

Self-Efficacy among Veterinary Professors in Mexico

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Abstract This cross-sectional study aimed to examine how veterinary faculty members perceive their self-efficacy in teaching their subject and to explore related variables, including sex, age, teaching seniority, and educational attainment. The Teacher Self-Efficacy Scale, encompassing *Didactic Planning*, *Effective Self-Regulation*, and *Monitoring, Evaluation, and Educational Improvement*, was utilized. Twenty-four veterinary professors — selected by their availability— completed the online instrument. Analyses included: 1) descriptive statistics of sociodemographic variables and perceptions of teaching effectiveness, 2) correlations between reported teaching efficacy and both age and teaching experience, and 3) comparisons of teaching self-efficacy by sex and educational level. Results indicated that professors generally perceived themselves as highly capable in teaching: *Didactic Planning* ($\bar{X} = 22.5, \pm 1.9$), *Effective Self-Regulation* ($\bar{X} = 21.3, \pm 2.6$), and *Monitoring, Evaluation, and Educational Improvement* ($\bar{X} = 22.0, \pm 1.9$). Years of teaching experience were negatively correlated with perceived teaching self-efficacy in lesson planning ($r_s = -0.49, p = 0.015$) and effective self-regulation ($r_p = -0.44, p = 0.029$). While women and those with a master's degree reported higher perceptions of teaching efficacy, these differences were not statistically significant. These findings offer insight into veterinary faculty members' self-perceptions of teaching ability and highlight the need for further research into why greater teaching experience may be associated with lower perceived efficacy.

Keywords: self-efficacy, teaching, professor, veterinary, assessment

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1. Introduction

The scientific literature reports that most higher education professors perceive moderate to high teaching self-efficacy. However, a proportion of them report feeling incapable of adequately performing the various activities related to their general professional competence and their ability to teach their specialty in particular [1].

Perceived self-efficacy is defined as the beliefs individuals hold about their ability to achieve certain outcomes [2]. This depends on the level and strength of personal efficacy in generating change through persistent effort and the creative use of abilities and resources, as well as on the flexibility of the environment. People who have significant doubts about their own abilities tend to anticipate the inconsequentiality of their efforts to change their life situation and therefore produce little change, even in environments that offer many opportunities. Conversely, those who demonstrate a strong belief in their efficacy find, through ingenuity and perseverance, ways to

exert some control, even in scenarios with limited opportunities and many constraints. In the specific case of teachers, their beliefs about their personal efficacy in motivating and promoting learning influence the types of learning environments they create and the level of academic progress their students achieve [3].

Perceived self-efficacy plays an essential role in human functioning because it affects behavior not only directly, but also through its impact on other determinants such as goals and aspirations, outcome expectations, affective tendencies, and perceptions of obstacles and opportunities within their social context. Efficacy beliefs influence how individuals think: erratically and pessimistically, or strategically and optimistically. They also affect the courses of action people choose, the challenges and goals they set and their commitment to them, the effort they put into specific initiatives, the results they expect from their efforts, how long they persevere when faced with obstacles, their resilience in the face of adversity, the quality of their emotional life, and the stress and depression they experience when coping with environmental demands, as well as the life choices they

make and the achievements they attain [2]. Self-efficacy is a set of beliefs that motivate teachers to apply their knowledge and skills in teaching situations [4].

It has been observed that teachers who feel less effective at teaching their subject tend to be reluctant to implement novel activities considered useful for their students' learning [5] and also report a lower quality of work life [6].

It has been found, for example, that those who possess knowledge of self-regulated learning and perceive themselves as having high efficacy in fostering such learning tend to report greater teaching practice aimed at promoting self-regulated learning among students [7].

In situations that pose additional stressful challenges for teachers, such as the transition from an assessment model based on paper-based exams to online exams adapted to students' abilities, it was found that teachers' high perceived efficacy related to computer use had a positive effect on their intention to use this type of exam [8]. A different case was that of veterinary professors in Mexico, who faced difficulties working from a competency-based teaching perspective because, according to them, there was a certain lack of awareness of the then-new educational model and the concept of competencies itself, as well as limitations stemming from their professional profile as veterinarians rather than as teachers, which they attempted to overcome through continuing education [9].

