



Research Article

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Predictive Factors of Attitudes Towards Scientific Research in University Teachers in Peru

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Abstract

Scientific research is essential for university teachers and the university in general, since its main objective is to generate and disseminate knowledge. The objective of this study was to examine the factors that influence the attitudes of university lecturers in Peru towards scientific research. The study employed a quantitative methodology, focusing on an explanatory-predictive framework. A 28-item questionnaire related to university teachers' attitudes towards research was applied, with a Cronbach's alpha of 0.9 reliability. The sample included the participation of 405 university teachers from different regions of Peru with 1 to 30 years of professional experience. Non-parametric analysis of variance (ANOVA) statistical techniques were applied for data processing. The results showed that the factors analysed (sex, years of experience, and region of origin) predicted the behavioural and cognitive dimensions but not the affective dimension. Teachers from the northern part of the country and Lima have prevalence in the behavioural and cognitive dimensions, and most teachers have a high level in the behavioural and cognitive dimensions but a low level in the affective dimension. The results are consistent with previous studies showing that attitudes towards research are influenced by factors such as age, research subject, participation in research activities, and social capital.

Keywords: Attitude determinants, higher education, teacher's attitude and scientific research

1. Introduction

Nowadays, worldwide, the professional standard of university teachers places a greater emphasis on the acquisition of more complex competencies for scientific research, such as the use of digital tools

and artificial intelligence. The current context is Industry 4.0, robotization that is booming at a dizzying pace, and 3D printing. The conditions for conducting scientific research are becoming increasingly complex and require a higher level of ethical sense. Still, as time goes by, research teachers continue to develop research skills and competencies to achieve the construction of new knowledge. Nevertheless, a significant and alarming deficiency exists in the scholarly literature regarding the assessment of this particular subject matter. (McFadden & Williams, 2020).

Assessing university teachers' attitudes towards scientific research could provide information on their commitment (behavioural), willingness (affective), and beliefs (cognitive). Some results that could be obtained from this assessment would include the level of interest, which could be reflected in their willingness to participate in teaching research projects, the search for external funding for research that addresses local and national issues, and participation and collaboration in research groups, among others. The assessment should also include the valuation of scientific research in the academic environment and as part of the exercise of teaching and patent proposals (innovation and creativity). This situation expresses or intends to imply how teachers attribute to research a high value compared to other responsibilities, as well as their beliefs and benefits provided by scientific research (Palacios, 2021).

Likewise, the assessment of research competences involves measuring the level of expertise of university teachers in research methodology, assessing their abilities to design experimental, non-experimental, or qualitative designs, analysing quantitative or qualitative data, and publishing results in scientific journals of impact. At the same time, the assessment may reveal the obstacles and feasibility that university teachers face in relation to scientific research. This may include aspects such as availability of resources and funding, teaching workload, institutional support, and collaboration or synergy with other researchers. The assessment can also help identify the professional development needs of university teachers in relation to scientific research. This can guide the implementation of training, support programmers to improve their skills, and promote a research culture in the institution (Palacios, 2021).

The function of the research professor has evolved into a multifaceted and intricate domain, characterised by controversy and the emergence of adverse circumstances. These challenges include the intense pressure to publish in prestigious journals, restricted financial support and resources, and the delicate equilibrium between research commitments and teaching responsibilities, among various other factors. The profile of the research professor presupposes and demands the following attributes: academic, emotional intelligence, ethical, publication capacity, didactic, visibility, and permanence or sustainability in scientific work. This is why the profile of the scientific researcher in times of technology is characterised by the integration of technical and scientific skills, as well as by a permanent capacity for change and the efficient use of technological tools. It includes a solid command of knowledge in their area of specialization. Researchers must be up-to-date with developments and advances in their respective professional fields. Likewise, university lecturers must be adaptable and flexible in their teaching work. Ability to adapt to the particular needs and characteristics of students, as well as to the use of new technologies and teaching techniques. University teachers must be empathetic and supportive of students. This involves understanding the individual needs of students, being willing to help, and providing academic and personal guidance. Finally, university teachers should foster critical thinking in their students through research, encouraging them to question, analyse, and evaluate information in a rigorous way (Villanueva *et al.*, 2020).

