Perceptions of the gender gap in higher education and how to improve female students' integration: A case study in two engineering majors of UTPL

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Abstract

Today, in some countries, women outnumber men in higher education enrolment, yet female students still represent a minority in Science, Technology, Engineering, and Mathematics (STEM) majors. Among the reasons why we must address the problem of the underrepresentation of women in STEM is because it affects the scientific development of any country. According to UNESCO, greater participation by women strengthens the scientific and engineering communities and can improve the quality and impact of research and technology. Especially, engineering jobs tend to be prestigious and highly paid; therefore, promoting greater diversity in STEM also helps to reduce social inequality. During the development of the program in the present academic period, activities were carried out aimed at meeting a specific objective: to identify the specific problems and barriers faced by young people who choose engineering careers at Universidad Técnica Particular de Loja (UTPL). In this document, we describe the study carried out with the students of the engineering careers of the UTPL and the results obtained regarding their perceptions of the gender gap in the university context and their environment.

Keywords [1]

Gender gap perceptions, higher education, students, women, engineering education.

1. Introduction

Nowadays, in some countries like Ecuador, women outnumber men in higher education enrolment, although the general average is unfavourable for women. According to UNESCO [1], during the year 2015 worldwide, the enrolment average rate of female students, in higher education, was around 37%. Unfortunately, in Science, Technology, Engineering and Mathematics (STEM) majors, the gender gap is higher, because female students still represent a minority. According to the American Association of University Women, women make up only 28% of the workforce in STEM, and men vastly outnumber women majoring in most STEM fields in college[2]. The low participation rates of women in STEM majors, and mainly in engineering fields, limit their professional development in the areas of engineering and science.

The problem of the underrepresentation of women has been studied through different studies such as [2]–[4]. In addition to identifying the causes and effects of gender imbalances in different contexts and locations [5], [6], in higher education is important to identify negative attitudes, thoughts and feelings that affect women when choosing and pursuing studies on engineering majors.

If fewer female students enter STEM majors, fewer women will have the chance to launch promising careers in the fields of engineering, technology, and science. Jobs in these fields tend to be prestigious and highly paid; therefore, promoting greater diversity in STEM also helps to reduce social inequality [7]. In addition, according to [8], greater participation of women promotes the generation of a diverse

Proceedings XV Congress of Latin American Women in Computing 2023, October 16–20, 2023, La Paz, Bolivia
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[2] https://www.aauw.org/resources/research/the-stem-gap/

range of innovative ideas and perspectives in STEM, thus, women could strengthen the scientific and engineering communities and boost the social and economic progress of countries.

In the specific context of higher education, tackling the problem of the underrepresentation of female STEM students involves two distinct challenges [9]. The first is to understand the factors that influence women for selection of STEM majors; the second is to increase the retention of women who have already chosen STEM studies and careers. The first step to understanding the problem is essential to begin by knowing what perceptions students have regarding gender gaps in higher education.

In Iberoamerican countries, we found two studies in which students' perceptions about the gender gap are tried to characterize. In [14], the authors analyse the perception of computing students concerning the gender gap in computer science studies at two public universities in Costa Rica. For this study, GENCE 2.0 (GENder perspective in Computer Engineering questionnaire, version 2.0) was taken as a basis and adapted to the Costa Rican higher education context. Likewise, in [15], the social, family, educational, and peer influences on university students' opinions about STEM studies were tried to discover. Using a questionnaire, 115 university students participated in a pilot. In this case, responses about five dimensions (gender ideology, attitudes, interests, perception & self-perception, and expectations about science) reinforced the idea that different environments surrounding the people condition whether they have gender stereotypes about STEM studies.

Therefore, the present study tries to find out what students think, feel, and have attitudes regarding gender gaps in higher education. The study was carried out with a group of students enrolled in STEM careers at the Universidad Técnica Particular de Loja (UTPL), Ecuador, and is part of a larger initiative, which aims to apply and evaluate a mentoring program for the new students of the STEM majors of the university.

To identify the impressions of the students, we created an online questionnaire, which was structured into four informative sections such as identification and demographic, study selection and university experience, perceptions about the gender gap, and attraction and permanence of women in engineering studies. Then the questionnaire was applied to the female and male students enrolled in the first year and last year of the majors of Computing and Civil Engineering of the UTPL. Based on the results obtained below, we identify the most important patterns regarding the feelings, thoughts, and experiences of students.

2. Methodology

In this section, we describe how can get the perception of students who choose engineering majors regarding the gender gap in this field. To achieve the objective, we carried out two fundamental activities: 1) the definition of a questionnaire for data collection, and 2) the application of the questionnaire. The following section describes the results found after the application.

