools.

### *4.4. Presenting the Results*

**Table 7.**
Descriptive Statistics (Means and Std. Deviation) for Presenting the Results.

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| Organize and analyze the research data using suitable statistical procedures and techniques for the research problem. | 3.70 | 1.072 | 6 | High |
| Organize the findings in line with the sequence of the research questions. | 3.95 | 1.017 | 2 | High |
| Analyze the research data logically by relating it to the main findings of previous studies. | 3.85 | .982 | 4 | High |
| Identify the extent to which the research findings can be generalized for suitable populations. | 3.82 | .999 | 5 | High |
| Present the inferences and conclusions in light of the main findings concisely and accurately. | 3.94 | .984 | 3 | High |
| Identify the research recommendations and suggestions in a procedural and specific manner. | 4.00 | .951 | 1 | High |

Table 7 shows that the means of "Presenting the Results" ranged between 3.70 and 4, with high levels. The first item, "Identify research recommendations and suggestions in a procedural and specific manner," ranked first. "Organize and analyze research data using suitable statistical procedures and techniques for the research problem" ranked last with a mean of 3.70. This item had the lowest mean compared to the other items on the research competency scale. This suggests that Omani postgraduate students need to develop more competencies and skills in conducting statistical analyses, interpreting, summarizing, and organizing findings, as the analysis of findings is one of the most important aspects of research.

### *4.5. Documenting the References*

**Table 8.**
Descriptive Statistics (Means and Std. Deviation) for Documenting the References.

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| Use a sufficient and suitable number of sources that cover all aspects of the research problem. | 4.11 | 0.885 | 3 | High |
| Use a sufficient number of new and contemporary in-text sources directly related to the research problem. | 4.06 | 0.944 | 4 | High |
| Consult primary, original sources that were the first to address the problem coherently. | 3.90 | 0.965 | 5 | High |
| Document all sources used in the research in the reference list using APA referencing style. | 4.19 | 1.002 | 1 | High |
| Document all in-text sources using APA referencing style. | 4.17 | 1.006 | 2 | High |

Table 8 shows that the competencies related to "Documenting the References" were present in the Omani postgraduate students with high levels and means that ranged between 3.90 and 4.19. The item "Document all sources used in the research in the reference list using APA referencing style" had the highest mean of 4.19, while the item "Consult primary, original sources that were the first to address the problem coherently" had the lowest mean of 3.90. This indicates that the skill of relying on original sources still needs development, as some students only refer to later studies that have examined the research problem instead of consulting the original sources that addressed the origin of the problem.

*4.6. Writing the Research Report*

**Table 9.**
Descriptive Statistics (Means and Std. Deviation) for Writing the Research Report

| Items | Mean | Std. Deviation | Rank | Level |
|---|---|---|---|---|
| Organize all parts of the research report correctly and clearly within the text. | 4.10 | 0.888 | 2 | High |
| Achieve a balance and integration among the various parts of the research final report. | 3.90 | 0.933 | 5 | High |
| Present your personal points of view on the problem under investigation consistently. | 4.03 | 0.891 | 3 | High |
| Avoid language errors (grammar and spelling) and typos inside the text. | 4.11 | 0.954 | 1 | High |
| Prepare the research report using a clear, practical, and accurate writing style. | 4.03 | 0.948 | 4 | High |

The competency of writing the research final report is one of the most important competencies that should be mastered by researchers, as it enables them to organize and summarize their findings. Table 9 shows that the means of "Writing the Research Report" ranged between 3.99 and 4.11. The item "Avoid language errors (grammar and spelling) and typos inside the text" ranked first with a mean of 4.11, which confirms the fact that writing correctly and avoiding spelling and grammatical mistakes are some of the most important competencies mastered by Omani postgraduate students when writing their dissertations or research. The competency that researchers excel in and is hard to master easily is to "Achieve a balance and integration among the various parts of the research final report," because this competency requires effort and constant practice of research. Table 9 clearly shows that Omani postgraduate students have not yet mastered this competency, as it had the lowest mean (3.9) compared to the other items in "Writing the Research Report".