The attitudes of university teachers towards scientific research require more effective practices to raise the levels of scientific production, since with them there will be a better predisposition to build new knowledge. Knowledge of research methodology per se is not enough, but the underlying attitudes are. Currently, the dispositions of university teachers are dispersed; it is necessary to know which attitudes predict a better disposition to carry out scientific research. Hastürk and Zdemir (2021) conducted a study that aimed to compare the attitudes of prospective preschool teachers towards the instruction of science and their preferred ways of learning. A comparative analysis was

conducted to examine the correlation between the preferred modes of learning and the attitudes of potential preschool teachers towards science instruction. The findings of the study indicate that there was no statistically significant disparity observed between the views of prospective teachers towards science instruction and their preferred approaches to learning. As a result, the study's goal was to examine the factors that predict attitudes towards scientific research among Peruvian university professors from various districts or regions to make predictions about how scientific activity will develop in the future and to help develop a model for formative research.

2. Literature Review

The aim of the descriptive study conducted by Gálvez Diaz et al. (2021) was to describe nursing students sociodemographically and analyse the factors and attitudes of nursing trainees towards scientific research. For this purpose, a sociodemographic questionnaire and a Likert-type attitude scale were administered to 80 trainees of the Nursing Programme of the Universidad Señor de Sipán in Peru. As a result, it was established that a research competency programme is necessary to change the attitudes of nursing interns towards scientific research because, without it, professional practice could become purely technical. It was found that 58.8% of them had a negative attitude towards scientific research, while 41.3% had a positive attitude. They concluded that there is statistical support for the hypothesis that the variables age, gender, research topic, participation in research activities, and amount of research work done are related to the attitudes of student nurses towards research.

According to Barrios and Delgado (2020), the disposition towards research plays a crucial role in attaining substantial learning outcomes. Hence, the objective of this study was to develop and verify a survey instrument aimed at assessing university students' attitudes towards scientific research. The semantic networks technique, composed of 28 items, was used and was applied to 212 university psychology students. A Cronbach's alpha of .726 and a factor analysis were obtained, which yielded 2 factors (positive and negative attitude) with 30.24% variance. In conclusion, the questionnaire showed acceptable psychometric values for its application in different realities.

Palacios (2021) concluded that just 8.3% of the sample population had a favourable attitude towards research, compared to 41.7% who had an unfavourable attitude, based on an exhaustive assessment of the scientific literature. The emotive component displays a positive category with 21.4% as opposed to the negative category, which is present with 14.2%, while the cognitive component displays a positive category with 35.7%. The positive category makes up 21.4% of the behavioural component, as opposed to the negative category's 7.1% share. Therefore, it is important to ask lecturers in charge of research courses to motivate their students and use strategies to help postgraduate and undergraduate students develop a research-friendly attitude.

On the other hand, Su et al. (2022) investigated how the improved and growing attitude of teachers effectively facilitates online teaching and solves various challenges, such as student stress, scarce resources for research, and educational quality. For some university teachers, there is a scarce supply of attitudes, skills, and knowledge that help them effectively carry out their research work, since many are unaware that their educational attitudes influence teaching and pedagogical learning.

Kostoulas et al. (2019) claim that the sample of educators has a broad view of growth and reads about research findings frequently, especially in online and professional journals. Additionally, factors that deter some teachers from taking part in studies were found. These include issues with gaining access to research, a lack of time, and reluctance on the part of some teachers to use research in their courses.

Attitudes are relatively stable dispositions that are made up of feelings, thoughts, and behaviours that are integrated (Rodríguez 2006). One is not born with a positive or negative disposition towards something. It is a consequence of experiences, which are acquired and presuppose learning events. They include three components: The cognitive component, which involves possessing knowledge about an object or social event, is responsible for providing foundations and reasons for attitudes. The affective component involves feelings and emotions about

the object. You feel what you think; therefore, emotions and feelings are the aggravators of good or bad attitudes, which will be mitigated by what the cognitive processes indicate or order. The behavioural component is the manifestation of the relatively stable behaviours of people, which are unconscious and are subject to cognitive and affective aspects. People act as they feel and think (Rodriguez, 1993, quoted in Masías, 2006).

3. Methodology

The study comprises a quantitative, explanatory-predictive approach, which involves making use of the information collected to make predictions about how the phenomenon or variables will behave in the future. A questionnaire with 28 items related to the attitudes of university teachers towards research was applied, with a Cronbach's Alpha of 0.9 reliability. The sample included 405 university teachers from different regions of Peru with 3 to 30 years of professional experience. Statistical techniques of nonparametric analysis of variance (ANOVA) were applied for data processing.