2.1. Definition of the questionnaire

The definition of the instrument to determine the perceptions of the students enrolled in two of the STEM careers offered by the Universidad Técnica Particular de Loja (UTPL) was elaborated from the selection and redefinition of items from other questionnaires. As inputs to prepare the questionnaire applied in this study, we review three proposals:

- The *Gender Equality Survey* prepared by the Nevada Commission for Women of the United States [10].
- The survey presented in [11], aims to explore student perceptions of gender inequality in the university context through surveys conducted with students from the *Universidad de Buenos Aires*.
- Survey prepared within the project W-*STEM: Building the future of Latin America engaging women into STEM* [12].

From the review of each proposal, we create a list of items, which were reviewed by all the members of the project. The objective of the review was to detect problems or errors in the language or writing and decide the relevance of the items. Those items that were oriented to capture objective responses (statements based on the Likert scale) and open about the perception of students about gender inequality in STEM fields were selected and adapted. Then, the selected items were integrated into an online questionnaire, which was applied to the first and last-year students of Computer Science and Civil Engineering careers. Table 1 presents the structure and the most important features that make up the questionnaire, which consists of 37 varied items.

Table 1
Structure and main features of the Questionnaire

Information category	Main features	Answer type	Number of items
Identification and demographic	Student' name, birthdate, birth city, marital status, gender, employment status, number of dependents	Open	4
		Multiple option	3
		Dichotomic	1
Study selection and university experience	Degree, academic level, reasons to choose the degree, knowledge of university services, and integration in classroom	Open	2
		Multiple option	3
		Dichotomic	2
		Likert – 5 levels	3
Perceptions about gender gap	Attitudes, feelings and thoughts about the gender gap and barriers that face women in society, university, and classroom.	Open	2
		Likert – 5 levels	13
Attraction and permanence of women in STEM studies	Recommendations 1) to attract more women to STEM studies, 2) for teachers to improve the integration of female students in STEM studies, 3) to integrate or empower female students in STEM careers and 4) of topics to provide training or support all students of STEM studies.	Open	4

Considering the number of items included in the questionnaire, we tried to incorporate the largest number of closed-response items (multiple choice, dichotomous, or Likert scale); As a result of applying this strategy, 67.6% of the items were for selecting one response option, which in some way helped to alleviate the effort required by the students to complete the instrument.

The items whose response is based on the Likert scale were formulated as an affirmation, in this way we try to allow the student to express their feeling or level of agreement or disagreement with the proposed expression. This feature of the questionnaire allows us to assess and measure how students perceive certain thoughts, attitudes, or actions related to the gender gap in the field of higher education, specifically in STEM studies.

2.2. Questionnaire Application

Once the questionnaire was defined, it was applied to all the students enrolled in the academic term, October 2022 - February 2023. In this term, in the engineering careers: Computer Science and Civil Engineering, the total of enrolled students was: 211 students in the first year, while in the last year 102 students were enrolled. To facilitate the dissemination and application of the questionnaire among students, we created a web form using the Microsoft 365 Forms tool. The questionnaire is available at this link.

Table 2 presents the number of students by major, the study year, and the percentage of female students by the group. Here we can note the lower presence of women in the two degrees of study. In Civil Engineering there are the highest rates of female students, even so, there is a considerable imbalance, the worst rate is observed in Computing, in the last year of the degree, less than 7% of students are women.

Table 2
Students enrolled to STEM majors

Degree	Study year	Total number of students	Rate of female students
Computer Science	first	98	12,2
	last	29	6,9
Civil Engineering	first	113	17,7
	last	73	31,5*

* The rate of students in the last year of this major is higher than that of the first year because female students who were retained from previous cohorts and are currently in their last semester are included.

After the application, of the 313 students enrolled in the two majors, 28.4% of them filled out the questionnaire, that is, approximately 1 out of every 4 students enrolled. Of the 89 students who answered the questionnaire, 77.5% are men (n=69) and the remaining 22.5% are women (n=20). Likewise, from Civil Engineering, 11 women and 30 men answered, and from Computer Science, 9 women and 39 men answered.

At the end of the questionnaire application period, we analyzed the collected data and organized the results according to the 4 categories of information included in the instrument (see Table 1). In the following section, the main findings found during the analysis are discussed.

