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JOB PERCEPTION AND EXPECTATIONS SCALE: INSIGHTS FROM ENGINEERING STUDENTS

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Abstract

This study presents the application of the Job Perception and Expectations Scale, a multidimensional instrument designed to assess how students perceive their future career prospects. The scale integrates three key dimensions: self-perceived employability, perceived gender equity, and job quality perception. Data were collected from 305 first-year engineering students at the Universitat Politècnica de Catalunya (Spain) across industrial and Information and Communication Technology (ICT) fields. Results show that students report high perceived employability, particularly within their field of study. In the work environment subdimension, industrial engineering students perceived higher status within the field, while ICT students rated work-life balance more positively. Statistically significant gender differences were observed in perceived gender equity, with women reporting higher awareness of inequality. Prior work experience correlated positively with perceived employability and job status. The findings underscore the value of early, evidence-based assessment of students' job perceptions to inform institutional strategies, career guidance, and equity-oriented policies in STEM education. It highlights the need for further research into the individual and contextual determinants shaping these perceptions, with the goal of designing more effective educational, policy, and organizational strategies to reduce inequalities and foster more equitable and sustainable career trajectories.

Keywords – STEM, Engineering students, Information and communication technologies, Self-perceived employability, Job quality, Gender equity.

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1. Introduction

STEM fields (science, technology, engineering and mathematics) are widely recognised by UNESCO, the World Bank and the Organisation for Economic Co-operation and Development (OECD) as central to human development, national competitiveness and economic prosperity (UNESCO, 2016). Across the last decade, employment in science and technology has grown steadily in Europe, with 78.3 million people working in these areas in 2023, up 25% from 2013, suggesting robust labour-market demand for STEM competencies (EUROSTAT, 2024). Yet many systems continue to report an insufficient supply of STEM graduates. This persistent shortfall keeps enrolment expansion high on policy agendas and raises a fundamental question: why do more students not choose, and persist in, STEM study?

A central dimension of this challenge is gender. On average, only 15% of new female entrants in higher education select a STEM field, compared to 41% of new male entrants; these rates have remained largely unchanged since 2015 (OECD, 2024). The disparity is especially stark in information and communication technologies (ICT): in 2020, only 2% of new female entrants chose ICT programmes (versus 10% of males), despite accelerating demand (OECD, 2022). Progress over the last decade has been modest (Nebot & Mugica, 2023). This pattern has been linked to a constellation of factors -including gendered socialization and expectations, persistent stereotypes about STEM cultures and careers, and differences in self-efficacy and fear of failure- that can depress interest and persistence among women (Cheryan, Master & Meltzoff, 2015; Kanny, Sax & Riggers-Piehl, 2014; Kim, Sinatra & Seyranian, 2018; OECD, 2015).

At the same time, research consistently shows that students' utility beliefs, particularly their perceptions of career prospects, are decisive in STEM study choices (López, Simó & Marco, 2023). Here lies a paradox: while ICT and engineering occupations have expanded rapidly (e.g., a 50.5% increase in ICT specialist employment in the EU between 2012 and 2021, far outpacing overall employment growth) (EUROSTAT, 2022),enrolments have not responded as might be expected. Understanding how students perceive employability, job quality and future working conditions at the point of entry to university is therefore critical for designing effective institutional and policy interventions.

Global initiatives led by UNESCO and others have sought to broaden participation and promote gender equity in STEM by aligning national strategies with the Sustainable Development Goals and by recommending targeted actions in schooling and higher education (UNESCO, 2016, 2017; United Nations, 2015). Yet the effectiveness of such efforts depends on having conceptually grounded, psychometrically sound instruments that capture students' perceptions in ways that are sensitive to field (e.g., engineering vs. other STEM) and gender, and that can be compared across contexts over time.

This article contributes to that agenda in three ways. First, we present evidence from a large cohort of first-year engineering students on the Job Perception and Expectations Scale (López, Simó & Marco, 2025), a multidimensional measure of job-related perceptions and expectations at the outset of higher education. The scale focuses on perceived employability, anticipated job quality (e.g., work-life balance, fairness, and progression), and near-term career expectations, constructs that map onto established motivational frameworks and contemporary policy concerns in higher education. Second, we examine systematic differences by gender and field within engineering, addressing an internationally salient equity question in a discipline where participation gaps are among the widest. Third, we discuss how such measures can be used by universities and policy-makers to target early, evidence-based interventions (e.g., programme information, career services, and pedagogical design) that respond to students' perceived prospects rather than to labour-market signals alone.

