

Gender Disparities in Citation Rates on ResearchGate among Algerian Researchers

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Abstract:

Gender equality has gained increased attention and realised significant progress. However, women researchers still confront specific hurdles impacting their academic visibility and recognition in higher education. Therefore, this study's objective is to compare Algerian women researchers' citation rates on ResearchGate to those of their male counterparts. This research deploys random sampling in selecting Algerian researchers' profiles, both female and male, from ResearchGate. Analysing citation data from these profiles contributes to identifying the disparities and discrepancies in citation rates and academic recognition. The findings improve knowledge of the gender gap in academic citations and emphasise the need for gender equality policies and practices in higher education.

Keywords: Citations, female and male, recognition, research, ResearchGate, visibility

1. Introduction

Researchers' visibility, career advancement, and impact in academia can be assessed through citations as an academic metric. Over the years, gender disparities in citation practices have been evidenced by growing interest in gender research. There are studies positing that male researchers' citation rates are higher than those of their female counterparts. Such differences are attributed to social and institutional factors determined by researchers' self-citation and collegial citation practices, disciplinary biases, and collaborations.

Scholarly enquiry has long investigated gender disparities in citation rates across traditional journals. Several studies found the difference in citations in favour of males even when they controlled the variables

of journal impact, discipline, publication volume, etc. Larivière et al. (2013) investigated over five million papers authored by male and female researchers, concluding that females receive less citations in almost all disciplines. In the same vein, Wu (2024) inquired into gender disparities in STEM fields, and he confirmed males outperforming females in citations because of their extended collaboration networks and publication in high-impact journals. Moreover, the social sciences have been investigated by Goyanes, Tóth, et al. (2024), who also mapped the citation patterns excluding females from influential scholarly communities. These example studies highlight the citation gap persistent between both genders due to structural inequalities.

However, digital academic platforms, like Google Scholar and ResearchGate, have increasingly developed, allowing researchers to share their publications and engage in scholarly debate with colleagues across the globe. These platforms also rely on algorithmic patterns that determine researchers' visibility depending on citations, h-index, i10-index, research interest scores, etc. These dynamics across genders remain under-researched on ResearchGate although it has the potential to blend scholarly dissemination and social features. Indeed, Singh and Lathabai (2022) found that visibility indicators on ResearchGate do not always correlate with traditional citation impacts after investigating the matter from an etic (analysing Researchgate metrics) and emic perspective (interviewing researchers). Wu's (2023) study demonstrated the disproportionate favourism of prominent researchers through algorithmic sorting and engagement metrics.

Notwithstanding research on citations on ResearchGate, the gender-specific gap on the same digital platform remains largely under examined, especially in a regional context like Algeria. Digital academic engagement is unevenly distributed in Algeria, which is the central focus of the present study. Particularly, this research addresses the gap in citation rates among Algerian male and female researchers on ResearchGate.

This research grapples to answer the following questions:

- Are there significant differences exhibited in citation rates of female and male research publications on ResearchGate?

To answer the research question, we posit that

H_0 : Female citation rates on ResearchGate are less than those of their male counterparts.

H_1 : Female citation rates on ResearchGate are more or equal to those of their male counterparts.

2. Theoretical Framework

Researchers' visibility, credibility, and career advancement are shaped by academic citations (Larivière et al., 2013). Indeed, citation practices provide researchers with privileges in institutional activities, promotions, and accreditation in academia. West et al. (2013) posit that there are gender disparities in citation rates amongst males and females though gender equity is a matter of considerable interest and attention. Several studies investigated the extent to which equity is ubiquitous in male and female researchers' citation rates. Most of the studies probe into gender differences in citation rates across journals. For example, Mendoza (2021) explored citation practices and how they vary in different academic disciplines and demographics. Another research work by Anauati et al. (2018) investigates the citation rates across different tiers of journals specialised in economics. Goyanes, Herrero, et al. (2024) found that structural factors persist across national contexts wherein female researchers receive more citations in a short time, but fail to keep up with males' impact metrics on the long run. Wu (2024) confirmed this gender bias by contending males' collaboration to boost each other's career –not because of publication quality.

However, academic platforms remain underexplored, engendering lack of knowledge about potential factors contributing to gender-related differences in citation rates. Particularly, such gendered disparities in citation trends on ResearchGate are unknown, in spite of the plethora of studies on general citation metrics and platform algorithmic behaviours. For example, Singh and Lathabai (2022) compared citation metrics between Google Scholar and ResearchGate, without a special focus on variability between males and females.