3. Results

When the period for completing the questionnaire expired, we proceeded to download the responses in Excel format and transform some data to facilitate their synthesis. To graphically summarize the closed-response items (as a binary response, multiple choice, or Likert scale), we use the Tableau tool. Regarding the analysis of the open-ended questions, human intervention was needed to try to classify or summarize the comments of the students and then highlight the relevant ideas provided by them. This section highlights the results found for each of the four categories of information that were studied.

3.1. Identification and demographic information

Regarding the demographic characteristics of the students, 100% of them are single, and 25,8% said that they need to combine studies with work. In addition, 11,2% state that they have family responsibilities, that is, one in ten students have children or other relatives that they oversee. Regarding the nationality of the students, the majority were born in Ecuador (n=83), and to a lesser extent they come from Spain (n=5) and the United States (n=1). Regarding the age of the students, the average age is 20,6 years; being 18 and 19 years as the most frequent age in Computing and Civil Engineering, respectively.

3.2. Study selection and university experience

In this category on information, we focus into know background for students' selection of majors and the experience of them in the classroom.

3.2.1. Major selection

To discover the main reasons that attract high school students to choose a engineering major, one of the questions asked was: *What was the main reason you chose the major*? The form was configured to receive free text responses, in this way, students had the opportunity to freely express their ideas.

Figure 1 shows the six categories into which we classify student responses. By each category, the proportion of responses is indicated, differentiated by gender, and the last column contains the most common words or phrases used by students in their sentences. In the list, the most common response from students was "*I like what is related to...*", the complement varies depending on the major. In the case of Computing students, the most common word was *technology*, while the word most used by Civil Engineering students was *construction*. Another aspect that can be seen in the figure is that, in general, in each category, the proportion of male and female students is somewhat similar, that is, the reasons or motivations that they had to choose STEM studies are common, regardless of their gender. The highest difference in percentages corresponds to the fourth category, that is, almost 15% of female students (versus 6.8% of male ones) chose to study Computer Science or Civil Engineering because they want to develop skills to create useful solutions that improve the quality of life of people or the environment.

No.	Category	Response rate by gender	Reasons provided in explanations
1.	Preferences & affinity for the area	Male: 46,6% Female: 48,1%	*I like the related to/I feel an affinity for...* - **Computer Science**: technology, software, hardware, computers, programming, artificial intelligence & data security. - **Civil engineering**: construction of structures, mathematics, participation in big projects, work outside.
2.	Opportunities in the area	Male: 22,3% Female: 18,5%	Advantages of the career, salary remuneration, helping my family, specialization opportunities, evolution of the field, high labor demand.
3.	Curiosity or interest	Male: 12,6% Female: 11,1%	By the field in general, technology, development of programs / mobile applications / videogames, construction of buildings.
4.	I will develop the ability to create solutions	Male: 6,8% Female: 14,9%	Create solutions: useful for people, that improve people's quality of life, improve the environment, make life easier for people, or contribute to the socio-economic development of the city.
5.	Previous skills in the area	Male: 6,8% Female: 3,7%	Mathematics or logical reasoning, construction of engineering works, programming.
6.	Others	Male: 4,9% Female: 3,7%	It was a family suggestion, I want to fulfill a family plan, it was an obligation, to obtain a university degree, there are several engineers in the family.

Figure 1: Main reasons why students chose to study STEM majors

Another question that is related to the choice of major is, *did you have the influence or motivation of any person or character when choosing the career*? The answers to this question are summarized in Figure 2. Here, note that one of every two students made the decision of their own free will and motivation; Second place, the Civil Engineering female students said that they felt influenced by their mother; while, in the case of men, the second most chosen option was the father. Regarding Computer Science, both male and female students were influenced or motivated by external characters that are not related to their immediate environment.

	Degree / Gender			
	Civil Engineering		Computer Science	
	Female	Male	Female	Male
Another relative	6,7%	13,5%		10,3%
External figure			10,0%	1,7%
Father	20,0%	13,5%	10,0%	17,2%
Friend	6,7%			6,9%
High-school teacher		2,7%	10,0%	3,4%
Mother	26,7%	10,8%	10,0%	5,2%
Self-initiated election	40,0%	59,5%	60,0%	55,2%

Figure 2: Entities who influenced or motivated students to start a STEM career

The last question related to the choice of career was, have you regretted choosing the degree in which you are enrolled? In this case, most students said that they did not and that they felt comfortable in each degree. Only two responses were marked as YES; one case corresponds to a first-year male Civil Engineering student, who stated that she chose the major because it was a family suggestion; and the other case corresponds to a female Computer Science student, in her last year of majoring, who stated that she studied by obligation.

