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Gender and Its Impact on Work Engagement and Research Productivity of University Teachers in Serbia

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ABSTRACT

This study investigates the impact of gender on work engagement and research productivity among university teachers in Serbia, with an additional focus on the potential mediating role of work engagement. Grounded in international literature that identifies persistent gender disparities in academic careers, particularly in research performance, the study explores whether similar patterns are evident in the Serbian context. Utilizing a quantitative approach, data were collected via a structured questionnaire, from 263 academic staff across four major public universities. Work engagement was assessed using the Utrecht Work Engagement Scale (UWES-9), while research productivity was measured by the number of publications indexed in SCI, SSCI, and ESCI databases. Statistical analyses, including t-tests, correlation, and mediation analysis using PROCESS macro (Model 4), revealed no significant gender differences in either work engagement or research productivity. However, a modest but statistically significant positive correlation was found between work engagement and research productivity. Although work engagement significantly predicted productivity, it did not mediate the relationship between gender and research output. These findings suggest that, while Serbia may exhibit greater gender parity in academia than some international counterparts, subtle forms of inequality may persist and suggest the need for further exploration through expanded and more nuanced research methodologies.

KEYWORDS

gender, work engagement, research productivity, university teachers, Serbia

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Thematic section

1 INTRODUCTION

Perceived as a social and cultural construct that differentiates the attributes of men and women and defines their respective roles and responsibilities (UNICEF 2017), *gender* has gained particular prominence in recent decades, driven by the growing recognition of gender equality as "one of the basic principles of human rights" (Vujadinović et al. 2020: 17). This principle entails "a situation where women and men have equal conditions for realizing their full human rights and potential, and are able to contribute to and benefit equally from political, economic, social, and cultural development" (Inclusive Security and DCAF 2017: 8).

Although the foundation for gender equality was established as early as 1948 with the adoption of the Universal Declaration of Human Rights (United Nations 1948), its importance has since been reaffirmed through numerous international and European legal and policy instruments. These include the Convention on the Elimination of All Forms of Discrimination against Women (United Nations 1979), the Beijing Declaration and Platform for Action (United Nations 1995), Directive 2006/54/EC on the implementation of the principle of equal opportunities and equal treatment of men and women in matters of employment and occupation (European Union 2006), and the 2030 Agenda for Sustainable Development (United Nations 2015), all of which explicitly uphold the principle of gender equality (Petrušić and Vujadinović 2018).

Growing public awareness of and concern for gender equality, particularly in more developed societies, has contributed to an intensified academic focus on this issue (Górska 2023). Since the late 1960s, a substantial body of research has been produced within the higher education sector (Mählck 2003; Aiston and Jung 2015; Drew and Canavan 2020; Fagan and Teasdale 2021; Morris et al. 2022). Researchers' interest in gender equality within higher education stems from the contradictory position of universities: on the one hand, they are powerful promoters of gender equality, diversity, and inclusion, not only within academia but also in society at large; on the other hand, they remain environments where gender-based imbalances, segregation, stereotyping, and issues such as sexual harassment and assault are still prevalent (Aiston and Jung 2015; Rosa and Clavero 2021). As Mott (2022: 5) points out, "Despite HE [higher education] systems being a driver for the promotion of equality and empowerment, the evidence shows that they also reproduce discrimination against women, often 'by default rather than design."

Within the context of gender equality, research in higher education primarily focuses on various aspects of academic careers. Key themes include recruitment, selection, career advancement, salary disparities, promotion opportunities, work-life balance, leadership and decision-making, educational and research practices, student evaluation, and instances of harassment and assault (Rosa and Clavero 2022; Mott 2022). These and numerous other variables may be shaped, either directly or indirectly, by gender-based differences.

In addressing global challenges related to gender inequality, Mott (2022) highlights the persistence of discriminatory and exclusionary practices in academic hiring, selection, and promotion processes. She notes that men tend to receive more opportunities and higher discretionary payments, are rated more

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favorably by students, and are more likely to cite other male scholars in their publications. Moreover, they cite their own work 70% more often than women and are awarded academic prizes, especially prestigious ones, at significantly higher rates than expected.

Similarly, Fagan and Teasdale (2021) argue that despite increased participation of women in academia, they continue to be underrepresented in the highest-ranking academic positions. They further contend that while promotion criteria, based on research funding and publication output, are formally meritocratic and gender-neutral, they nonetheless privilege research over teaching and administrative tasks, the latter of which are more frequently undertaken by women. Their analysis further indicates that although gender gaps in publication productivity are narrowing, subtle disparities remain, with men still disproportionately occupying the most prestigious authorship positions.

This paper examines work engagement and research productivity as critical aspects of academic careers that have either been insufficiently explored from a gender perspective (particularly work engagement), or have evolved over time and vary across different national contexts (a pattern common to both work engagement and research productivity). The aim is to examine the impact of gender on the academic careers of university teachers in Serbia, with a specific focus on differences in work engagement and research productivity between men and women.