The answer to the second question: Are there any statistically significant differences in research competencies among Omani postgraduate students based on gender and university type (public, private)?

The researchers used a multivariate test (MANOVA) to answer the second question of the study. The differences among Omani postgraduate students in research competencies were identified based on their gender (male, female), university type (public, private), and the interaction between these two variables. Table 10 shows the findings of this analysis.

**Table 10.**
Value of Wilks' Lambda for the Multivariate Tests (Manova) of gender and university type (public, private).

| Variable | Wilks' Lambda Value of | F | Hypothesis df | Error df | Sig. |
|---|---|---|---|---|---|
| Gender | 0.970 | 1.086[b] | 6.000 | 211.000 | 0.372 |
| University | 0.925 | 2.854[b] | 6.000 | 211.000 | 0.011 |
| Gender * University | 0.975 | .896[b] | 6.000 | 211.000 | 0.499 |

Table 10 illustrates the value of Wilks' Lambda for the multivariate tests (MANOVA) of gender and university type (public, private). The results indicate that there is a statistically significant difference at the 0.05 level between Omani postgraduate students concerning their university type (public or private). These differences are attributed to the variable of university type. However, there are no statistically significant differences concerning gender or the interaction between both variables at the 0.05 significance level.

**Table 11.**
Results of the analysis of Multivariate Tests (Manova) on the means of research competencies for the Omani postgraduate students as per the variables of gender and university (public, private).

| Variable | Source | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Mean | Gender | 0.525 | 1 | 0.525 | 00.896 | 0.345 |
| | University | 4.791 | 1 | 4.791 | 8.179 | 0.005 |
| | Gender * University | 0.685 | 1 | 0.685 | 1.169 | 0.281 |
| Defining the Research Problem | Gender | 0.248 | 1 | .248 | .404 | 0.526 |
| | University | 3.336 | 1 | 3.336 | 5.444 | 0.021 |
| | Gender * University | 1.486 | 1 | 1.486 | 2.425 | 0.121 |
| Reviewing the Related Literature | Gender | 0.955 | 1 | .955 | 1.506 | 0.221 |
| | University | 6.072 | 1 | 6.072 | 9.571 | 0.002 |
| | Gender * University | 0.852 | 1 | 0.852 | 1.343 | 0.248 |
| Implementing the Procedures | Gender | 1.446 | 1 | 1.446 | 2.010 | 0.158 |
| | University | 3.557 | 1 | 3.557 | 4.945 | 0.027 |
| | Gender * University | 0.604 | 1 | 0.604 | 0.839 | 0.361 |
| Presenting the Results | Gender | 0.685 | 1 | .685 | 0.843 | 0.360 |
| | University | 5.691 | 1 | 5.691 | 6.995 | 0.009 |
| | Gender * University | 0.583 | 1 | 0.583 | 0.716 | 0.398 |
| Documenting the References | Gender | 0.336 | 1 | 0.336 | 0.476 | 0.491 |
| | University | 8.103 | 1 | 8.103 | 11.479 | <0.001 |
| | Gender * University | 0.130 | 1 | 0.130 | 0.184 | 0.669 |
| Writing the Research Report | Gender | 0.045 | 1 | 0.045 | 0.069 | 0.793 |
| | University | 2.788 | 1 | 2.788 | 4.293 | 0.039 |
| | Gender * University | 0.817 | 1 | 0.817 | 1.258 | 0.263 |

The findings of Table 11 indicate the presence of statistically significant differences among research competencies for Omani postgraduate students in each component of the scale at a significance level below 0.05. These differences are attributed solely to the variable of the university. By examining the means and standard deviations in Table 12, it can be observed that these differences favor Sultan Qaboos University, where the means of postgraduate students in research competencies and each component of the scale were generally higher. This clearly indicates that the level of research competencies among postgraduate students at Sultan Qaboos University is superior to that of their peers at private universities. This is expected because Sultan Qaboos University is the only public university offering postgraduate programs and employs an elite group of experienced professors. Additionally, students who wish to join are selected from a large pool of candidates who must pass several admission tests.