3.2.2. Level of integration and interrelation in the classroom

To find out the level of integration of students in their classroom, we asked them two questions: 1) indicate your level of integration and interaction with your classmates of the same gender, and 2) indicate your level of integration and interaction with your classmates of another genre. The responses to these questions were configured as a five-option Likert scale. Figure 3 provides insight into how students have felt in their classrooms with peers of the same or opposite gender. At a general level, Civil Engineering students have felt more confident with their peers of the same gender, although there is also a high level of interrelationship with peers of the opposite gender; a low percentage of female students felt a low level of integration with their male partners. In the case of Computer Science students, the responses were more divided, and at different levels they were interrelated with peers of the same gender and of the opposite gender.

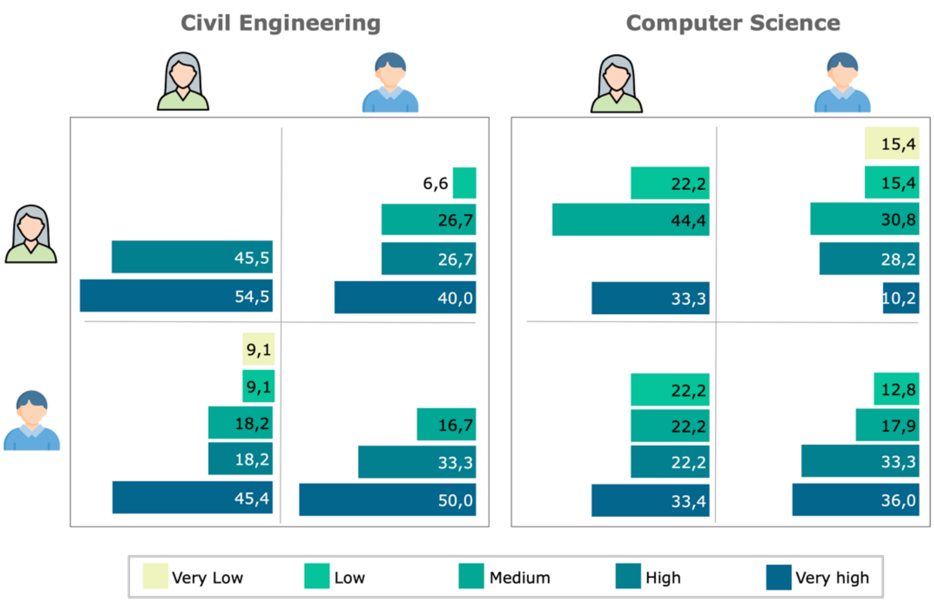

Figure 3: Level of integration and interaction of students in the classroom

To confirm the answers regarding how the students felt in the classroom, two more Likert-base items were raised: 1) *I felt better working in a group with peers of the same gender*, and 2) *I felt comfortable with all my classmates*. Figure 4 highlights that almost one in four students feel good working with peers of the same gender, the others do not give much importance to this aspect; rather, three out of four students feel comfortable working in heterogeneous groups.

Statement	Scale	Gender: Female	Gender: Male
I felt better working in a group with peers of the same gender	1- Low	45,00%	42,03%
	2 - Medium	30,00%	42,03%
	3 - High	25,00%	15,94%
In general, I felt comfortable with all my classmates	1- Low	10,00%	
	2 - Medium	15,00%	20,29%
	3 - High	75,00%	79,71%

Figure 4: Feelings regarding coexistence in the classroom

3.3. Perceptions about the gender gap

To determine the perceptions about the gender gap, the questionnaire included 10 affirmative sentences related to this topic, in this way the students were able to express their level of agreement or disagreement with what was stated. Figure 5 highlights the responses for each item.

Category	Statement	Female SD	Female D	Female NAD	Female A	Female SA	Male SD	Male D	Male NAD	Male A	Male SA
1. Society	I believe that there is gender inequality in our society			20,0%	30,0%	50,0%	10,1%	13,0%	36,2%	26,1%	14,5%
1. Society	It is more difficult for women to remain their studies or career due to their role as mothers or caregivers		15,0%	20,0%	30,0%	35,0%	18,8%	11,6%	33,3%	23,2%	13,0%
1. Society	Men have advantages to access, remain and graduate from an engineering	15,0%	10,0%	15,0%	45,0%	15,0%	42,0%	21,7%	18,8%	11,6%	5,8%
2. University	I have experienced at least one situation of inequality or discrimination based on my gender	45,0%	10,0%	5,0%	30,0%	10,0%	65,2%	7,2%	20,3%	2,9%	4,3%
2. University	I have perceived that there are prejudices that give greater value and recognition to men	35,0%	15,0%	20,0%	30,0%		60,9%	11,6%	17,4%	5,8%	4,3%
2. University	I have perceived that there are prejudices that result in less recognition of women	30,0%	20,0%	30,0%	15,0%	5,0%	56,5%	17,4%	23,2%	1,4%	1,4%
3. Classroom	I perceive differentiated treatment by teachers because they do not recognize women	60,0%	5,0%	25,0%	5,0%	5,0%	63,8%	10,1%	21,7%	1,4%	2,9%
3. Classroom	I perceive differentiated treatment by teachers because they give greater value and recognition to men	50,0%	10,0%	25,0%	5,0%	10,0%	68,1%	11,6%	11,6%	5,8%	2,9%
3. Classroom	I perceive differentiated treatment by teachers because they minimize the intellectual capacity of women	60,0%	10,0%	20,0%	5,0%	5,0%	66,7%	8,7%	14,5%	7,2%	2,9%