Work engagement is increasingly recognized as a critical construct within academic careers (Lee et al. 2016; Crome et al. 2019; Telu and Potnuru 2024). It is commonly defined as a "positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Bakker et al. 2008: 188), or alternatively, as "the attachment employees feel towards their work that results in higher levels of performance, commitment, and loyalty" (Chandel 2023: 26). Numerous empirical studies have identified a variety of positive outcomes associated with heightened levels of work engagement, including enhanced job performance, greater proactivity, reduced absenteeism and turnover, improved mental and physical health, the expression of positive emotions, as well as increased innovation, creativity, productivity, and profitability (Tshilongamulenzhe and Takawira 2015; Schaufeli 2018).

Despite its importance, the body of research examining the factors influencing work engagement remains relatively limited and fragmented (Schaufeli 2018; Sharma and Rajput 2021; Žnidaršič and Marič 2021). In this context, a cross-national study conducted by Schaufeli (2018) across 35 European countries is particularly noteworthy. His findings suggest that work engagement at the national level is influenced by various economic, governance-related, and cultural factors.

Among the underexplored factors of work engagement, gender occupies a prominent position (Banihani, Lewis and Syed 2013). Additionally, the limited number of studies on this topic has resulted in inconsistent findings and interpretive challenges. For example, Banihani, Lewis and Syed (2013) argue that work engagement is often conceptualized and studied as a gender-neutral construct, implying equal opportunity for both men and women to exhibit engagement in the workplace. Nevertheless, the authors introduce a conceptual framework that challenges this assump-

tion, suggesting that work engagement is, in fact, gendered, more readily accessible to men than to women.

The gendered nature of work engagement, as articulated by Banihani, Lewis and Syed (2013), stems from organizational processes and interactions that favor male experiences. These mechanisms foster greater psychological meaningfulness for men, thereby contributing to higher engagement, while women are often disadvantaged by disproportionate responsibilities in domestic spheres, including childcare, meal preparation, and other forms of housework. Drawing on a United Nations (2010) report, the authors further emphasize that women globally endure a "double burden" of paid work and domestic responsibilities, which cumulatively leads to significantly longer total working hours compared to men.

Within the higher education sector, gender differences in work engagement have also been explored. Based on a study involving 123 academic staff members from three universities in the Kashmir region of India, Gulzar and Teli (2018) report that female academics demonstrated significantly higher levels of work engagement compared to their male counterparts. In contrast, a study by Tshilongamulenzhe and Takawira (2015), involving 154 employees at a South African university, found no statistically significant gender differences in work engagement. Similar results were reported by Sood and Sharma (2023), who investigated engagement levels among 263 college teachers in India and found no notable gender-based disparities.

Research productivity is another important variable of academic career. Defined as "the output of a research process" (Nguyen 2015: 35), it constitutes a fundamental measure of academic success, progression, and recognition (White et al. 2012; Jalal 2020). It also plays a critical role in global university rankings (e.g., Academic Ranking of World Universities; Times Higher Education). Although various indicators can be used to quantify research productivity (Heng, Hamid and Khan 2020), the most common metric remains the number of peer-reviewed journal publications (Aiston and Jung 2015).

Numerous factors influence research productivity. For example, Dundar and Lewis (1998) categorize these factors into individual and institutional. Jalal (2020) similarly categorizes them as personal and institutional, while Heng, Hamid and Khan (2020) expand this framework by introducing national-level factors, thereby adding another layer to the analysis of research productivity. Within the category of individual or personal factors, gender is frequently cited as a key factor.

Almost universally, a consistent finding across the literature is the existence of a gender gap in research productivity (Xie and Shauman 1998), often referred to as the gender productivity gap (Astegiano, Sebastián-Gonzáles and Castanho 2019). This gap is characterized by women producing fewer publications than men. Stack (2004) highlights that over 50 studies have confirmed that male scientists publish nearly twice as many articles as female scientists. Aiston and Jung (2015) investigated this phenomenon across Japan, Hong Kong, Germany, the USA, and Finland, finding the gender gap to be present in all contexts. The most significant disparities were observed in Japan and Hong Kong, with only a marginal difference in the United States. They also noted that the gap is more pronounced among senior

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academics compared to those in early career stages. Similarly, Lone and Hussain (2017) corroborate these findings, noting that the gender gap in research productivity persists across countries and has remained largely unchanged over time, although it is gradually narrowing due to improvements in women's research activity. However, some studies report contrasting results, indicating either minimal or no significant gender disparities in research output (Teodorescu 2000; Chen, Gupta and Hoshower 2006; Webber 2011).

Multiple factors contribute to the gender gap in research productivity (Stack 2004; Aiston and Jung 2015; Lone and Hussain 2017). These include a range of challenges that negatively impact women's academic careers. For instance, women often assume greater family responsibilities than men, which limits their time and resources for academic work. Additionally, they face difficulties in integrating into male-dominated professional and social environments and have fewer opportunities for collaboration and co-authorship. Structural barriers within academia further exacerbate the gender imbalance. Women are also less likely to receive substantial research funding, more likely to hold lower academic ranks, and are underrepresented in leadership positions within universities. The organizational culture of academia often privileges masculine norms and practices, reinforcing gendered hierarchies. Furthermore, academic gatekeeping, through selection processes, recruitment, and promotion, frequently disadvantages women, either slowing their career progression or excluding them from senior positions. Additionally, female academics typically bear greater teaching and administrative responsibilities, leaving them with less time for research. These roles, though essential, are generally undervalued compared to research-oriented activities typically undertaken by their male counterparts. Furthermore, the lack of mentors and professional networks further marginalizes women, limiting their opportunities for career advancement and professional development.