Situated in the international literature on STEM participation and gender, our study seeks to bridge the well-documented gap between macro indicators of demand and micro-level student decision-making. By foregrounding students' perceptions at entry, we illuminate a lever for change that is actionable within higher education institutions (through curriculum, advising and exposure to authentic work

practices) and tractable for system-level policy (through equity-focused incentives and information strategies). While our data are drawn from a single national context, the constructs and patterns we investigate speak to global concerns about supply, equity and the quality of graduate outcomes in STEM. We close by outlining implications for cross-institutional replication and for adapting the instrument to different systems, in line with international calls to build inclusive, evidence-informed pathways into STEM (UNESCO, 2016, 2017).

While the Job Perception and Expectations Scale was previously developed and psychometrically validated (López et al., 2025), the present study pursues a different research objective. Specifically, this manuscript focuses on the substantive analysis of students' perceptions and expectations regarding employability, job quality, and gender equity, as well as differences across gender and engineering domains. Accordingly, the research questions addressed here differ from those of the validation study and concern empirical patterns rather than measurement properties.

The remainder of the article is organised as follows. Section 2 presents the conceptual background and theoretical foundations underpinning the Job Perception and Expectations Scale, detailing its three core dimensions: self-perceived employability, gender equity, and job quality. Section 3 describes the methodological design, including participants, instruments, procedure, data analysis strategy and assessment of Common Method Bias. Section 4 reports the empirical results, structured according to the main dimensions of the scale and examining differences by gender, field of study, and work experience. Finally, Section 5 discusses the findings in relation to prior literature, outlines practical and policy implications, and identifies limitations and directions for future research.

2. Background

This section reviews the conceptual background underpinning the study and introduces the main constructs integrated into the Job Perception and Expectations Scale: self-perceived employability, gender and career prospects in STEM, and job quality (López et al., 2025).

2.1. Gender and Career Prospects in STEM

The motivations underlying the choice of a STEM degree, and the gender differences shaping them, have been widely examined. According to López et al. (2023), this decision is influenced by environmental, social, and personal factors. While ability has often been considered the main determinant, evidence shows that it alone cannot account for gendered patterns in career choice (Wang, Ye & Degol, 2017)

Among motivational components, utility beliefs, particularly those related to career prospects, play a decisive role in shaping students' interest in STEM fields (López et al., 2023). Key dimensions include salary, job status, creativity, work-life balance, and social contribution. Perceptions of certain occupations as altruistic or family-compatible may influence gender disparities in STEM participation (Eccles & Wang, 2016), whereas interventions that reframe such perceptions have been shown to increase women's representation (Diekman, Clark, Johnston, Brown & Steinberg, 2011).

Recent transformations -such as the impact of social media, remote work, and more inclusive organizational cultures- may be reshaping how young people value different job attributes. To capture these evolving perceptions, this study employs the Job Perception and Expectations Scale, focusing on gender-related differences in career prospects. The scale encompasses elements traditionally associated with occupational desirability or bias, including employability, status, salary, work-life balance, social impact, creativity, intellectual challenge, helping others, and a positive work environment, organized into three dimensions: employability, job quality, and gender equity.

Gender equity remains a salient concern in STEM, influencing workplace quality (Bilan, Mishchuk, Samoliuk & Mishchuk, 2020) and reflecting enduring stereotypes. Cross-national variation in engineering and computing participation underscores the role of cultural context (Stoet & Geary, 2018), while diverse workgroups have been shown to enhance creativity, productivity, and innovation (Page, 2008; Wei, 2024;

Živković, Štrbac & Paunović, 2024). Moreover, diversity in skills and perspectives leads to more inclusive designs that better serve a broad range of users (Fisher & Margolis, 2002).

Such evidence highlights how perceptions of inclusivity and fairness are central to students' expectations about professional futures.

2.2. Self-Perceived Employability

The prospect of securing quality employment within a chosen field is among the main reasons students report for selecting a particular degree (Olmedo-Torre, Sanchez-Carracedo, Salan-Ballesteros, Lopez, Perez-Poch & Lopez-Beltran, 2018; Skatova & Ferguson, 2014). The concept of employability has gained prominence across political, academic, and professional arenas, yet remains difficult to define and measure consistently due to its multidimensional nature and disciplinary diversity (van-der-Heijde & van-der-Heijden, 2005).