**Table 12.**
Means and standard deviations of the levels of research competencies for the Omani postgraduate students as per the university (public, private).

| | | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Mean | SQU | 112 | 4.1397 | 0.70353 |
| | Private Uni's | 108 | 3.8668 | 0.82326 |
| Defining the Research Problem | SQU | 112 | 4.1929 | 0.73272 |
| | Private Uni's | 108 | 3.9833 | 0.83302 |
| Reviewing the Related Literature | SQU | 112 | 4.1667 | 0.73385 |
| | Private Uni's | 108 | 3.8704 | 0.85724 |
| Implementing the Procedures | SQU | 112 | 3.9804 | 0.83135 |
| | Private Uni's | 108 | 3.7889 | 0.86633 |
| Presenting the Results | SQU | 112 | 4.0607 | 0.86194 |
| | Private Uni's | 108 | 3.7593 | 0.93839 |
| Documenting the References | SQU | 112 | 4.2911 | 0.75975 |
| | Private Uni's | 108 | 3.8759 | 0.91088 |
| Writing the Research Report | SQU | 112 | 4.1411 | 0.74138 |
| | Private Uni's | 108 | 3.9222 | 0.86504 |

## 5. Discussion

Literature related to scientific research has a significant interest in studying research competencies as one of the most important skills for students in higher educational institutions. This study aimed to determine postgraduate students' research competencies in Omani universities. It also aimed to identify the differences in their competencies concerning their gender and whether their university is public or private. The findings indicated that Omani postgraduate students possess high research competencies. This result can be attributed to the efforts made by both the students and their universities. Moreover, students develop high research competencies due to the variety of content applied in their universities, which includes both research knowledge and skills [3] stated that higher educational institutions pay great attention to enhancing their students'

research competencies. Further, Morales [16] and Garay-Argandona et al. [5] indicated that programs covering cognitive and skill aspects, as well as paying attention to motivating and attitude factors, can contribute to the development of students' research competencies. Moreover, the competency related to defining the research problem is the highest among research skills. In general, this result aligns with the context of research programs in higher educational institutions, as they believe that determining the research problem is an essential skill for developing other research skills. Pardede [21] and Al Ajmi and Ali [2] indicated that formulating a problem statement is critical for any research. The results showed that there is no significant difference between postgraduate students in research competencies related to their gender. This can be explained by the fact that both male and female students received the same preparation programs and encouraging features as are applied in the Omani higher educational institutes. This result is in line with the result of Durmusçelebi [17] and Feruza Rahmatova [14]. The statement referred to that there is no significant difference between male and female students in their research competencies. However, this result is inconsistent with Camara and Cancino [19], who found that females have better research competencies than males. Additionally, the results indicated that students at the public university possess higher competencies than those at private universities. The source of the difference between SQU and private institutions could be due to variations in their policies. Turka, et al. [20] emphasized that the polices of higher institutions affect the level of their students' research competencies. Additionally, SQU is the first and most experienced university offering master's and doctoral programs that prepare students as researchers. SQU has excellent research facilities that assist both students and their supervisors in achieving their objectives and acquiring the necessary skills.

## 6. Conclusion

The purpose of this study was to determine the proficiency of postgraduate students in research within Omani universities. Additionally, it aimed to identify any disparities in research competencies based on gender and the type of university (public vs. private). The results indicated that postgraduate students generally possessed high levels of research competencies. The findings also revealed that research competencies among male and female students were comparable. However, there is sufficient evidence to conclude that research competencies at public universities are higher than those at private universities. This suggests that public and private universities should collaborate and share experiences in training postgraduate students in research skills. The study's findings could influence how higher education institutions plan and implement research competency development programs aligned with similar academic courses.

## 7. Recommendations

Based on the findings that the study has reached the following recommendations can be made:

- It is necessary to review the policies at the private university related to research to enhance students' research competencies.
- Courses related to research should be reviewed and we should use the feedback to develop these courses.
- Private universities should utilize the experience of Sultan Qaboos University in developing research skills for postgraduate students.
- Private universities should conduct training programs for their postgraduate students on research competencies, especially on implementing procedures and presenting results.

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