Given the broadly positive correlation between work engagement and employee outcomes documented in the literature (Banihani, Lewis and Syed 2013; Nešić et al. 2020; Ji 2021), it is plausible to assume a similar link between work engagement and research productivity among university teachers. Gulzar and Teli (2018: 1) argue that "work engagement leads to improved employee productivity because engaged employees are energized and passionate about the work they do," suggesting that enthusiasm and commitment translate into tangible academic outputs. Consequently, they advocate for institutional efforts to foster work engagement, as this is likely to enhance both individual and institutional productivity. Similarly, based on research involving 242 employees at public universities in northern Malaysia, Hanaysha (2016) identified a significant positive correlation between work engagement and employee productivity.

To ensure a comprehensive review of existing academic literature on gendered aspects of work engagement and research productivity within Serbian higher education, a systematic search was conducted using the Google Scholar database (López-Cózar, Orduna-Malea and Martín-Martín 2019). The search strategy employed key terms such as "gender," "gender equality," "university teachers," and "higher education," systematically combined with "work engagement" and "research productivity."

This approach generated a substantial number of search results: 35,600 for "gender and work engagement of university teachers in Serbia," 63,300 for "gender and work engagement in higher education in Serbia," and 25,400 for "gender and research productivity of university teachers in Serbia," along with similar counts for related variations.

However, when the "Advanced Search" function was applied, no articles were found that precisely matched any of the predefined keyword combinations.

The literature selection process involved eliminating duplicate and irrelevant results. The remaining articles were initially screened based on their abstracts, and full texts were reviewed only if the abstracts indicated strong thematic relevance and the articles were available online.

It is important to note that in Serbia, gender equality is a fundamental human right explicitly guaranteed by Article 15 of the Constitution of the Republic of Serbia (Službeni glasnik RS 2006). In addition to constitutional provisions, gender equality is further reinforced through a comprehensive legal and strategic framework, including the Law on Gender Equality (Službeni glasnik RS 2009a), the Law on the Prohibition of Discrimination (Službeni glasnik RS 2009b), the National Strategy for Gender Equality (Službeni glasnik RS 2016a), and the Strategy for the Prevention and Suppression of Gender-Based Violence Against Women and Domestic Violence (2021–2025) (Službeni glasnik RS 2021).

In the context of higher education, gender equality is also embedded in sector-specific policies. The Law on Higher Education (Službeni glasnik RS 2017) prohibits discrimination, including on the basis of gender, thereby indirectly promoting gender equality within academia. Additionally, the Strategy for the Scientific and Technological Development of the Republic of Serbia (2016–2020) – Research for Innovation (Službeni glasnik RS 2016b) explicitly addresses gender equality in science and innovation, underscoring the importance of equal opportunities in research and technological advancement.

Gender equality within Serbia's higher education sector remains an under-researched area (Manić, Joksimović and Zarić 2018). Only in recent years has the topic gained some attention, though it is still insufficiently explored (Lazarević-Moravčević, Mosurović Ružičić and Minović 2023).

The so-called "university boom" (Petrušić and Vujadinović 2018: 315) that occurred in Serbia during the 1970s, characteristic of all former Soviet bloc countries, as also noted by Schaufeli (2018), was marked by the mass inclusion of women in higher education. As a result, the number of women among university academic staff increased, leading to near parity between men and women in the academic workforce (Statistical Office of the Republic of Serbia 2024). However, this did not eliminate existing gender disparities in the academic profession.

According to Petrušić and Vujadinović (2018: 321), despite certain emancipatory advancements in higher education, "the reality of higher education is still far from the expected and required process of gender mainstreaming." They emphasize that the persistence of patriarchal social models, historically rooted gender inequality, and authoritarian governance structures continues to sustain horizontal and vertical segregation, gender imbalance in leadership roles, and gender-blind curricula within Serbian universities.

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Lazarević-Moravčević and colleagues likewise highlight ongoing issues of gender-based segregation in Serbian education and science. In addition to pronounced horizontal segregation, evident, for example, in the underrepresentation of women in STEM (Science, Technology, Engineering, and Mathematics) fields, they also point to the presence of vertical segregation. This is most evident in the extremely low participation of women in leadership roles at research institutes and faculties. According to the authors, this situation is shaped by a dominant patriarchal model, whereby "female scientists in Serbia, in addition to doing science, still take on most of the family and household duties… consult more with their partners and seek their support… are aware of their lower vertical mobility," among other factors (Lazarević-Moravčević, Mosurović Ružičić and Minović 2023: 149).