Within this framework, self-perceived employability refers to individuals' own assessment of their ability to obtain and sustain employment (Vanhercke, De-Cuyper, Peeters & De-Witte, 2014). Perception is central to this construct, as it represents a forward-looking evaluation of one's capacity to navigate the labor market (Rothwell, Herbert & Rothwell, 2008). Consequently, students' motivation to pursue a degree, often tied to expectations of quality employment, is shaped by their perceived employability.

Research has examined the internal and external determinants of perceived employability (Fudali-Czyż, Mamcarz, Martynowska, Domagała-Zyśk, Rothwell & Leal-Costa, 2022; Jackson & Wilton, 2017; Monteiro, Vasconcelos & Almeida, 2021; Pitan & Muller, 2020; Rothwell et al., 2008). External factors encompass labor market conditions, qualification demand, field prestige, and the perceived fit between skills and employer expectations, whereas internal factors include knowledge, competencies, experience, personality traits, social capital, and personal development planning. Demographic characteristics such as gender, field of study, institutional type, age, and social class also contribute to variations in perceived employability (Dacre-Pool & Qualter, 2013; Moreau & Leathwood, 2006).

2.3. Job Quality

Work constitutes a central part of people's lives and is closely linked to their overall well-being. On average, individuals in OECD countries spend around 37 hours per week in paid employment, making job quality a key determinant of life quality and a driver of participation, productivity, and economic performance (Cazes, Hijzen & Saint-Martin, 2015)

Younger generations, such as Generation Y and beyond, tend to conceive work differently from previous cohorts, showing greater concern for meaning and work-life balance (Chalofsky & Cavallaro, 2013; Manuti, Curci & der-Heijden, 2018). Yet, there is no single definition of job quality. While income-related indicators have been widely used, the happiness-income paradox suggests that the relationship between earnings and satisfaction diminishes over time (Easterlin, 1974; Easterlin, McVey, Switek, Sawangfa & Zweig, 2010).

Beyond material conditions, subsequent research has emphasized non-monetary aspects, highlighting the intrinsic rewards of work -interest, challenge, learning, autonomy, and recognition- as central to job quality (Cascales-Mira, 2021; Green & Mostafa, 2012; Muñoz-de-Bustillo, Fernández-Macías, Esteve & Antón, 2011). Accordingly, scholars now agree that job quality is a multidimensional construct encompassing economic, temporal, and psychosocial factors such as earnings, job security, learning opportunities, autonomy, work intensity, and the physical and social environment (Cascales-Mira, 2021; Eurofound, 2017; Muñoz de Bustillo, Fernández-Macías, Antón & Esteve, 2009).

These dimensions form the conceptual foundation for the present study's analysis of students' perceptions of employment and career expectations.

2.4. Job Perception and Expectations Scale

The Job Perception and Expectations Scale is a tool designed to assess how students perceive their career prospects and evaluate the main factors influencing their professional expectations. It aims to capture early perceptions that may shape students' educational and occupational choices, providing institutions with actionable insights for promoting more equitable and realistic career pathways. The scale comprises three key dimensions:

- Self-perceived employability: Measures students' confidence in their ability to access and sustain employment, both in general and within their specific field of study. This dimension builds on validated instruments developed by Rothwell et al. (2008), Jackson and Wilton (2017) and Pitan and Muller (2020).
- Perception of gender equity: Examines students' views on gender equality and inclusion across professional sectors, acknowledging how perceived fairness and representation shape expectations and preferences in different fields.
- Job quality perception: Assesses the importance attributed to aspects such as salary, status, work-life balance, and the working environment in career decision-making. This dimension draws on the OECD Job Quality Framework, which provides a consolidated reference integrating insights from economics, sociology, and occupational health. It identifies three core dimensions, earnings quality, labour market security, and quality of the working environment, that together capture both the economic and non-economic conditions affecting workers' well-being (Cazes et al., 2015).

Overall, the Job Perception and Expectations Scale offers a multidimensional approach to understanding how students envision their future professional lives, combining established theoretical models with a focus on the evolving social and cultural context of career decision-making.

3. Methodology

3.1 Participants

To conduct this study, 1209 first-year engineering students at Universitat Politècnica de Catalunya (Spain) were invited to complete an anonymous on-line questionnaire during the first semester of the 2023-24 academic year. A total of 305 responses were received, giving an overall response rate of 25.2%.

The study involved participants from four major engineering domains: industrial engineering (including mechanical, electrical or electronic disciplines), aerospace engineering, telecommunications engineering and computer engineering. For analysis, the first two domains -more closely related to traditional industry- were grouped together, while the latter two -more aligned with information and communication technologies (ICT)- formed another group.

