

Gatekeepers: The Role of Physics Teachers in Latino Women's Physics Identity Development

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Abstract. This study highlights the significant influence of physics teachers on women's physics identity development. Identity, within the educational realm, is understood through the lens of recognition within a specific context, with an additional emphasis on performance in the field of physics. We explore the impact of external validation by teachers on physics identity, through the biographies of six South American female physics teachers. Furthermore, we illuminate the pivotal role of certain educators, *gatekeepers*, in guiding and supporting students towards physics. These people contribute to the adaptation to new institutional cultures and open gates to Physics.

Introduction

Despite evidence suggesting that women possess equal interest and ability as men, they continue to be underrepresented in Science, Technology, Engineering, and Mathematics (STEM) fields worldwide, with physics being notably male-dominated [1]. A promising strategy to address this disparity is to cultivate Physics identity among students, which involves fostering their engagement with physics, developing self-efficacy, and encouraging the pursuit of related scientific careers [2].

This study underscores the significant role Physics teachers played in the development of physics identity of six South American women who are physics teachers and the forms of recognition that have been involved.

Theoretical Framework

Physics Identity and explicit Recognition

The concept of science identity serves as a lens for understanding the impact of different cognitive and emotional experiences on individuals' self-perception and societal recognition as individuals involved in science [3]. Physics identity refers to whether students perceive themselves as a "physics person." It is influenced by three key factors: performance beliefs, interest in physics, and recognition from others. The most significant impact on students' identification with physics stems from the recognition they receive from others [2].

One of the primary sources of explicit recognition supporting the formation of a physics identity comes from science teachers, particularly in secondary school [2]. Recognition manifests in various forms: words of validation and encouragement, extra attention and care, high expectations and challenges [2, 4]. It is important that the role models from whom recognition is received also represent diversity in ethnic, religious, racial, class, and sociocultural aspects [4].

In this context, we ask: *What role have Physics teachers played in the development of physics identity of six South American women who are physics teachers, and what forms of recognition have been involved?*

Methods

In this qualitative study, we use life narratives to explore how 6 female physics teachers, 3 Argentinian and 3 Chilean, develop their physics identity and connection with science. 2 of them were pre-service teachers; 2 in-service teachers in secondary schools; and 2 physics professors.

Grounded in biographical narratives and walking methodologies [5], we analysed the presence and contribution of physics teachers in the participants' narratives and identified the forms of recognition involved. For this study data were collected through semi-structured interviews and coded for emergent themes.

Findings and Conclusion

As in the reported literature [2, 4], the recognition by teachers in the trajectories of the participants was fundamental in their choice of a career in Physics. This recognition was not only explicit due to their good performances, but it mainly manifested in emotional support and assistance in entering and adapting to new environments or activities.

We want to highlight two findings. The first one is that in some stories, it was men who allowed entry into the world of experimental Physics and the exploration of natural phenomena. There were male teachers, especially in high school, who legitimized the performance and validation of a physics identity. This was done through gestures such as lending books of scientific divulgation or proposing challenges that did not underestimate the students' abilities.

A second finding relates to the role of female scholars who facilitate the integration into university life. Without the support of female professors, the persistence in a male-dominated career might have been unsuccessful. The scientific capital [6] needed for good performance in scientific endeavours and in university is not equally possessed. Particularly, being a woman in Physics implies being at a disadvantage in academic institutions. The presence of these mentors aided in the empowerment and success of these women in Physics.

In both cases we observe that both male and female teachers act as *gatekeepers to the world of Physics*. In the case of male teachers, they open the gate to the projection of a physics career with gestures of confidence. In the case of female teachers, they open the gate to a new institutional culture which, a priori, the participants had not mastered. We underline the fundamental role that the presence of female physics teachers play in the lives of women who have pursued physics careers for their development and success in their careers. These figures, in addition to valuing and promoting a physics identity in their students, serve as guides and protectors for their insertion in university careers and in activities related to physics. We would like to invite you to reflect on our influence on the lives of our students.

References

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