Furthermore, it has been observed that the greater the belief in one's ability to teach or control the academic environment, the less influence physiological and emotional pressures have on performance and the formation of this belief. Additionally, teachers who believe in their ability to engage students in the teaching-learning process may have developed these beliefs from their own classroom experiences or from others [10].

There is evidence that those who report high self-efficacy in lesson planning, active student engagement, promoting positive classroom interaction, and evaluating student learning and their own performance (self-assessment) tend to exhibit more effective teaching practices [11,12]. All of this will be reflected in a quality university education if it is considered the set of teaching characteristics that positively impact student learning [4].

While some studies on teacher self-efficacy indicate that around one-fifth of university professors have low levels of self-efficacy [13,14,15,16], the results regarding the variables that may be associated with it are not always conclusive [5,10,11,12,13,15,17].

Identifying professors' perceptions of their teaching effectiveness is a starting point for providing them with programs focused on their professional development needs, enabling them to perform effectively. There is increasing evidence that similar programs improve professors' enjoyment of teaching and reduce anxieties associated with feeling vulnerable [18].

Accordingly, understanding how veterinary faculty members perceive their teaching effectiveness, along with associated variables, is essential for informing targeted professional development.

2. Methodology

2.1. Design and Participants

This analytical cross-sectional study included 24 professors of Veterinary Medicine and Animal Science from Mexico City, selected based on their availability. A cross-sectional study can be described as a type of observational study that provides a snapshot of a population on a single occasion and enables the analysis of associations between variables without the influence of temporal factors [19].

This research method was chosen for this study because it is particularly well-suited to estimate the prevalence of teaching self-efficacy outcomes, describe population characteristics, and evaluate associations in a defined population.

2.2. Research Objectives

2.2.1. General Objective

The aim of this research was to understand how veterinary faculty members perceive their effectiveness in teaching their subject, as well as any related variables. For this purpose, a teaching self-efficacy scale developed and validated by Petra et al. [20] among university professors in Mexico was used.

2.2.2. Specific Objectives

- 1) To describe the perceived teaching self-efficacy of veterinary professors.
- 2) To describe the sociodemographic characteristics (*sex, age, seniority in teaching, and degree of study*) of veterinary professors.
- 3) To identify statistically significant correlations between sociodemographic variables (*age and seniority in teaching*) and the perceived teaching self-efficacy of veterinary professors.
- 4) To identify statistically significant differences between sociodemographic variables (*sex and degree of study*) and the perceived teaching self-efficacy of veterinary professors.

2.3. Data Collection Instrument

The measurement instrument used was a questionnaire which comprised of two sections, detailed below.

2.3.1. General Information

Each participant was asked for the following information: *sex* (woman/man), *age* (in years), *seniority in teaching* (in years), and *degree of study*.

2.3.2. Perceived Teacher Self-Efficacy

The Perceived Teacher Self-Efficacy Scale by Petra et al. [20] was used. It consists of 15 items distributed across three subscales that assess teachers' perceptions of their own ability to engage in:

Lesson planning. Strategically plan the teaching process by organizing objectives, content, and activities relevant to the students' level, as well as using pedagogical strategies that promote their participation and meaningful learning.

Effective self-regulation. Responsibly meet the demands of their teaching role and effectively manage their emotions, well-being, and motivation.

Monitoring, evaluation, and improvement. Reflect on and critically evaluate their own teaching practice and accept feedback from students and colleagues.

To rate this instrument, a Likert-type scale was used, with response options: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree, where a higher total score on each subscale indicates a greater perceived teaching self-efficacy (by dimension), and vice versa.

The internal consistency of the three self-efficacy subscales ranges from Cronbach's alphas of 0.72 to 0.75 and McDonald's omegas of 0.73 to 0.75.