Manić, Joksimović and Zarić (2018) similarly point out vertical segregation in Serbian higher education, noting that women are underrepresented in the highest academic ranks compared to men. Other studies have also confirmed the existence of segregation in the higher education sector in Serbia (Šobot 2019; Babović, Drašković and Popović 2019).

Analyzing the general status of women scientists in Balkan societies, including Serbia, Blagojević (2009) notes that the already unfavorable conditions for scientific work in the region (e.g., low salaries, poor infrastructure, lack of access to international networks, and outdated academic promotion systems), disproportionately affect women due to their underrepresentation in decision-making positions and enduring vertical segregation. She also observes that although women begin their careers on par with men, they tend to "lag behind" once they start families, with career interruptions clearly associated with childbearing and child-raising. Regarding the gender gap in research productivity, she notes that male researchers in Balkan countries tend to publish more, especially internationally, and are more likely to speak multiple foreign languages.

In light of the preceding discussion, several hypotheses are proposed in this study.

Building on the conceptual framework of gendered work engagement (Banihani, Lewis and Syed 2013) and findings from the selected empirical studies involving academic staff (e.g., Gulzar and Teli 2018), the first hypothesis is:

H1: *Male university teachers in Serbia are expected to exhibit higher levels of work engagement than female university teachers.*

Drawing on previous research on gender disparities in research productivity (Xie and Shauman 1998; Stack 2004; Aiston and Jung 2015), the next hypothesis is:

H2: *Male university teachers in Serbia are expected to exhibit higher levels of research productivity than female university teachers.*

Finally, in line with prior studies exploring the relationship between work engagement and research productivity (Banihani, Lewis and Syed 2013; Hanaysha 2016; Gulzar and Teli 2018; Ji 2021), the following hypotheses are:

H3: *The work engagement of university teachers in Serbia has a positive impact on their research productivity*;

H4: *Work engagement mediates the relationship between teachers' gender and research productivity*.

To visually summarize the theoretical framework and the formulated hypothe-

ses, the conceptual model (Figure 1) has been developed to illustrate the expected relationships between gender, work engagement, and research productivity.

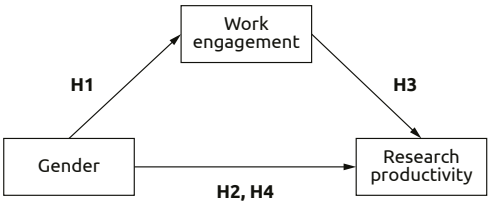

Figure 1 Conceptual model and hypotheses

2 METHOD

According to the National Entity for Accreditation and Quality Assurance in Higher Education (Nacionalno telo za akreditaciju i obezbeđenje kvaliteta u visokom obrazovanju 2025), Serbia continues to have nine public and eleven private accredited universities. The World Bank Group and UNICEF highlight the dominance of four public universities, University of Belgrade, University of Novi Sad, University of Niš, and University of Kragujevac, not only in terms of student enrolment (more than 70% of all tertiary education students are enrolled at these four institutions) but also with regard to research output (World Bank Group and UNICEF 2022). Accordingly, the present study focused on these four public universities and their affiliated faculties.

Moreover, considering that research productivity, one of the primary variables examined in this study, was quantified by the number of publications in journals indexed in the SCI, SSCI, and ESCI databases, and given the relatively long time required for publishing such results, the study included only the academic staff holding professorial titles (i.e., full, associate, and assistant professors), excluding teaching assistants and other early-stage researchers.

The research was conducted between December 2024 and April 2025. Data collection was carried out using a structured questionnaire, which was distributed to respondents via their official email addresses, publicly available on the websites of the faculties where they were employed. The Google Forms web application was used for survey administration. The collected data were analysed using SPSS software, version 23.

The initial sample comprised 850 individuals to whom the survey link was distributed. One month later, a reminder email was sent to all potential participants, encouraging them to complete the questionnaire if they had not already done so. A total of 266 responses were received. After data screening and validation procedures, 263 responses were retained as valid and formed the final sample. Table 1 presents the key demographic and academic characteristics of the respondents.

Table 1 Sample characteristics

Characteristic		N	%
Age	31–45	114	43.3
	46–60	121	46.0
	> 60	28	10.6
Sex	Male	115	43.7
	Female	148	56.3
Title	Full professor	105	39.9
	Associate professor	81	30.8
	Assistant professor	77	29.3
Total		263	100.0

Source: Authors' calculations.

As shown in Table 1, the majority of respondents were aged between 46 and 60 (46.0%), followed by those aged 31 to 45 (43.3%). In terms of sex distribu-

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Table 2 Summary statistics by sex

Variable	Group	N	Mean	SD	95% CI Lower	95% CI Upper
Work Engagement	Overall	263	3.973	.652	3.894	4.053
	Male	115	3.935	.716	3.803	4.068
	Female	148	4.003	.599	3.906	4.100
Research Productivity	Overall	263	25.939	34.130	21.795	30.083
	Male	115	29.348	40.930	21.787	36.909
	Female	148	23.290	27.582	18.810	27.771

Source: Authors' calculations.

tion, there were more female (56.3%) than male (43.7%) respondents. With respect to academic rank, 39.9% of the sample consisted of full professors (46.7% male; 53.3% female), 30.8% were associate professors (35.8% male; 64.2% female), and 29.3% were assistant professors (48.0% male; 52.0% female).