SD = Strongly Disagree D = Disagree NAD = Neither Agree nor Disagree A = Agree SA = Strongly Agree

Figure 5: Level of agreement related to gender gap perceptions

The items on perceptions were organized according to three categories: a broad context for students (*Society*), an intermediate setting (*University*), and a more specific setting (*Classrooms*). For each category, 3 items were raised, which were written as sentences with a negative sense towards gender equality; therefore, in the responses, the most expected value was *Strongly Disagree* (SD). As can be seen in Figure 5, the items that had unexpected answers were those related to Society: 50% of the female students believe that there is gender inequality in society. Likewise, one in three female students believes that it is more difficult for women to remain in studies or careers due to their role as mothers or home caregivers. Regarding the University category, it seems that there has also been a certain negative perception on the part of female students because they have seen some situation of inequality or some favoritism towards men; these perceptions have been expressed by one in every 3 female students (see column A in Figure 5). Finally, in the more specific environment of the students, the classroom, it seems that, in general, the experiences have not been negative, because both male and female students state that they disagree with the fact that there has been differential treatment in favor of men, or negative that minimizes female students, in short, it seems that there is respect, although a closer study is required to discover behaviors or thoughts that affect coexistence in the classroom.

Another item based on the Likert scale that was consulted is "*You believe that women have the same opportunities to progress as men*"; the responses are shown in Figure 6. Considering the gender of the students, we can observe that three out of four male students (responses *Agree* + *Strongly Agree*) answered that it is possible; while in the case of female students, half of them think so (responses *Agree* + *Strongly Agree*). However, it is possible that fewer female students believe that women have the same opportunities to progress as men because the 35% of them preferred to remain neutral with respect to this sentence (response *Neither Agree nor Disagree*). Therefore, a deeper study is needed to detect if there are misconceptions, or if there are real barriers that reduce women's chances of progressing in STEM careers.

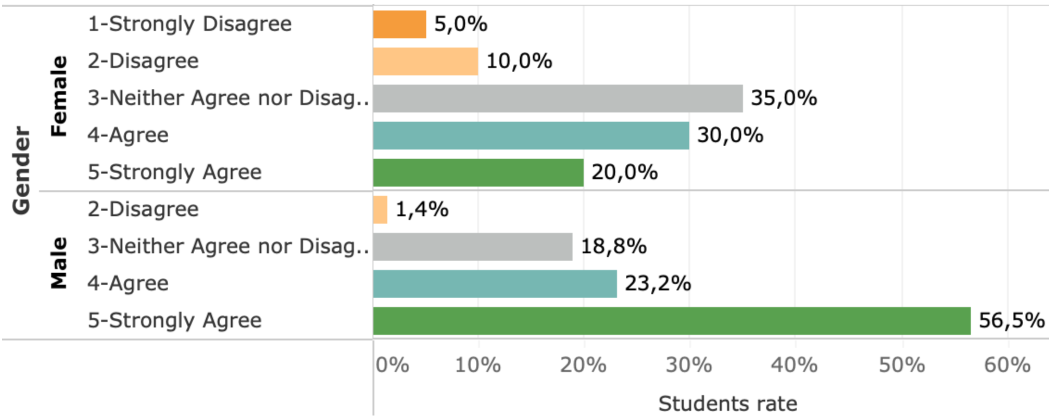

Figure 6: Perceptions about whether women have the same opportunities to progress as men

To try to find out what behaviors or actions have been experienced or seen by students regarding gender inequality or barriers, we posed one open question, "*In what specific aspects have you felt that men and women are not treated equally in your classes?"* The most common response was "*In no case have I experienced such treatment*", which now produces a feeling of relief. However, it is also necessary to continue investigating and trying to detect micro-sexist actions, which were able to be gathered in more detail through open-ended questions. These actions tend to go unnoticed or are not well known.