2.4. Procedure

Twenty-four veterinary professors participated by completing the online measurement instrument.

2.4.1. Sample Selection

Professors were selected by their availability, which is a non-probability sampling method, involving non-random selection.

The inclusion criterion was being a professor of one or more subjects in the veterinary medicine program.

2.4.2. Measurement Instrument Administration

Participants were informed about the study's nature, assured of voluntary participation, and guaranteed confidentiality of their data.

The application was administered digitally (Google Forms), while the data analysis was performed using the statistical packages SPSS 23 and Jamovi 2.6.23.

2.4.3. Ethical Issues

The study project was evaluated and approved by the Research and Ethics Committee of the educational institution where it was conducted. The data generated in the research were used solely for scientific purposes and were not used for any other purpose; therefore, the handling of participants' information was carried out with absolute confidentiality.

2.5. Statistical Analysis

To describe the sex variable, percentages were used, while age and seniority in teaching were reported as means with their respective standard deviations.

For the perception of teacher self-efficacy, the means and standard deviations of the scores on the subscales, were calculated.

Spearman's or Pearson's correlation coefficient was calculated, depending on the distribution of the data for the subscales, to investigate whether there was an association between their corresponding scores and the variables of age and seniority in teaching work.

Likewise, for the comparative analysis by sex of teachers' perception of their teaching efficacy, the Student's *t*-test was used for variables with a normal distribution, and the Mann-Whitney U test for variables that did not meet the normality criterion.

Finally, for the comparative analysis by highest level of education, the Kruskal-Wallis test was used.

3. Results

A total of 24 veterinary professors from Mexico participated. The majority held postgraduate degrees (Table 1).

Table 1. Characteristics of the participating teachers

	Mean	Standard Deviation
Age (in years)	54.5	9.7
Seniority in teaching (in years)	24.3	10.3
	Frequency	Percentage
Sex		
Women	18	75.0
Men	6	25.0
Degree of studies		
Bachelor's	4	16.7
Master's	11	45.8
Doctoral's	9	37.5

Overall, teachers reported favorable perceptions of their ability to achieve students' learning objectives (Table 2).

Table 2. Professors' perception of their teaching self-efficacy

Dimension	$\bar{X}$	$\pm$ SD
Lesson planning	22.5	1.9
Effective self-regulation	21.3	2.6
Monitoring, evaluation, and improvement	22.0	1.9

$\bar{X}$ = Mean, SD = Standard Deviation.

The score that can be obtained in each dimension ranges from five to twenty-five points.

Correlation analysis indicated that professors with less teaching experience were more likely to report that positive student interactions enhanced class development and that they effectively managed their emotions, well-being, and motivation to meet teaching demands (Table 3).

Table 3. Correlations between teaching self-efficacy perception and seniority in teaching

Dimension Item	$\bar{X}$	$\pm$ SD	Correlation	
			Coef.	Sig.
Lesson planning Classes go more smoothly when there is good interaction among the students. ^a	4.8	0.4	-0.49	0.015
Effective self-regulation ^b	21.3	2.6	-0.44	0.029

$\bar{X}$ = Mean, SD = Standard Deviation, Coef = Coefficient, Sig = Significance (bilateral).

^a Spearman's correlation coefficient (r_s) is reported. The score that can be obtained in this item ranges from one to five points.

^b Pearson's correlation coefficient (r_p) is reported. The score that can be obtained in this dimension ranges from five to twenty-five points.

Comparative analysis by sex revealed no statistically significant differences in teaching self-efficacy (Table 4).

Table 4. Comparison of teaching self-efficacy by sex

Sex	Teaching self-efficacy dimensions		
	Lesson planning	Effective self-regulation	Monitoring, evaluation, and improvement
Women (n=18)			
$\bar{X}$	22.7	21.2	22.1
$\pm$ SD	1.6	2.8	2.0
Men (n=6)			
$\bar{X}$	21.8	21.3	21.8
$\pm$ SD	2.8	2.4	1.6
Z	-0.51	-0.07	-0.27
Sig.	0.607	0.946	0.787

$\bar{X}$ = Mean, SD = Standard Deviation, Sig=Significance (bilateral).
The score that can be obtained in each dimension ranges from five to twenty-five points.
The non-parametric Mann-Whitney U test was used.