The questionnaire comprised three main sections. The first section focused on demographic characteristics of respondents, including age, sex, and academic title. Sex, as an independent variable in the conceptual model, was dummy coded with male coded as '0' and female as '1'. The second section assessed research productivity, operationalized as the number of scientific publications in journals indexed in the SCI, SSCI, and ESCI databases. The third section evaluated respondents' levels of work engagement. To measure this construct, the Utrecht Work Engagement Scale - UWES-9 (Schaufeli, Bakker and Salanova 2003) was used (Appendix 1). This instrument includes nine items grouped into three dimensions. A seven-point Likert scale was applied, ranging from 1 (never) to 7 (always), to assess the degree of agreement with each item. An example of an item used is: "My work inspires me." The reliability of this measurement instrument was confirmed by a Cronbach's alpha coefficient of 0.899, indicating excellent internal consistency. Detailed summary statistics for key variables by sex are shown in Table 2.

Appropriate statistical procedures were employed to test the proposed hypotheses. Descriptive statistics, including means, frequencies, and standard deviations, were computed. Consistent with Field (2018), the reliability of all multi-item measures was assessed using Cronbach's alpha, with 0.70 set as the minimum acceptable threshold.

To test Hypotheses 1 and 2, independent samples t-tests were conducted. Prior to performing these tests, assumptions of normality and homogeneity of variance were examined. As Field (2018) notes, with large sample sizes, statistical tests may suggest deviation from normality even when the distribution is sufficiently normal for parametric testing. Thus, this study relied on the central limit theorem to assume approximate normality. The homogeneity of variance was assessed using Levene's test. If the p-value exceeds 0.05, the null hypothesis of equal variances is not rejected, and the assumption is considered satisfied.

To test Hypotheses 3 and 4, and to assess the effect of the independent variable (i.e., gender) on the dependent variable (i.e., research productivity)

through a mediating variable (i.e., work engagement), a mediation analysis was performed using the PROCESS macro (Model 4), developed by Hayes and Rockwood (2017). Bootstrapping with 5,000 samples and a 95% confidence interval was employed to evaluate the significance of the indirect effect. Mediation was considered significant if the confidence interval did not contain zero. All necessary assumptions for conducting regression analysis, including independence, normality, linearity, multicollinearity, and homoscedasticity, were checked and met.

3 RESULTS

To test the first and the second hypotheses, an independent samples t-test was conducted (Table 3).

An independent samples t-test was conducted to examine gender differences in work engagement and research productivity among university teachers. For work engagement (WE), Levene's test indicated that the assumption of equal variances was met, F(1, 261) = 3.265, p = .072. The t-test revealed no statistically significant difference between male and female participants, t(261) = -0.835, p = .405, with a negligible mean difference of -0.068. Furthermore, Cohen's d was calculated to provide a standardized measure of the magnitude of the difference between groups (or lack thereof) by using G*power program. Its value is -0.104. The negative sign means just that males scored slightly lower than females, while the magnitude (0.10) is very small, suggesting a negligible difference in practical terms. For research productivity (RP), Levene's test indicated a violation of the equal variances assumption, F(1, 261) = 4.271, p = .040; therefore, results were interpreted using the corrected degrees of freedom. The analysis again revealed no significant gender difference, t(190.27) = 1.364, p = .174, with a mean difference of 6.057. Cohen's d value is 0.0017. Therefore, the difference between males and females in this variable is statistically and practically negligible. These findings suggest that gender does not play a statistically significant role in determining either work engagement or research productivity in this sample

Table 3 Independent samples t-test results

Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Df	Sig.	Mean Difference
WE	Equal variances assumed	3.265	.072	-.835	261	.405	-.068
	Equal variances not assumed			-.816	220.913	.415	-.068
RP	Equal variances assumed	4.271	.040	1.431	261	.154	6.057
	Equal variances not assumed			1.364	190.272	.174	6.057

Source: Authors' calculations.

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of university teachers, whereas research hypotheses 1 and 2 were not confirmed.

To test the third and fourth hypothesis, firstly, the correlation coefficient was assessed. The results of a bivariate correlation analysis are presented in the following table (Table 4).

Table 4 Correlation analysis

Variable	Mean	SD	Gender	WE	RP
Gender	-	-	1		
WE	3.973	.652	.052	1	
RP	25.939	34.130	-.088	.119*	1

Note: * p < 0.1. *Source:* Authors' calculations.

Pearson correlation coefficients were computed to examine the relationships involving gender, work engagement, and research productivity among university teachers. The mean score for work engagement was 3.97 (SD = 0.65), while the mean for research productivity was 25.94 (SD = 34.13), indicating high variability in research output. Gender was weakly and positively correlated with work engagement (r = .052) and negatively correlated with research productivity (r = –.088); however, both correlations were negligible and not statistically significant. A small but statistically significant (at 10% level) positive correlation was found between work engagement and research productivity (r = .119, p < .10), suggesting that higher levels of engagement are modestly associated with greater research output. This is relatively lenient threshold and the small effect size indicate a weak relationship that should be interpreted with caution. Overall, the results indicate a limited role of gender in predicting either work engagement or research productivity, while highlighting a slight yet meaningful link between engagement and productivity.