A total of 164 students (49 identifying as female) were from the industrial engineering field and 141 students (26 identifying as female) were from the ICT field. The age range was from 17 to 28 years old. The majority, 87.9%, are 18 years old. The mean age is 18.3 years (SD = 1.1).

Although the study was conducted at a single public technical university, its institutional context is comparable to that of other European polytechnic or engineering schools. The engineering programmes follow the harmonised structure of the European Higher Education Area (EHEA), ensuring comparability in programme design and qualification standards, and the gender distribution across subfields reflects national and OECD patterns.

	Enrollment				Responses					
	Female		Male		Female		Male		Others	
	Total	%	Total	%	Total	%	Total	%	Total	%
Industrial engineering	187	26.8%	510	73.2%	49	0.30	114	69.5%	1	0.6%
TIC	119	19.4%	494	80.6%	26	0.18	115	81.6%		
Total	306	23.4%	1,004	76.6%	75	0.246	229	75.1%	1	0.3%

Table 1. Enrollment and responses distribution by gender and field

Table 1 presents a comparative analysis of gender distribution across the engineering degrees under study, contrasting official enrollment data with the composition of the survey respondents. The comparison reveals a very similar distribution, with only minor differences. This suggests that the sample is representative in terms of gender balance.

	Work experience						No work experience			
	Female		Male		Others		Female		Male	
	Total	%	Total	%	Total	%	Total	%	Total	%
Industrial engineering	39	31.45%	84	67.7%	1	0.8%	10	25.0%	30	75.0%
TIC	14	17.07%	68	82.9%			12	20.3%	47	79.7%
Total	53	25.73%	152	73.8%	1	0.5%	22	22.2%	77	77.8%

Table 2. Distribution of Work Experience by Gender and Field

Table 2 presents the characteristics of the sample in relation to students' work experience. The gender distribution within the group of students with work experience is very similar to that of the overall sample.

Regarding work experience, a total of 206 students reported having previous work experience. Among them:

- 104 had less than one year of experience,
- 44 had between one and two years,
- 32 had between two and three years,
- 26 had more than three years of experience.

At the time of completing the questionnaire, 73 of these students were actively employed.

The dataset used in this study corresponds to the same data collection employed for the initial validation of the Job Perception and Expectations Scale (López et al., 2025). In that study, the data were used exclusively for instrument development and psychometric validation. The dataset is publicly available in the Research Data Repository (RDR) (López, Simo, Marco & Perramon, 2026).

3.2. Instruments: Job Perception and Expectations Scale

This study uses the Job Perception and Expectations Scale developed by López et al. (2025). This scale was designed to assess how students perceive their career prospects. Specifically, it evaluates the following aspects:

- Self-perceived employability: Measures students' confidence in their ability to enter the labour market, both generally and within a specific field.
- Perception of gender equity: Identifies students' views on gender equality in different professional sectors.

- Job quality perception: Assesses factors such as salary, status, work-life balance, and work environment that influence career preferences.

The scale consists of 25 items rated on a five-point Likert scale. Additionally, the questionnaire included demographic questions regarding gender, age, degree program, and work experience. The complete set of scale items can be found in the original validation study by López et al. (2025).

Table 3 shows the number of questions asked for each dimension. The questionnaire also includes between 5 and 7 demographic questions, depending on the respondents' answers.

The scale uses 9 items to measure self-perceived employability: 4 to assess generic employability (GEP variables), which is not oriented toward any particular field of knowledge, and 5 to assess sector-oriented employability (OEP variables), in our case, engineering.

Scale dimensions	Components	Variables	Items
Non-oriented employability (generic employability)		GEP	4
Oriented employability (sector-specific employability)		OEP	5
Gender equity (in the specific sector)		GEN	4
Employability quality (in the specific sector)		EQ	12
	status	EQS	3
	work-life balance	EQB	3
	work environment	EQR	6
			25

Table 3. Scales

Additionally, four items to measure the perception of gender equity in jobs within the engineering field (GEN variables). Higher scores on the GEN scale reflect greater perceived gender inequality (lower perceived equity).