4. Results

Data analysis was performed, but previously the Kolmogorov-Smirnov normality test was applied with a significance of less than 0.05 ($p < 0.05$), indicating that the data do not belong to a normal distribution. Therefore, ANOVA, Mann-Whitney U and Kruskal-Wallis tests were used because they belong to nonparametric statistics.

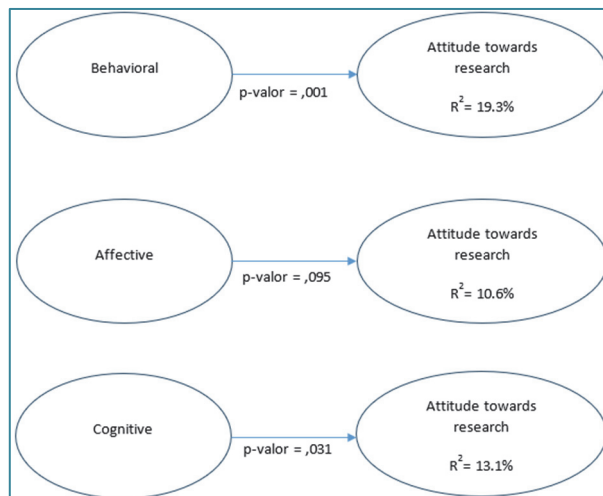


Figure 1: Regression analysis of the predictors and dimensions of the variable attitude towards research in Peruvian university teachers

The F-value is 3.533, the mean square is 0.835, the total of squares is 6.677, and the significance level (Sig.) is 0.001 for the behavioural dimension. This suggests that the behavioural dimension's various means differ significantly from one another. The corrected R-squared value is 0.139, and the R-squared value is 0.193, showing that the behavioural dimension accounts for 19.3% of the variation in the data. The estimate's standard error is 0.48607. The mean square is 0.455, the F-value is 1.743, the significance level (Sig.) is 0.095, and the sum of squares for the affective dimension is 3.638. This shows that the affective and cognitive dimensions do not significantly differ from one another. This shows that, at the 0.05 significance level, there is no difference in the means of the affective

dimension. The data's 10.6% variance is explained by the affective dimension, according to the R-squared value of 0.106, while the adjusted R-squared value is 0.045. The estimate's standard error is 0.5174. The F-value is 2.221, the mean square is 0.391, the square sum is 3.131 for the cognitive dimension, and the significance level (Sig.) is 0.031. This suggests that the cognitive and affective dimensions differ significantly from one another. This suggests that the means of the cognitive dimension differ significantly from one another. The cognitive component accounts for 13.1% of the variance in the data, according to the R-squared value of 0.131, while the corrected R-squared value is 0.072. The estimate's standard error is 0.418181.

Table 1: Regression analysis of the predictors and dimensions of the variable attitude towards research in Peruvian university teachers, according to their characteristics.

| Coefficients a | | | | | |
|----------------|-------------------------------|---------------------------|--------|--------|-------|
| Model | | Standardized Coefficients | | t | Sig. |
| | | Beta | | | |
| Behavioral | Sex | | 0.066 | 0.783 | 0.435 |
| | Region=North | | 0.348 | 2.455 | 0.016 |
| | Region =Lima | | 0.343 | 2.433 | 0.016 |
| | Years Teacher=1 to 5 years | | -0.310 | -2.356 | 0.020 |
| Affective | Sex | | -0.101 | -1.144 | 0.255 |
| | Region =Lima | | -0.027 | -0.179 | 0.858 |
| | Years Teacher =16 to 20 years | | 0.077 | 0.602 | 0.549 |
| Cognitive | Sex | | -0.076 | -0.874 | 0.384 |
| | Region=North | | 0.461 | 3.135 | 0.002 |
| | Region =South | | 0.370 | 2.658 | 0.009 |
| | Region =Lima | | 0.486 | 3.318 | 0.001 |
| | Years Teacher =1 to 5 years | | -0.149 | -1.092 | 0.277 |

These coefficients are related to a regression analysis. They show the standardised coefficients, beta values, t-scores, and significance levels for each predictor variable in the model. The table shows 12 predictor variables, each with its own beta, t-score, and significance level.