No statistically significant differences in reported teaching self-efficacy were observed when comparing by highest level of education (Table 5).

Table 5. Comparison of teaching self-efficacy by level of education

Teaching Self-efficacy Dimension	Education Degree		
	Bachelor's (n=4)	Master's (n=11)	Doctoral's (n=9)
Lesson planning			
$\bar{X}$	22.3	23.2	21.8
$\pm$ SD	2.2	1.7	2.0
Test statistic			2.72
Significance (bilateral)			0.256
Effective self-regulation			
$\bar{X}$	22.8	21.3	20.6
$\pm$ SD	1.5	3.4	1.6
Test statistic			3.18
Significance (bilateral)			0.204
Monitoring, evaluation, and improvement			
$\bar{X}$	21.0	22.5	21.8
$\pm$ SD	1.8	1.4	2.3
Test statistic			1.72
Significance (bilateral)			0.423

$\bar{X}$ = Mean, SD = Standard Deviation.
The score that can be obtained in each dimension ranges from five to twenty-five points.
The non-parametric Kruskal-Wallis test was used.

4. Discussion

The changes taking place across various spheres of today's world require that the education of new generations be based on high-quality teaching, in which teachers feel capable of carrying out a range of activities that promote student learning. Perceived self-efficacy plays a significant role in human functioning because it affects behavior not only directly but also through its impact on other determinants, such as goals and aspirations, expectations of outcomes, emotional dispositions, and perceptions of obstacles and opportunities in the social environment [2].

Most research on how teachers perceive their ability to teach and facilitate student learning has been conducted in elementary and secondary education. Therefore, both the

instruments developed to assess their perceived teaching self-efficacy and the results obtained have focused on seeking support from parents and the educational center to achieve learning objectives.

In recent years, universities have begun conducting studies on how their professors perceive their own effectiveness in teaching their respective subjects. While all have started from Bandura's theoretical framework [2, 3], the authors have had to develop their own instruments tailored to the characteristics of their faculty and the specific areas they are interested in addressing regarding teaching self-efficacy.

4.1. Professors' Perception of their Teaching Efficacy

The professors reported their overall effectiveness in carrying out their teaching duties. This is consistent with the scientific literature, which reports that most higher education professors report moderate to high levels of teaching self-efficacy [1,14,15,21]. However, as in the present study, some of them stated that they did not feel capable of adequately performing certain activities related to their teaching in their specialty [1,14]. Some teachers harbored doubts about whether their efforts were truly having a positive impact on their students' learning and whether the established objectives could be met, which made them feel uncomfortable in their teaching roles.

The scale used enabled exploration of three specific dimensions related to the participating veterinary professors' perceptions of their teaching efficacy.

4.1.1. Lesson Planning

In general, teachers felt they had the necessary skills to plan their classes properly. In order of decreasing scope, they believed that: 1) classes go more smoothly when there is good interaction among the students; 2) they develop various strategies to capture and maintain their students' attention; 3) the classes they teach are well-structured for their students' academic level; 4) it is essential to plan the class and clearly define its objectives; and 5) they can have a positive impact on their students.

There is evidence that this component of professors' perceived self-efficacy is associated with better teacher performance in their educational practice [11,12].

4.1.2. Monitoring, Evaluation, and Improvement

Professors reported a high level of effectiveness in monitoring, evaluating, and improving their teaching practice, although to a lesser extent than in lesson planning. Listed in descending order of importance attributed to each aspect of this dimension, professors considered that: 1) teachers who are confident in their work welcomes feedback from their colleagues; 2) they reflect on whether their teaching practice influences their students' academic results; 3) they frequently accept suggestions and initiatives put forward by their students; 4) when a topic concludes, they verify whether their students have learned what was expected; 5) they are confident that their students can achieve the goals they set for them.