In the second step, mediation analysis was conducted. By applying PROCESS macro (model 4), it was tested whether work engagement mediates the relationship between gender and teachers' research productivity (Table 5).

The indirect effect (Table 5) was β = .439 with a 95% bootstrap confidence interval of [–.583, 1.798], which includes zero, indicating that the mediating effect of work engagement between gender and research productivity was not statistically significant. These findings suggest that work engagement does not serve as a significant mediator in the relationship between gender and research productivity. Furthermore, both direct and total effects of gender on the research productivity of the university teachers are not statistically significant.

Following the results of the mediation analysis, Figure 2 interprets the relationship between the independent, mediating, and dependent variables.

As illustrated in Figure 2, the effect of gender on the university teachers work engagement (*a* path) is positive (β = .068) but not statistically significant (p > .05). On the other hand, the effect of work engagement on the research

Table 5 Results of mediation analysis

Relation	Effect	SE	t	p	CI
Indirect effect of X on Y (a × b)	.439	.594			[-.583; 1.798]
Direct effect of X on Y (c')	-6.497	4.215	-1.541	.124	[-14.796; 1.803]
Total effect of X on Y (c)	-6.057	4.234	-1.431	.154	[-14.395; 2.280]

Source: Authors' calculations.

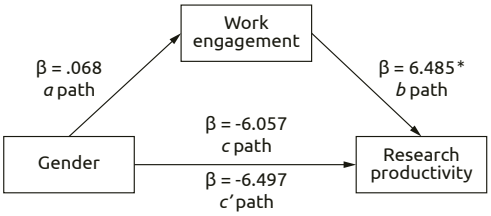

Figure 2 Work engagement as a mediator between gender and research productivity

productivity of university teachers (*b* path) is positive (β = 6.485) and statistically significant (p < .05), while 2.3 percent of the dependent variable is explained by the independent variable. Therefore, while work engagement significantly predicts research productivity, it does not mediate the relationship between gender and research productivity in a statistically meaningful way. Therefore, research hypothesis 3 is confirmed while research hypothesis 4 is not confirmed. Even though work engagement is a predictor of a research productivity, its role as a mediator between gender and research productivity is not confirmed.

4 DISCUSSION

The findings of this study provide insight into the complex relationship among gender, work engagement, and research productivity with university teachers in Serbia. While several prior studies conducted in international contexts have identified significant gender differences in academic careers, particularly in terms of research productivity (Xie and Shauman 1998; Stack 2004; Aiston and Jung 2015), and to a lesser extent in work engagement (Banihani, Lewis and Syed 2013; Gulzar and Teli 2018), the present results indicate no statistically significant differences between male and female respondents across either of the two examined domains within the context of public universities in Serbia.

Based on the t-test analysis, the first two hypotheses proposed in this study were not confirmed. These findings suggest that, within the sample of 263 university teachers, there is no convincing evidence that gender constitutes a determining factor in shaping either professional engagement or research productivity, as measured by the number of publications indexed in the SCI, SSCI, and ESCI databases. Such results, however, should be interpreted with caution and situated within the specific contextual and methodological framework of the study.

From a contextual standpoint, one possible explanation for the absence of significant gender differences may lie in the relatively balanced representation of men and women in academic positions in Serbia (Statistical Office of the Republic of Serbia 2024). This balance has been shaped by distinctive historical and social circumstances, most notably the substantial increase in women's participation in higher education since the 1970s (Petrušić and Vujadinović 2018). The predominance of females in our sample, both overall and across academic ranks, indicates that the absence of significant gender differences in professional engagement and research productivity is not due to underrepresentation of women. In addition, the existence of a relatively well-developed legal and strategic framework for gender equality, which explicitly promotes equal opportunities within the higher education sector, may have contributed to mitigating potential disparities (Ćeriman and Fiket 2019).

At the same time, certain methodological aspects may have influenced the results. The study focused exclusively

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on professors (assistant, associate, and full), while junior academic staff, such as teaching assistants and early-career researchers, were not included. This is a relevant limitation, given that younger academics frequently face the dual pressures of establishing a career and starting a family, the factors that previous studies suggest may disproportionately affect women (Blagojević 2009; Lazarević-Moravčević, Mosurović Ružičić and Minović 2023).

Finally, it should be noted that research productivity in this study was operationalized solely through the number of publications indexed in SCI, SSCI, and ESCI databases. While this bibliometric indicator is widely accepted and highly relevant, it represents only one dimension of academic performance. Future studies would benefit from incorporating additional indicators, such as participation in research projects, access to international networks, doctoral supervision, success in obtaining competitive research grants, and the extent of international collaborations. Evidence from some previous work shows that gender often shapes opportunities across these dimensions, with women frequently facing structural disadvantages (Šobot 2019; Babović, Drašković and Popović 2019; Ćeriman and Fiket 2019).