Finally, to assess job quality perception (EQ variables), 12 items are included, grouped into three components:

- Income and job status (EQS variables): 3 items
- Work-life balance (EQB variables): 3 items
- Work environment quality (EQR variables): 6 items

The results indicate that the scale demonstrates high reliability and construct validity across all dimensions (α = 0.90/0.84/0.85/0.84), making it a useful instrument for understanding students' perceptions of employment prospects. Strong reliability was also observed within the subgroups analysed by field of study: Industrial Engineering (IE: α = 0.88/0.81/0.83/0.82) and Information and Communication Technologies (ICT: α = 0.91/0.86/0.87/0.84); as well as by gender: female (α = 0.91/0.90/0.82/0.77) and male (α = 0.89/0.81/0.85/0.84).

3.3. Procedure

The 25 items shown in the study by López et al. (2025) were presented to respondents in the order shown. Respondents rated each statement on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

The survey was administered online and anonymously. Participation was entirely voluntary.

3.4. Data Analysis

Unlike the scale validation study, which focused on exploratory and confirmatory factor analyses to assess measurement properties, the present study adopts a substantive analytical approach. Analyses focus on descriptive statistics, group comparisons, and inferential tests aimed at characterizing students' perceptions and identifying differences across gender and engineering domains.

A statistical analysis of the survey responses was carried out. Classical descriptive indicators were used. In addition, linear regression models were applied to explore dependencies between variables.

The analysis focused particularly on gender differences, differences between fields of study (industrial engineering vs. ICT-related programs), and the impact of work experience on students' perceptions and expectations regarding employment in the engineering sector. Independent group comparisons were conducted using Welch's two-sample t-tests.

Analyses were restricted to male and female respondents due to a single case in the 'Other' category, which was excluded from inferential tests.

Two-way ANOVAs tested the effects of gender and field of study (IE vs. ICT) and their interaction on each dependent variable (GEN, GEP, OE, EQ). As the interaction was non-significant, we fitted a reduced model including only main effects. Given unequal cell sizes, Type II sums of squares were used.

3.5. Assessment of Common Method Bias

As all variables were measured using a single self-report questionnaire administered at one time point, the potential for common method bias (CMB) was assessed. A Harman's single-factor test was conducted by entering all measurement items into an unrotated exploratory factor analysis. The results indicated that multiple factors emerged and that the first factor accounted for 22% of the total variance, suggesting that common method bias is unlikely to substantially affect the results.

4. Results

This section analyses the questionnaire responses applying the Job Perception and Expectations Scale (López et al., 2025), with the aim of studying perceptions of employability and expectations regarding job quality in the field of engineering. Specifically, it examines general perceived employability, employability within the engineering field, perceptions of equity in the workplace in this sector, and expectations concerning job quality.

Classical statistical indicators were used. In addition, the frequency of each value is reported for every item and subgroup analysed. Where relevant, hypothesis tests or linear regression models were applied.

The results were analysed from different perspectives, comparing differences by gender, field of study, and respondents' work experience.

The gender analysis focused on male and female groups. Only one participant identified with a different gender, and the size of this subsample did not allow for a meaningful analysis.

Differences by field of study were examined by grouping degrees related to industrial engineering (IE) and those related to information and communication technologies (ICT).

The following sections present a detailed analysis of the responses corresponding to each dimension of the scale.

4.1. Self-Perceived Employability (GEN - OEP)

Measures students' confidence in their ability to enter the labour market, both generally and within a specific field, in this case the field of engineering.

	Mean	SD	1st Qu.	Median	3rd Qu.	Mode	Frequency				
							1	2	3	4	5
GEP1	3.25	1.07	3	3	4	3	14	59	112	76	44
GEP2	3.38	1.05	3	3	4	3	11	50	103	93	48
GEP3	3.02	1.10	2	3	4	3	20	87	100	63	35
GEP4	3.20	1.10	2	3	4	3	20	59	105	81	40
GEP	**3.21**	**0.94**	**2**	**3**	**4**	**3**	**65**	**255**	**420**	**313**	**167**
OEP1	4.37	0.75	4	5	5	5	2	2	31	115	155
OEP2	4.36	0.79	4	5	5	5	3	4	30	112	156
OEP3	4.39	0.74	4	5	5	5	1	1	37	104	162
OEP4	4.16	0.83	4	4	5	5	3	2	60	119	121
OEP5	3.81	0.88	3	4	4	4	3	12	98	118	74
OEP	**4.22**	**0.62**	**4**	**4**	**5**	**5**	**12**	**21**	**256**	**568**	**668**

Table 4. Statistical data of GEP and OEP dimensions

Table 4 presents the results for each of the items corresponding to the two dimensions associated with self-perceived employability. There is a high degree of homogeneity in the responses related to general employability perception (GEP): the mode and median are both 3, and the overall mean is 3.21. In contrast, in the specific dimension of employability within the field of engineering (OEP), the mean rises to 4.22, the median is 4, and the mode is 5 for all items except item OEP5, where the mode is 4 and the mean is below 4. Overall, these results suggest that students perceive relatively high employability, with notably higher ratings within the engineering field than in the general labour market.