To further identify students' perceptions of whether there is equal treatment of men and women during their classes, an open-ended question was administered, resulting in 88 responses. Of these, 74% believe that there is equal treatment regardless of gender, while 26% have perceived certain discriminatory situations. Figure 7 shows the most frequent phrases in the open-ended questions as follows: *male classmates treated me as if I had no idea what I was doing* (5%), *teachers prefer women* (7%), *classmates don't let women participate in class* (3%), *preference for men as team leaders* (2%), *professors think this career is for men* (2%).

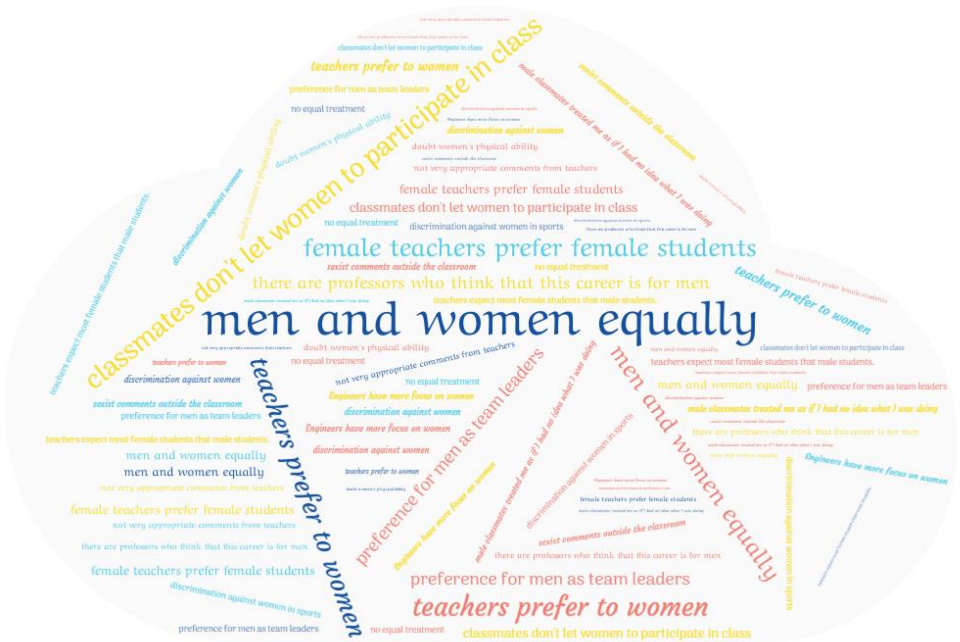

Figure 7: Gender preference in the classroom

Although most students perceive equal treatment within the classroom, the responses of those who perceive gender discrimination in the classroom, which are less frequent in the responses but important to mention, include: harassment received by a group of men (1%), inappropriate comments from teachers (1%), teachers who think engineering is for men (2%), underestimating women's ability in academics, leadership, sports, and physical strength (4%), and the need to prove otherwise, considering that women are incapable of solving difficult cases. Similarly, within their class, they perceive that their teachers treat men and women differently (10%).

To analyze the perception of students in other environments outside of their classroom, the following open-ended question was administered: "*Have you perceived or been told about cases where men and women are not treated equally?*" 88 responses were obtained, of which 65% of respondents consider that there is equal treatment, while 35% consider that there is no equal treatment between men and women. Figure 8 shows the most frequent phrases in the responses, as follows: men and women equally (65%), doubt women's ability (13%), job preference for men (8%), and discrimination against women (8%).