On the other hand, the findings from the correlation and mediation analyses provide additional insights. While gender did not significantly correlate with either work engagement or research productivity, a weak but statistically significant positive correlation was observed between work engagement and research productivity.

This finding supports the third hypothesis (H3), as it reveals a statistically significant positive relationship between work engagement, measured here as self-perceived vigour, dedication, and absorption (UWES-9), and research productivity. However, the practical significance of this relationship appears limited. The correlation between the two variables was statistically significant but relatively weak, and the amount of variance in research productivity explained by work engagement was modest. Although this result aligns with the previous literature suggesting that engaged employees tend to be more productive (Hanaysha 2016; Gulzar and Teli 2018), the small effect size observed in this study calls for cautious interpretation. These findings indicate that, while work engagement may contribute to research output, it is likely only one of several factors influencing productivity (Heng, Hamid and Khan 2020).

However, the mediation analysis did not confirm the fourth hypothesis (H4), as work engagement did not significantly mediate the relationship between gender and research productivity. This result is partly due to the absence of gender differences in engagement and productivity within the observed sample.

From a theoretical standpoint, these findings do not indicate that gender is irrelevant. Scholars of higher education in Serbia and wider region, consistently point to subtle yet enduring gender inequalities, such as vertical segregation, unequal allocation of administrative tasks, and persistence of patriarchal cultural norms, that may hinder women's career advancement in academia (Petrušić and Vujadinović 2018; Šobot 2019; Tašner and Antić Gaber 2019; Lazarević-Moravčević, Mosurović Ružičić and Minović 2023). These forms of inequality, though not always captured by quantitative metrics such as publication numbers, still require scholarly and institutional attention.

The results of this study should be interpreted in light of several limitations. The sample was restricted to academic staff holding professorial ranks, thereby excluding teaching assistants and other early-career academics. Furthermore, the study focused exclusively on public universities in Serbia, omitting private institutions. Future research could benefit from adopting a broader quantitative and qualitative scope. For instance, it would be valuable to investigate whether teaching and junior assistants, who represent a younger and potentially more vulnerable category, are more affected by gender-based barriers than their more established counterparts. Additionally, as research productivity in this study was measured solely by the number of publications indexed in the SCI, SSCI, and ESCI databases, other relevant forms of academic contribution were not considered. Subsequent studies should aim to adopt a more comprehensive approach. Finally, incorporating qualitative methods, such as interviews, could provide a deeper understanding of how gender differences manifest in everyday academic life.

5 CONCLUSION

This study aimed to investigate the influence of gender on work engagement and research productivity among university teachers in Serbia, as well as to consider the potential mediating role of work engagement in the relationship between gender and scientific output. Building on contemporary theoretical frameworks and international research findings that highlight notable gender disparities in academic careers, particularly in terms of research performance and work engagement, this study formulated four hypotheses, which were empirically tested on a sample of 263 university professors employed at four public universities in Serbia.

Employing a quantitative research design and standardized instruments (including the UWES-9 scale to assess work engagement), the analysis included independent samples t-tests, correlation analysis, and mediation analysis using the PROCESS macro (Model 4). The results revealed no statistically significant differences between male and female respondents with respect to either work engagement or research productivity. The first two research hypotheses (H1 and H2), which posited that male university teachers in Serbia would exhibit higher levels of work engagement (H1) and higher research productivity (H2) compared to their female counterparts, were not confirmed.

In contrast, the third hypothesis, which proposed a positive correlation between work engagement and research productivity, was confirmed, aligning with relevant theoretical assumptions and previous research. The fourth hypothesis, which suggested that work engagement mediated the relationship between gender and research productivity, was not supported. Although work engagement has a positive effect on productivity, this effect does not appear to be influenced by gender.

These results should be interpreted with caution within the specific contextual and methodological framework of the study. They may reflect Serbia's progress in institutionalizing gender equality, potentially due to the historical inclusion of women in higher education and existing legal and strategic frameworks promoting equal access to academic and research positions. At the same time, the sample structure (the study focused exclusively on assistant, associate, and full

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professors), and the chosen measure of productivity (assessed solely through publications indexed in SCI, SSCI, and ESCI databases), may potentially limit the scope of the findings. However, the absence of gender differences in quantitative indicators does not preclude the existence of subtler forms of inequality within the higher education sector, as suggested by prior research.

Accordingly, the value of this research lies not only in providing empirical insight into the current state of gender dynamics in Serbian higher education but also in opening opportunities for future investigation. Subsequent studies should adopt a broader research scope by including early-career academic staff, private higher education institutions, a wider range of research productivity indicators, and qualitative methods capable of uncovering deeper aspects of academic life and potential gender-based challenges.

Ultimately, the results of this study may provide a foundation for institutional and public policies aimed not only at maintaining and further promoting gender equality in Serbian higher education, but also at strengthening the academic capacity of universities in Serbia. Institutional measures could include transparent procedures for hiring and promotion, mentorship and career development programs for all academic staff, regular monitoring of gender representation, and initiatives supporting work-life balance. Additionally, institutions should consider measures to strengthen work engagement among university teachers, such as offering professional development opportunities, staff awards, and supportive work environments, as well as initiatives to enhance research productivity, including internal research grants, collaborative projects, and access to international networks, regardless of sex. Public policies might focus on sustaining and enhancing national legal frameworks for gender equality, encouraging balanced participation in research projects and academic committees, and supporting research on subtler forms of inequality that may not be captured by quantitative indicators. These proactive policies can help ensure that equal opportunities and conditions are preserved for all academic staff.