4.1.1. Differences by Gender

Table 5 shows gender differences for each item in both self-perceived employability dimensions, along with mean values for the entire sample and for each group.

	Mean Male	SD Male	Frequency					Mean Female	SD Female	Frequency				
			1	2	3	4	5			1	2	3	4	5
GEP1	3.22	1.05	11	44	86	60	28	3.36	1.15	72	15	25	16	16
GEP2	3.40	1.01	6	37	80	72	34	3.35	1.17	5	13	22	21	14
GEP3	3.00	1.10	15	68	71	51	24	3.07	1.13	5	19	28	12	11
GEP4	3.15	1.07	15	46	84	58	26	3.37	1.17	5	13	20	23	14
GEP	**3.19**	**0.92**	**47**	**195**	**321**	**241**	**112**	**3.29**	**1.03**	**87**	**60**	**95**	**72**	**55**
OEP1	4.39	0.73	2	1	18	92	116	4.32	0.81	0	1	13	22	39
OEP2	4.38	0.80	3	3	19	84	120	4.29	0.77	0	1	11	28	35
OEP3	4.45	0.71	1	0	23	77	128	4.23	0.80	0	1	14	27	33
OEP4	4.18	0.85	3	2	42	86	96	4.08	0.75	0	0	18	33	24
OEP5	3.84	0.89	3	7	73	86	60	3.72	0.85	0	5	25	31	14
OEP	**4.25**	**0.60**	**12**	**13**	**175**	**425**	**520**	**4.13**	**0.67**	**0**	**8**	**81**	**141**	**145**

Table 5. Statistical data of GEP and OEP dimensions by gender

Regarding general employability perception (GEP), female students report a higher mean score (3.29) compared to male students (3.19).

Figure 1 illustrates this difference graphically. In three out of the four items analysed, female ratings exceed male ratings.

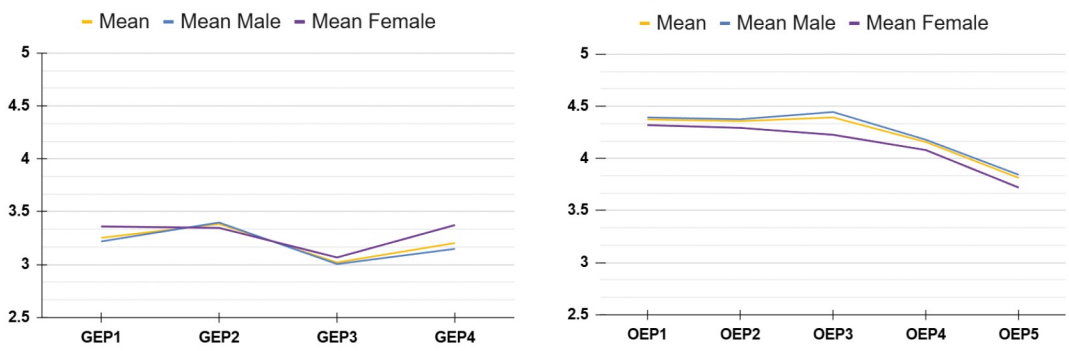

Figure 1. GEP and OEP by gender

However, this difference is not statistically significant ($p = 0.479 > 0.05$). As shown in Table 6, the corresponding effect size is negligible (Cohen's $d = -0.10$), indicating that the observed difference between male and female students is trivial in magnitude and unlikely to have substantive relevance.

In the case of perceived employability within the field of engineering (OEP), the trend reverses: male students report higher mean scores across all items, as shown in Figure 1.

Here again, no statistically significant difference is found ($p = 0.172 > 0.05$), and the associated effect size remains small (Cohen's $d = 0.19$), suggesting that the magnitude of the difference is limited in practical terms.

In both genders, employability perception is higher in the specific field of engineering than in the general labour market.