This theoretical framework aims at contextualising this study by drawing upon the theories of social constructivism, gender inequality, and citation dynamics.

First, social constructivism advocates the influence of social structures on knowledge production (Berger, 1966). Indeed, this theory posits that knowledge cannot be decontextualised or neutralised of its social environment because individuals as social actors contribute to its construction. Such knowledge includes stereotypes constructed by social groups, especially with regard to gender roles. Therefore, in academic contexts, the perception of male and female researchers and citing them in one's work is highly impacted by gender-based stereotypes (Merton, 1968). Accordingly, Maliniak et al. (2013) state that citation practices, which are driven by implicit biases, engender systemic hurdles in female scholars' career.

Second, gender inequality is persistent in academic networks. The social capital theory (Bourdieu, 1986) is applicable to such a context because power structures are reflected in citation networks, with more visibility associated with more established researchers. Some factors contribute to citation gaps across gender, such as co-authorship and collaborations wherein males have the tendency to enlarge their professional networks (Huang et al., 2020). Besides, Rossiter (1993) refers to the "Matilda Effect" in which female researchers' contributions in academia are undervalued, decreasing the potential of citing them.

Last, self-citation is a frequently used tactic in citation dynamics to raise researchers' visibility. King et al. (2017) posit that male researchers are more likely to self-cite than their female counterparts. Algorithms on platforms like ResearchGate play an important role in boosting researchers' visibility; for example, Research Interest (RI) scores give preference to metrics of engagement that favour dominant networks, which exacerbates gendered differences in citations.

The social networking features on ResearchGate, unlike traditional citation databases, impact researchers' communications and interactions (Nicholas et al., 2015) and expands disparities in citations, and thus visibility. Thelwall and Kousha (2017) believe that female

researchers are disadvantageous because they have limited engagement and collaborations, and thus lower algorithmic visibility. Therefore, bias in citations and disparities in citations metrics can be caused by ResearchGate algorithms that are embedded in its visibility ranking systems (Kordzadeh, & Ghasemaghaei, 2021; Boateng & Boateng, 2025).

This theoretical foundation connects gender disparities in citation rates and the digital platform of ResearchGate to explore how citation metrics are different between Algerian male and female researchers.

3. Research Methodology

3.1. Philosophy, Approach, and Method

In this study, we adopted a positivist research philosophy, assuming the objective, observable, and measurable nature of reality. We are inclined to use empirical data and statistical analyses (descriptive and comparative) to test hypotheses based on patterns. Citation rates are considered numerical indicators of researchers' academic visibility, which helps in quantitatively establishing differences in citation rates between males and females.

We lean to use the deductive approach as we started with a general theory from the literature on gender-based differences in citation rates between male and female researchers. Accordingly, this theoretical foundation paved the way to formulating the H_0 and H_1 to be tested through statistical tests, allowing to draw conclusions about this research claim "Algerian female researchers have less citation rates compared to their male counterparts."

This study highly –and completely– depends on numerical data and statistical tests. Thus, the quantitative method is appropriate for both data collection and analysis. Data take the form of citation rates from ResearchGate profiles of Algerian male and female researchers. They are categorised into ranges and analysed using descriptive statistics (frequency, mean, and variance) and inferential statistics (one-tailed two-sample unequal-variance t-test).

3.2. Population and Sample

Multi-dimensional sampling is opted for to select Algerian, English-specialised, both-gender researchers.

Profiles are selected randomly, selecting a case from a random Algerian university, and selecting any co-author(s) associated with that case.

The selection is performed on the basis of the following criteria:

- Country: Only researchers from Algeria are selected, excluding any co-authorship from other countries.
- Specialisation: Only researchers specialised in the English language and its different disciplines are selected, excluding any co-authorship from other fields (eg. Statistics).
- Gender: both males and females are included in the study as gender is essential in establishing comparisons. 136 males and 130 females are selected.

3.3. Data Collection and Analysis

Analysing Algerian researchers' ResearchGate profiles depends on some categorisations. The sample profiles are stratified on the basis of author gender (male and female), and then they are clustered according to difference ranges (a scale of 10) of number of citations. Such clusters allow us to uncover nuanced differences, rather than simply detecting overall disparities.