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Data Availability Statement

Data are available from the authors upon request

Coauthor Contributions

Ivana Simić: Conceptualization, Investigation, Validation, Visualization, Writing – Original Draft;
Biljana Đorđević: Investigation, Validation, Writing – Review & Editing;
Sandra Milanović Zbiljić: Methodology, Data Curation, Formal Analysis.

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APPENDIX 1

UWES-9 Scale

Subdimensions of Work engagement	Item
Vigour	At my work, I feel bursting with energy.
	At my job, I feel strong and vigorous.
	When I get up in the morning, I feel like going to work.
Dedication	I am enthusiastic about my job.
	My job inspires me.
	I am proud of the work that I do.
Absorption	I feel happy when I am working intensely.
	I am immersed in my work.
	I get carried away when I'm working.

Source: Schaufeli, Bakker and Salanova (2003).

Rod i njegov uticaj na radno angažovanje i istraživačku produktivnost univerzitetskih nastavnika u Srbiji

PROŠIRENI SAŽETAK

U radu se ispituje uticaj roda na radno angažovanje i istraživačku produktivnost univerzitetskih nastavnika u Srbiji, uz analizu potencijalne medijatorske uloge radnog angažovanja u odnosu između roda i naučne produktivnosti. Istraživanje je utemeljeno na savremenim teorijskim pristupima i brojnim međunarodnim studijama koje ukazuju na postojanje rodnih nejednakosti u okviru akademskih karijera, a sprovedeno je na uzorku od 263 univerzitetska nastavnika sa četiri najveća državna univerziteta u Srbiji. Podaci su prikupljeni putem strukturisanog upitnika i analizirani su korišćenjem statističkog softvera SPSS (verzija 23). Radno angažovanje je mereno uz pomoć validirane skale UWES-9 (Utrecht Work Engagement Scale), dok je istraživačka produktivnost operacionalizovana brojem naučnih radova objavljenih u časopisima indeksiranim u relevantnim bazama. Za obradu podataka korišćeni su: deskriptivna statistika, t-testovi, korelaciona analiza i analiza medijacije putem PROCESS makro modela 4. Rezultati pokazuju da ne postoje statistički značajne razlike između muškaraca i žena ni u pogledu radnog angažovanja, ni u pogledu istraživačke produktivnosti. Muški univerzitetski nastavnici nemaju ni viši nivo radnog angažovanja, niti višu istraživačku produktivnost u poređenju sa svojim koleginicama. Međutim, utvrđena je pozitivna i statistički značajna, ali slaba korelacija, koja ukazuje da su angažovaniji univerzitetski nastavnici ujedno i produktivniji u naučnom smislu. Takođe, radno angažovanje jeste značajan prediktor produktivnosti, ali ne i medijator za uticaj roda na istraživačku produktivnost. Dobijene nalaze tumačimo u kontekstu višedecenijskog intenzivnog uključivanja žena u visoko obrazovanje, relativno razvijenog normativnog okvira koji promoviše jednakost, ali i izabranog metodološkog okvira. Ipak, odsustvo statistički značajnih razlika ne znači da su rodne nejednakosti u visokom obrazovanju u Srbiji iskorenjene. Potrebna su istraživanja koja bi uključila mlađe akademske kadrove, privatne visokoškolske ustanove i kvalitativne metode da bi se bolje razumeli svakodnevni izazovi zaposlenih u akademskoj zajednici. Dobijeni rezultati mogu poslužiti kao osnova za kreiranje institucionalnih i javnih politika u funkciji rodne ravnopravnosti u visokom obrazovanju u Srbiji, ali i jačanju akademskih kapaciteta univerziteta. Institucionalne mere mogu uključiti transparentne procedure zapošljavanja i napredovanja, redovno praćenje rodne zastupljenosti i ravnopravnosti na svim nivoima, inicijative za balans između privatnog i poslovnog života, kao i podsticanje radnog angažovanja i unapređenje istraživačke produktivnosti, kroz nagrađivanje, podršku profesionalnom i istraživačkom razvoju, pristup istraživačkim grantovima i međunarodnim mrežama. Javne politike mogu biti usmerene na unapređenje nacionalnih pravnih okvira za rodnu ravnopravnost, podsticanje ravnomerne zastupljenosti u istraživačkim projektima i akademskim komisijama, kao i podršku istraživanjima o suptilnijim oblicima nejednakosti koje nisu obuhvaćene kvantitativnim indikatorima. Ove proaktivne politike mogu doprineti očuvanju jednakih šansi i uslova za sve akademske radnike.

KLJUČNE REČI

rod, radno angažovanje, istraživačka produktivnost, univerzitetski nastavnici, Srbija

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