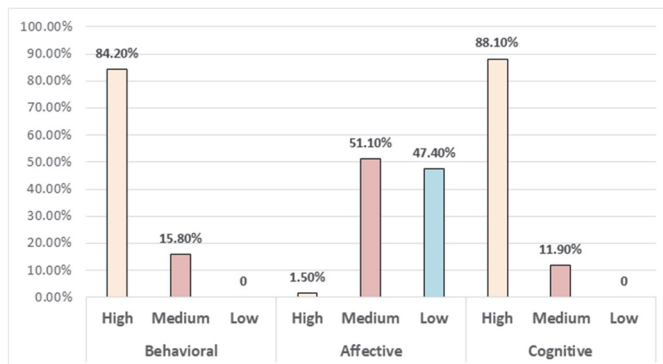


Figure 2: Descriptive analysis of the dimensions of the variable attitude towards research in university teachers.

In the behavioural dimension, the majority of respondents (84.2%) reported a high level of attitude towards research, 15.8% a medium level, and none a low level. In the affective dimension, only a small percentage (1.5%) of respondents reported a high level of affective attitude towards research, while

the majority (51.1%) reported a medium level and a considerable minority (47.4%) a low level. Regarding the cognitive dimension, the majority of respondents (88.1%) reported a high level of cognitive attitude towards research, while (11.9%) reported a medium level, and none reported a low level.

Table 2: Analysis of significant differences among the dimensions of the variable attitude towards research and the predictor sex.

| | Null Hypothesis | Test | Sig. ^{a,b} |
|---|----------------------|---------------------|---------------------|
| 1 | Behavioral Dimension | Mann-Whitney U Test | 0.688 |
| 2 | Affective Dimension | Mann-Whitney U Test | 0.548 |
| 3 | Cognitive dimension | Mann-Whitney U Test | 0.443 |

The Mann-Whitney U tests, a type of nonparametric test designed to examine the distribution of outcomes between two groups, are employed for the three dimensions. The results demonstrate the degree of statistical significance associated with each test. The p-value obtained from the Mann-Whitney U test for the behavioural dimension is 0.688, exceeding the predetermined significance level of 0.05. Therefore, it can be concluded that the null hypothesis is not valid. Consequently, the null hypothesis remains unrefuted, indicating that there are no significant disparities in attitudes towards research between the high and medium-behaviour groups. The p-value obtained from the Mann-Whitney U-test for the affect dimension is 0.548, which exceeds the significance level of 0.05. As a consequence of this, it is not possible to reject the null hypothesis. Consequently, the null hypothesis remains unrefuted, indicating a lack of observable disparity in the research-related attitudes between the high and medium-affect groups. The p-value obtained from the Mann-Whitney U-test for the cognition dimension is 0.443, indicating that it is above the conventional significance level of 0.05. As a result of this, it is not possible to reject the null hypothesis. Consequently, the null hypothesis remains unrefuted, suggesting that there is no observable distinction in the research-related attitudes between the high and medium-cognition groups.

Table 3: Analysis of significant differences among the dimensions of the variable attitude towards research and the predictors of years of university teaching experience and region of origin.

| Null Hypothesis | | Test | Sig. ^{a,b} |
|------------------|----------------------|---------------------|---------------------|
| Years teaching | Behavioral Dimension | Kruskal-Wallis Test | 0.001 |
| | Affective Dimension | | 0.033 |
| | Cognitive Dimension | | 0.284 |
| Region of origin | Behavioral Dimension | Kruskal-Wallis Test | 0.012 |
| | Affective Dimension | | 0.269 |
| | Cognitive Dimension | | 0.041 |

Kruskal-Wallis tests, which are nonparametric tests used to compare the distribution of scores among three or more groups, were employed for the six tests. The outcomes reflect each test's level of statistical significance. The Kruskal-Wallis test's p-value for the behaviour dimension and the years of teaching experience component is 0.001, which is less than the normative alpha level of 0.05. The null hypothesis is thus acceptable. Since there are significant differences in attitudes towards research among the various groups with years of teaching experience in the behavioural dimension, it is possible to reject the null hypothesis and draw this conclusion.

The Kruskal-Wallis test's p-value for the affect dimension and the factor of years of teaching experience is 0.033, which is less than 0.05. Since there is a substantial difference in attitudes towards research amongst the various groups with years of teaching experience in the behavioural dimension, we can reject the null hypothesis and come to that conclusion. Since there are significant differences

in attitudes towards research among the various groups of years of teaching experience for the affect component, we can reject the null hypothesis and get to that conclusion.