Data are analysed descriptively first by showcasing frequencies of citation rates across gender to visualise their distribution. Besides, the mean of citation rates across gender is also calculated to measure which data set scored higher (Moore et al., 2014). Variance is also calculated to measure the variability of data and how far each number in the data set is from the mean (Hayes, 2025). Comparative analysis is then performed by means of a one tailed two-sample unequal-variance t-test (following the formulation of H_0), with alpha set at 0.05, to observe any statistically significant differences. For the t-test, assumptions of variable type, normality, and homogeneity of variance.

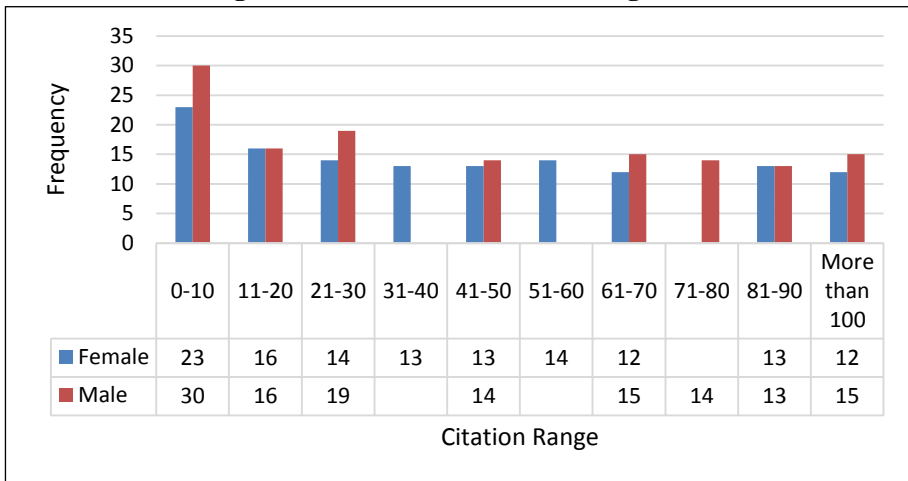
4. Data Analysis and Discussion

4.1. Descriptive Statistics

Notably, the citation ranges of [31-40] and [51-60] do not have any record of male citation rates. Similarly, the citation range of [71-80] does not report any female citation rates. According to Figure 1, it is clear that males' citation rates outscore those of female researchers in the citation ranges [0-10], [21-30], [41-50], [61-70], and more than

100. The male and female researchers whose citation rates range between [11-20] and [81-90] are equal.

Fig 1. Number of citations across gender



Comparing the mean of citation rates, we found out that there are differences between the two data sets. The male researchers’ citations are higher than the female researchers’ citations, the males having an average of 14 and the females having a mean of 13. Besides, variance also shows that there are differences between males’ and females’ citation rates, with males’ data set having a variability of 31 and females’ data set having a variance of 12. Indeed, males’ citation rates are more dispersed and spread out than females’ citations (Table 1).

Table 1. Mean and variance of citation rates across gender

Number of Citations	Mean	Variance
Female	13	12
Male	14	31

4.2. Comparative Analysis

Checking the assumptions necessary in a t-test is indispensable. First, the independent variable is dichotomous, with both datasets independent of each other and frequencies within the same dataset are also independent of one another. Second, the dependent variable is quantitative. Third, we assumed that data are normally distributed.

Last, the homogeneity of variance assumption is also guaranteed because there is variability across both groups.

A one tailed two-sample unequal-variance t-test is performed to assess any significant differences between males and females in their citation rates on ResearchGate (Table 2).

Table 1. T-test

one tailed two-sample unequal-variance t-test
0.14

Table 2 shows that the p-value is higher than alpha ($0.14 > 0.05$), denoting a statistically significant difference between male researchers' citation rates and those of female counterparts. Therefore, the null hypothesis is accepted, positing that female citation rates on ResearchGate are less than those of their male counterparts.

4.3. Discussion

This study examined gender disparities in citation rates among male and female researchers on ResearchGate. From descriptive and inferential analyses, findings reveal nuanced patterns in distribution and statistical significance. The mean citation rates are relatively close (males 14, females 13), but the variance is remarkably higher among male researchers (31 compared to 12 for females). This result reveals dispersion and greater variability in citation counts among males, which is compatible with findings by Larivière et al. (2013) and Holman et al. (2018). They postulate that male researchers tend to be highly represented in highly cited subfields or have more collaboration networks, which broadens their citation performance.