	Mean Male	SD Male	Mean Female	SD Female	t(df)	p-value	95% CI	Cohen's d
GEP	3.19	0.92	3.29	1.03	-0.71(115.21)	0.479	[-0.36, 0.17]	-0.10
OEP	4.25	0.60	4.13	0.67	1.37(116.18)	0.172	[4.25, 4.13]	0.19
GEN	2.07	0.88	2.68	0.92	-5.06(121.53)	< 0.001	[-0.86, -0.37]	-0.68
EQ	3.89	0.50	3.90	0.42	-0.13(148.56)	0.894	[-0.12, 0.11]	-0.02
EQS	3.80	0.64	3.87	0.63	-0.87(128.12)	0.386	[-0.24, 0.09]	-0.12
EQB	3.45	0.74	3.38	0.66	0.72(139.84)	0.470	[-0.11, 0.25]	0.09
EQR	4.15	0.58	4.16	0.49	-0.17(148.65)	0.862	[-0.15, 0.12]	-0.02

Table 6. Gender differences across dimensions

4.1.2. Differences by Field of Study

Table 7 presents the results broken down by field of study, grouping students into two broad areas: industrial engineering (IE) and information and communication technologies (ICT).

For general employability perception (GEP), the IE group shows a higher mean score (3.30) than the ICT group (3.11). This difference is illustrated in Figure 2.

			Frequency							Frequency				
	Mean IE	**SD IE**	**1**	**2**	**3**	**4**	**5**	**Mean ICT**	**SD ICT**	**1**	**2**	**3**	**4**	**5**
GEP1	3.26	1.02	7	28	66	43	21	3.24	1.12	7	31	46	33	23
GEP2	3.46	1.04	5	26	50	56	28	3.29	1.05	6	24	53	37	20
GEP3	3.11	1.05	8	40	62	36	19	2.91	1.15	12	47	38	27	16
GEP4	3.38	1.00	5	25	60	52	23	2.99	1.17	15	34	45	29	17
GEP	**3.30**	**0.89**	**25**	**119**	**238**	**187**	**91**	**3.11**	**1.00**	**40**	**136**	**182**	**126**	**76**
OEP1	4.26	0.71	0	1	22	75	67	4.51	0.77	2	1	9	40	88
OEP2	4.40	0.78	1	2	18	53	91	4.31	0.80	2	2	12	59	65
OEP3	4.32	0.73	0	1	23	63	78	4.48	0.73	1	0	14	41	84
OEP4	4.13	0.75	0	1	34	72	58	4.19	0.91	3	1	26	47	63
OEP5	3.75	0.86	1	6	63	59	36	3.89	0.90	2	6	35	59	38
OEP	**4.17**	**0.58**	**2**	**11**	**160**	**322**	**330**	**4.27**	**0.66**	**10**	**10**	**96**	**246**	**338**

Table 7. Statistical data of GEP and OEP dimensions by field of study

However, there is no statistically significant difference between the two groups ($p = 0.079 > 0.05$). As shown in Table 8, the associated effect size is small, suggesting that the observed gap, while directionally consistent, is modest in magnitude.

Regarding perceived employability within the field of engineering (OEP), students in the ICT field score higher on all but one item, as shown in Figure 2.

Again, no statistically significant difference is detected ($p = 0.157 > 0.05$), and the corresponding effect size is negligible (Cohen's $d = -0.16$), suggesting that the observed difference is minimal in practical terms.

In both fields of study, employability perception is higher within the specific field of engineering than in the general labour market.