It has been observed that professors who perceive themselves as more effective at teaching their subject area

tend to be less reluctant to engage in innovative activities considered beneficial for their students' learning [5].

4.1.3. Effective Self-regulation

Although teachers' perception of their efficacy in its three dimensions tended to be high, professors reported feeling less confident in this component than in lesson planning, monitoring, evaluation, and improvement. Ranked from highest to lowest, they believe that: 1) they enjoy teaching; 2) they enjoy dealing with the various situations that arise in the classroom; 3) the evaluation students make of their teaching performance motivates them to make corrections and improvements; 4) it is their responsibility to make sure their students learn; and 5) they feel comfortable with their duties as teachers.

Professors who firmly believe in their teaching efficacy tend to seek ways to exercise control over their educational practice to create positive learning environments and influence their students' academic progress [3].

Beliefs about their own efficacy influence their way of thinking, whether erratic or strategic, optimistic or pessimistic. Likewise, these beliefs influence: 1) the decisions professors make and the achievements they attain, 2) their resilience in the face of adversity, as well as the quality of their emotional life (specifically, the levels of stress and depression they experience when coping with the demanding nature of their teaching role) and their work life [2,6].

4.2. Correlations of Professors' Perceptions of their Teaching Efficacy with Other Variables

4.2.1. Seniority in Teaching Work

It was found that those professors with less teaching time tended to consider that: 1) good interactions among their students improved the development of the class, and 2) they effectively manage their emotions, well-being, and motivation, fulfilling the demands of their teaching work.

In other studies, professors with more years of teaching experience have reported feeling less capable of teaching than those with less experience [15].

4.2.2. Age

Although a trend was observed in which younger professors tended to have higher perceptions of their teaching ability, the correlations were weak and did not reach statistical significance. While some authors have also found that, with increasing age, professors tend to feel less capable of teaching their subject [14], others have reported a perception of higher teaching efficacy among professors over the age of 50 [15].

4.3. A Comparison of Professors' Perception of their Teaching Efficacy

4.3.1. Comparison According to Sex

Women expressed greater confidence than men in their ability to plan their classes, and to monitor, evaluate, and improve their teaching practice constantly. However, after

a sex-based comparison, these differences were not statistically significant. Similar findings have been observed among faculty members in various health-related disciplines (such as nursing, medicine, psychology, dentistry, biology, and nutrition) where, although women report a perception of higher efficacy than men, this difference is not statistically significant [21]. Nevertheless, studies involving medical faculty have found that a greater proportion of women perceive lower teaching efficacy than their male colleagues [14,15].

4.3.2. Comparison According to Level of Education

Professors with a master's degree reported a more favorable perception than those with a bachelor's or doctoral degree regarding their ability to plan their classes and to continuously monitor, evaluate, and improve their teaching practice. However, no statistically significant differences were found in reported teaching self-efficacy when compared by highest level of education.

Although some of the reviewed studies examined the educational level of the participating teachers, they did not report whether this factor was related to the professors' perception of their own teaching efficacy.

5. Conclusions

This study contributes to understanding veterinary professors' perceptions of their teaching ability and examines associations between sociodemographic variables and perceived teaching effectiveness.

A limitation of this research was the small sample size, which restricts generalizability. Nonetheless, the findings provide a foundation for further investigation into teaching self-efficacy and the factors that support its development, enabling the design of targeted interventions for faculty.

If professors feel capable of effectively planning the teaching of their course, fostering student participation in learning and positive classroom interaction, and continuously assessing both their students' academic progress and their own teaching practice, then this will be reflected in high-quality university education [4].

5.1. Recommendations

Because most studies on teacher self-efficacy — including this one — involving university professors in general, and veterinary professors in particular, have used small samples, future research should employ larger samples so that the results can identify similarities or differences among the populations studied.

The results of this research highlight the need for further study of factors related to teaching self-efficacy, particularly regarding years of teaching experience, as the negative association found here was consistent with other studies.

Statement of Competing Interests

The authors have no competing interests.

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