Two other findings related to the distribution of citation rates among male and female researchers are the complete absence of one gender or similar frequencies. The citation ranges [31-40] and [51-60] for males and [71-80] for females recorded representation of one gender, which may be attributed to clustering effects or to the dynamics of certain fields that ought to be enriched via qualitative investigation. Besides, the citation ranges [11-20] and [81-90] are equally represented by both genders. This may indicate that these isolated

extremist points appear balanced, compared to most citation brackets that reported major disparities.

Results from the t-test ($p=0.14$), which is higher than the alpha level (0.05), indicate no statistically significant difference in citation counts among Algerian male and female researchers. Therefore, we fail to reject the null hypothesis; i.e., there is no sufficient statistical evidence to posit that citation rates of female researchers are equal or higher than those of their male counterparts. The data suggest that despite dispersion in male citation counts, gender alone may not be the only indicator of these patterned citation performances, and the difference recorded may be a matter of chance. This finding contrasts with earlier studies, like West et al. (2013) that reported citation metrics are disparate across genders. However, this finding dovetails with recent studies –like Sugimoto et al. (2017)- that declare gap reduction in gender disparities owing to platform-specific dynamics and increased visibility.

The contribution of this study lies in enriching the growing substance of literature on gender-based academic metrics, with a special focus on a platform with both traditional scholarly impact and social networking -being ResearchGate. These research findings indicate dispersion in citation distribution, yet no statistically significant differences, which highlights the importance of context-specific investigations. Besides, this study also pinpoints the existence of gender disparities in academic recognition, but also underscores their little to no persistence in digital academic ecosystems –like ResearchGate. This study can be positioned within both regional and global frameworks to show that academic inequalities can be reinforced or reshaped by digital academic platforms.

5. Implications and Further Research

Findings from the present research evidence the approximately equal mean citation rates and great variance, yet the lack of statistical significance may indicate –more than previously assumed- that gender may not be an influential indicator on male and female researchers' citation performances on platforms like ResearchGate. This underscores the equalising effect of platforms like ResearchGate.

5.3. Implications

Several implications for academic equity, academic visibility and recognition, and bias considerations are suggested:

5.3.1. Academic Equity

Promoting inclusivity in academia and knowledge production is essential and can be achieved by addressing gender disparities in citation practices. Institutions are key actors in such measures; they can bridge the citation gap and ensure opportunities for equal recognition by organising mentorship programs, changing policies, and distributing funds equitable.

5.3.2. Academic Visibility and Recognition

Institutions and policymakers should assess networks of co-authorships to explore collaboration potentials and opportunities among males and females and the extent to which they influence their citation practices. Institutions and policymakers can explore research visibility metrics, like engagement levels on ResearchGate, and promote equitable visibility for both male and female researchers. For more insights on gender disparities, nuanced metrics –instead of aggregate citation rates- should rather be focused upon to uncover scholarly impact on digital academic platforms.

5.3.3. Bias Considerations

Institutions and policymakers should pay attention and reflect upon citation practices by carefully examining practices of author prominence, self-citation, and institutional prestige. They had better engage in explicit discussions at all levels about gender representation and research equity.

5.4. Further Research

Further research could elaborate findings from this research by:

- Exploring gender disparities in citation rates across specific disciplines whose norms may impact citation performance.
- Investigating the changes in citation rates in digital platforms over a period of time to determine their increase or decline or stability.

- Supporting metrics comparison by qualitative research, like interviewing researchers from both genders to gain deeper insights on their citation metrics on ResearchGate.
- Analysing the effects of social networking features on ResearchGate (e.g. follows) on shaping citation rates among both male and female researchers.

6. Conclusion

The present study provides nuanced insights on gender disparities in citation rates on ResearchGate among Algerian male and female researchers from the EFL industry. Despite the study findings revealing slightly high citation averages and greater variability in male citations, there is no statistically significant difference between males' and females' citation counts. Notwithstanding its contributive role in establishing numerical disparities, this research calls for deeper, thorough reflection on how digital academic platforms shape academic visibility.

Positioning this analysis within the framework of ResearchGate, equity in academic visibility and recognition is central to the ongoing discourse on citations. The study aligns with such claims and posits that digital academic platforms –like ResearchGate- may lessen overt disparities as they offer egalitarian visibility. In the future, research should mingle quantitative and qualitative perspectives to delve into the nuanced realities of gender citation metrics in evolving academic ecosystems.

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