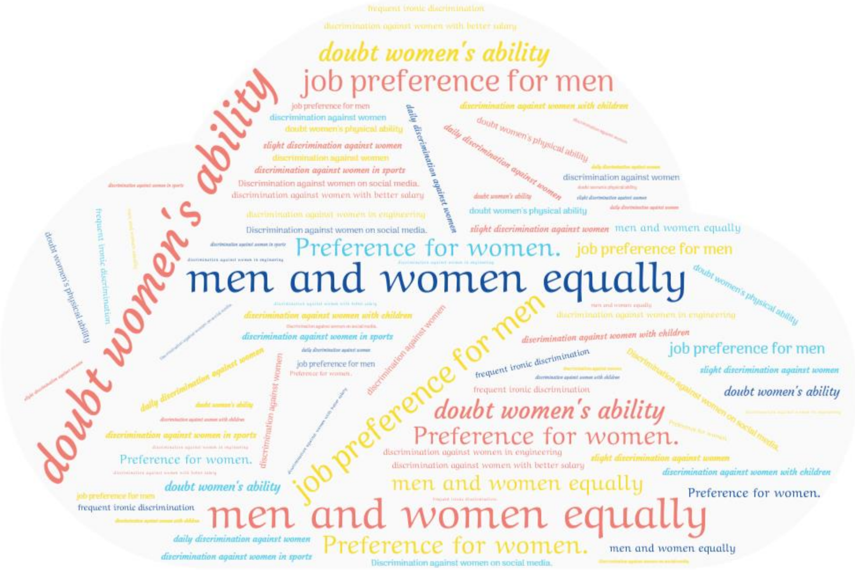

Figure 8: Gender preference outside the classroom

When comparing the responses inside and outside the classroom, it is evident that 75% of women mention that there is equal treatment within the classroom and 55% mention that there is equal treatment outside the classroom. On the contrary, 25% of women consider that there is discrimination within the classroom, and 45% consider that there is discrimination outside the classroom.

3.4. Recommendations to improve integration of students in Engineering majors

In this section there are four questions answered by the respondents, as follows: (i) What recommendations or ideas can you share with us so that our careers can attract more women to STEM careers? (ii) Can you provide any suggestions and/or strategies that we teachers can apply to improve the integration of incoming students (first degree cycle)? (iii) To foster the integration/empowerment of female students in STEM careers, what activities can you suggest us to carry out? and (iv) Can you propose topics for training through workshops and other events, to support all students (men and women) in STEM careers in their insertion into the university?

Figure 9.a) presents key recommendations for enhancing efforts to attract more women to STEM majors. It is noteworthy to mention that there are other responses that, while not significantly represented in the figure, suggest that universities should offer compelling, dynamic, and practical degree programs as a means of attracting more women to STEM majors.

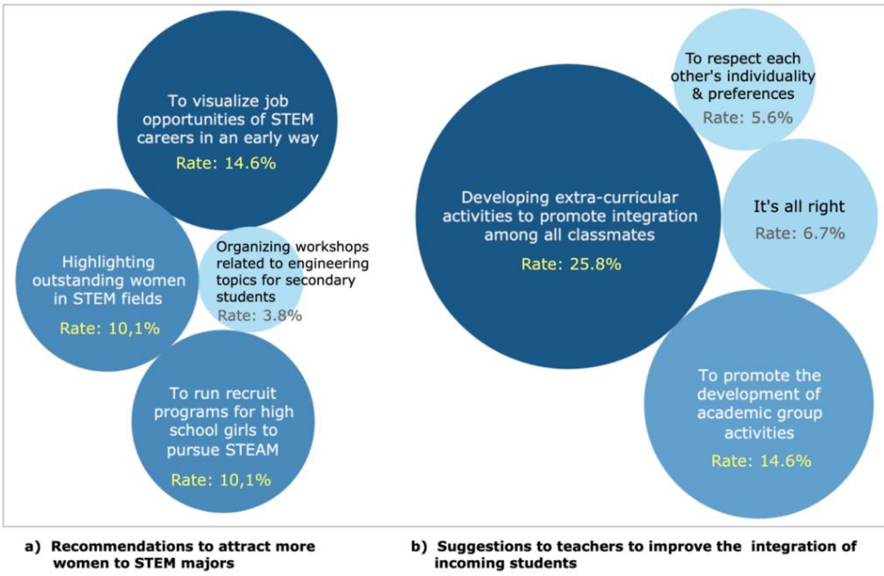

Figure 9: Recommendations to attract women and improve their integration into STEM majors

Similarly, Figure 9.b) clearly illustrates the responses to the question on suggestions and strategies that educators can implement to enhance the integration of incoming students. Group activities and recreational initiatives emerge as the most effective approaches to familiarize students with the university and their academic programs. In addition, there are unique responses, such as the suggestion that no recommendations are needed as the current offerings are satisfactory, and that faculty are already effective instructors. Furthermore, there are recommendations to motivate students to participate in university clubs, offer introductory courses, and facilitate the sharing of experiences from senior students to newcomers. In conclusion, it is evident that new students benefit from exposure to experiences and engagement in university activities to foster a smoother integration into the academic environment.

On the other hand, Figure 10.a) shows the results obtained regarding recommendations to promote the integration and empowerment of female students in STEM careers. The students mostly suggest: raising visibility of women in STEM careers and projects; integration activities, internships, and projects with participants of both sexes; increased publicity of STEM women in all media; events and spaces to share experiences of women in STEM careers; workshops that allow for experimentation with STEM careers; more information on STEM careers in women's colleges; equal treatment and opportunities; diversification of creative and recreational activities, as well as field trips, visits to companies or laboratories.