The Kruskal-Wallis test's p-value for the cognition dimension and the years of teaching experience factor is 0.284, which is higher than 0.05. As a result, it is possible to conclude that there is a substantial variation in attitudes towards research among the various groups of years of teaching experience for the affect dimension, even though the null hypothesis cannot be disproven. Since there are no significant changes in attitudes towards research amongst the various groups of years of teaching experience for the cognitive component, the null hypothesis cannot be rejected.

The behavioural dimension and the region of origin factor's p-value for the Kruskal-Wallis test is 0.012, which is less than 0.05. Consequently, the null hypothesis may be disproven. Thus, it may be concluded that there are significant variations in the behavioural dimension's groups' attitudes towards research, rejecting the null hypothesis.

The p-value for the affect dimension and the region of origin component in the Kruskal-Wallis test is 0.269, which is more than 0.05. As a result, even though the null hypothesis cannot be disproven, it is reasonable to conclude that there is a significant difference in the region-of-origin groups' behavioural dimensions attitudes towards research. For the affect dimension, there are no discernible changes in attitudes towards research among the four region-of-origin groups, which means that the null hypothesis cannot be disproven.

The Kruskal-Wallis test's p-value for the cognition dimension and the region of origin factor is 0.041, which is less than 0.05. Consequently, it is possible to reject the null hypothesis. As a result, it can be said that there is a substantial difference in attitudes towards research among the various region-of-origin groups for the cognition dimension, rejecting the null hypothesis in the process.

Table 4: Analysis of significant differences among the dimensions of the variable attitude towards research and the predictors: years of experience in university teaching and region of origin, according to the comparative groups.

| Dimensions | Pairwise Comparisons of Years Teaching | | | |
|--|--|----------------|---------------------|-------|
| | Sample 1 - Sample 2 | Test Statistic | Std. Test Statistic | Sig. |
| Behavioral Dimension - Years teaching | 1 to 5 years-11 to 15 years | -23.957 | -2.448 | 0.014 |
| | 1 to 5 years-6 to 10 years | -28.720 | -3.124 | 0.002 |
| | 1 to 5 years-21 years & more | -30.420 | -2.674 | 0.008 |
| | 1 to 5 years-16 to 20 years | -36.770 | -3.758 | 0.000 |
| Affective Dimension - Years teaching | 21 años a mas-1 a 5 años | 31.467 | 2.771 | 0.006 |
| | 16 a 20 años-1 a 5 años | 23.958 | 2.453 | 0.014 |
| Behavioral Dimension - Region of origen | Rest of the country-Lima | 28.937 | 2.497 | 0.013 |
| | Rest of the country -North | 33.941 | 2.868 | 0.004 |
| | South - North | 18.807 | 2.140 | 0.032 |
| Cognitive Dimension - Region of origen | Rest of the country-Lima | 27.435 | 2.366 | 0.018 |
| | Rest of the country -North | 31.244 | 2.639 | 0.008 |

These pairwise comparisons show the statistical significance of the differences among the different groups according to their scores on the different dimensions and their years of teaching experience or region of origin. For example, in the behavioural dimension, pairwise comparisons show that there are significant differences among teachers with 1-5 years of experience and those with 11-15 years, 6-10 years, 21 years or more, and 16-20 years of experience, respectively. The same occurs with the comparisons made for the Affective Dimension and Years of teaching, Significant disparities exist among teachers with varying levels of experience, namely between those with 1-5 years of experience, those with 21 years or more, and those with 16-20 years of experience. In the Behavioral Dimension, there are also significant differences between teachers from different regions of origin, such as Rest of the Country vs. Lima, Rest of the Country vs. North, and South vs. North. The same occurs with the

Cognitive Dimension and the comparison between teachers from Rest of the Country vs. Lima and Rest of the Country vs. North.

5. Discussion

The results in figure 1 show that the ANOVA model confirms that the factors analysed (gender, years of teaching experience, and region of origin) as a whole predict the behavioural and cognitive dimensions ($p < 0.05$), but do not predict the affective dimension ($p > 0.05$). It means that the factors do not predict the affective psychological states of the teachers or the motivation that drives them to reject or accept the execution of a certain purpose, which in this case would be to carry out scientific research events. In addition, it is observed that the factors analysed as a whole are able to predict the behavioural dimension at 19%, which indicates that gender, years of experience, and region of origin play a leading role in the willingness of teachers to conduct scientific research. Likewise, the factors evaluated as a whole can predict the cognitive dimension at 13%, which means that the years of teaching experience allow the teachers to have the capacity to elaborate on academic research. These results coincide with the findings of Galvez Díaz et al. (2021), who concluded in their research that the factors that predicted attitude towards research were age, sex, research subject, participation in research activities, and the number of research works carried out. On the other hand, Reichenberg (2021) determined in his study that social capital is a predictor of research attitude (an intangible asset of interpersonal relationships that allows the creation of a network of contacts to conduct research).