Finally, Figure 10.b) shows the recommendations regarding the main training topics that they suggest for better integration into the university, including gender-related topics, female leadership, teamwork, basic programming, as well as advice on jobs, applications, and the labor market.

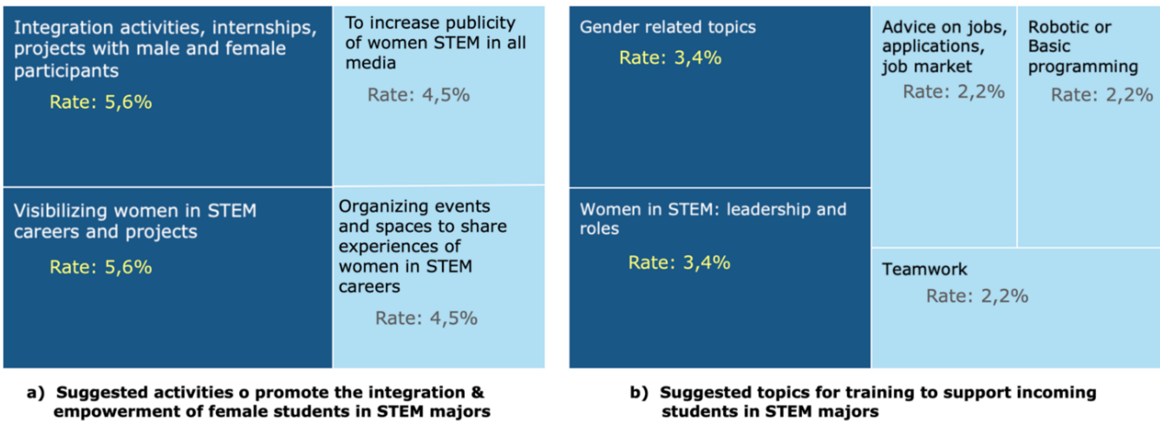

Figure 10: Recommendations to promote the integration, empowerment, and training of women

4. Conclusion

To reduce the gender gap in STEM majors, it is important to break down the barriers or problems that discourage female students from pursuing studies in these fields. The first step to meet this objective is to identify what students perceive during their studies in STEM careers, and how differential treatment due to their gender affects them. Therefore, through this study, we try to find out what thoughts, actions or feelings have been experienced by first and last-year students of two STEM majors at a university in Ecuador. Based on the perceptions of students regarding the gaps and barriers experienced by female students, it is important to reflect on and promote the change of stereotypes and behavior that limit the development of women in STEM careers.

The results obtained are consistent with previous studies, which have found that men and women generally perceive equal treatment, despite the normalization of micro-sexism and behavior patterns that favor men for decades. In academic fields related to civil engineering and computer science, there is still a prevailing belief that they are male-dominated careers. Women, on the other hand, tend to accept discriminatory treatment due to having heard it from an early age. Men often fail to recognize unequal treatment towards women, as they tend to perceive women as weak people incapable of carrying out intellectual or physical activities until they prove otherwise.

Women in STEM fields generally perceive equal treatment between men and women, however, there are women who perceive discriminatory treatment from their male peers and teachers within the classroom. Women's perception of equal treatment between men and women outside the classroom reveals a greater perception of discrimination. In addition to being discriminated against and underestimated by their peers and teachers, they also face inequality in salary matters and discrimination in assigning engineering and computing jobs to women.

It is necessary to work hard to change women's perception, as there is often resistance to recognizing gender discrimination in their own environment. This lack of recognition can worsen the normalization of gender disparity and limit women's opportunities, as they may not believe they deserve them. There is a lot of work to be done to eliminate patterns that normalize this type of discrimination and enable women to fully develop in STEM fields.

Through this study, we have been able to detect certain behaviors and perceptions of our students regarding the gender gaps that produce an underrepresentation of women in STEM careers. With the results found, all of us who make up the academic community should reflect and change attitudes that negatively affect to the integration, sense of belonging and continuity of our engineering female students.

As future work, it is expected to carry out an intervention process with students, both men and women, in such a way that we can raise awareness about the problems or barriers that affect female students, and the way in which they can be reduced.

5. Acknowledgements

The authors thank the Department of Innovation, Training and Teacher Evaluation of the Universidad Técnica Particular de Loja of Ecuador for sponsoring this innovative project.

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