Table 1 shows that teachers in the north of the country and in the city of Lima are more prevalent in the behavioural and cognitive dimensions. This situation could be understood in the sense that the universities in the capital and in the north of the country are the ones that most encourage teachers to carry out research and therefore have more scientific production. However, teachers with 1 to 5 years of experience do not predict the cognitive or affective dimensions, which shows that their predisposition could be focused on continuing to grow professionally, pursuing a career line, training, or seeking a position, but not on conducting scientific research. These results are similar to those by Hennessy & Lynch (2019), who concluded in their research that there is professional dissonance among educators. On the one hand, they recognise the importance of research in academia, but, on the other hand, they do not want to get involved in research groups to realise scientific growth spaces.

Figure 2 shows that 84.2% have a high level in the behavioural dimension, which shows that 8 out of 10 teachers evaluated show a willingness to strengthen their research competencies. Likewise, there is an inclination to search for information and investigate existing knowledge in order to produce new concepts, models, and theories that encourage an investigative culture in their lives. These results coincide with the conclusions of Palacios (2021), who found a predominance in the favourable category of the cognitive, affective, and behavioural components. In addition, 88.1% possess a high level in the cognitive dimension, indicating that teachers have the ability to conduct research, finding similarity with the manifestation of Çelebi (2021), who found that teachers' attitudes towards scientific research are not at the expected level. The low level of attitudes and interest indicates that competencies related to scientific thinking processes cannot reach the expected level. Likewise, 47% of the teachers surveyed show a low level in the affective dimension, showing that teachers do not have an emotional bond towards research activities, generating in them the absence of motivation and predisposition of psychological states to execute academic projects that have as an academic product a research project. This indicates a relationship with the findings of Su et al. (2022), who stated that the scarce supply of intrapersonal attitudes and skills influences research work and pedagogical learning.

Table 2 shows that the bilateral significance is greater than 0.05, which indicates that there are no significant differences in the dimensions according to the sex factor. This shows that the average scores of men and women are the same in the behavioural, affective, and cognitive dimensions,

having a discrepancy with the conclusions of Özgül et al. (2021), who found significant differences between men and women, being the female gender, who have a tendency and predisposition to get involved in academic projects related to the construction of theories, concepts, and research models.

Table 3 shows that according to the predictor factor of years of university teaching experience, the cognitive dimension has no significant differences. Likewise, the predictor factor region of origin has no significant differences in the affective dimension. Table 4 shows that, in the group of years of experience, teachers with more than 5 years of teaching experience have a greater behavioural predisposition to conduct research. However, teachers with less than 6 years of experience have a higher average in the affective dimension. In the group of regions of origin, teachers from the north of the country have a higher average in the behavioural dimension, and teachers from Lima have a predominance in the cognitive dimension.

6. Conclusions

The ANOVA model shows that the factors analysed (gender, years of teaching experience, and region of origin) jointly predict the behavioural and cognitive dimensions but not the affective dimension. Teachers from the north of the country and from Lima are prevalent in the behavioural and cognitive dimensions; most teachers are high in the behavioural and cognitive dimensions but low in the affective dimension. In other words, they do not predict the likes, boredom, frustrations, or states of anxiety that the process of scientific research may generate or how they are going to behave in the future, but they predict the results of the learning that university teachers are having every day in research methodology and in the development of research skills through permanent training processes. The prevalence of the cognitive and behavioural dimensions implies that there will be greater use of scientific methods to access knowledge, greater development of ethical research, greater development of creativity, greater development of critical thinking, and a greater increase in publications in high-impact journals. The prevalence of beliefs that research will have greater social recognition, greater efficiency of interdisciplinary research, and greater confidence that it is a means to solve problems and a generator of new goods and services. Ultimately, there were no substantial disparities observed between males and females across the three categories. The findings align with prior research, which posits that several factors, including age, study topic, engagement in research endeavours, and social capital, exert an influence on individuals' views towards research.

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