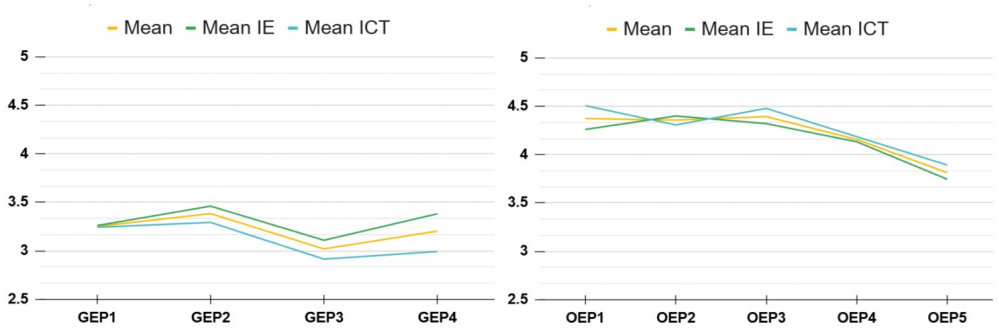

Figure 2. GEP and OEP by field of study

	Mean IE	**SD IE**	**Mean ICT**	**SD ICT**	**t(df)**	**p-value**	**95% CI**	**Cohen's d**
GEP	3.30	**0.89**	**3.11**	1.00	1.76(280.37)	0.079	[-0.02, 0.41]	0.20
OEP	4.17	0.58	4.27	0.66	-1.42(277.2)	**0.157**	[-0.24, 0.04]	-0.16
GEN	**2.28**	**0.91**	2.14	0.95	1.34(291.42)	0.180	[-0.07, 0.35]	0.16
EQ	3.92	0.46	3.86	0.50	1.07(286.13)	0.288	[-0.05, 0.17]	0.12
EQS	3.88	0.63	3.74	0.64	1.92(293.16)	0.055	[-0.002, 0.28]	0.22
EQB	3.36	0.70	3.52	0.74	-1.95(290.06)	0.052	[-0.32, 0.002]	-0.22
EQR	4.21	0.56	4.08	0.55	2.03(295.73)	0.044	[0.003, 0.26]	0.23

Table 8. Field-of-study differences across dimensions

4.2. Perception of Gender Equity (GEN)

Identifies students' views on gender equality in different professional sectors.

The questions on equity within the sector assess the lack of equity; that is, higher values indicate lower equity, and lower values indicate higher equity, with 1 representing absolute equity.

As can be seen in Table 9, the overall response values in this dimension are low, with the mean value of the GEN variable being 2.22 and mode 1. This appears to suggest that, in general, there is a fairly high degree of perceived equity in the engineering sector.

	Mean	SD	1st Qu.	Median	3rd Qu.	Mode	Frequency				
							1	2	3	4	5
GEN1	2.41	1.18	1	2	3	3	92	64	95	39	15
GEN2	2.54	1.22	1	3	3	3	80	64	100	38	23
GEN3	2.16	1.06	1	2	3	1	102	90	83	21	9
GEN4	1.76	0.96	1	1	3	1	167	61	65	8	4
GEN	**2.22**	**0.93**	**1**	**2**	**3**	**1**	**441**	**279**	**343**	**106**	**51**

Table 9. Statistical data of GEN dimension

4.2.1. Differences by Gender

In this case, clear differences between genders are observed. Table 10 and Figure 3 show that the group identifying as female scores notably higher in this dimension, with a mean of 2.68, compared to 2.07 in the male group.

	Mean Male	SD Male	Frequency					Mean Female	SD Female	Frequency				
			1	2	3	4	5			1	2	3	4	5
GEN1	2.22	1.13	82	51	67	22	7	3.01	1.17	10	12	28	17	8
GEN2	2.36	1.16	71	50	74	23	11	3.11	1.23	9	13	26	15	12
GEN3	1.99	0.99	91	68	54	13	3	2.69	1.10	11	21	29	8	6
GEN4	1.70	0.95	132	45	42	8	2	1.92	1.01	35	15	23	0	2
GEN	**2.07**	**0.88**	**376**	**214**	**237**	**66**	**23**	**2.68**	**0.92**	**65**	**61**	**106**	**40**	**28**

Table 10. Statistical data of GEN dimension by gender

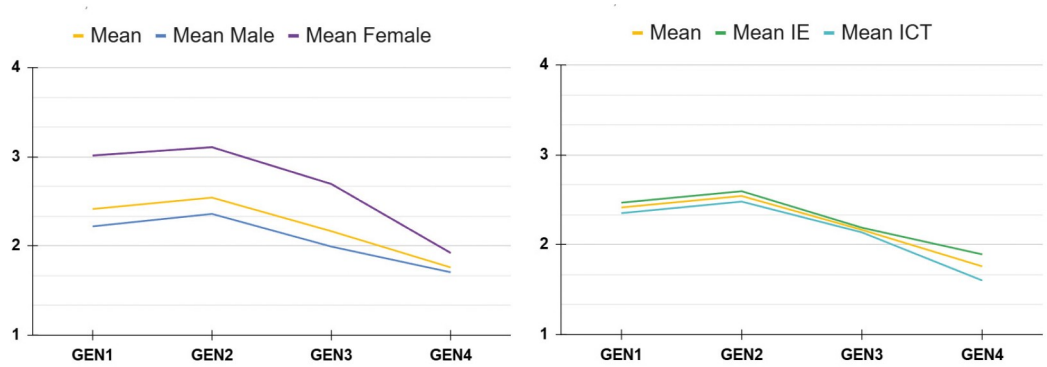

Figure 3. GEN by gender and field of study

While the most frequent responses among female students are at value 3, male students most frequently respond with value 1.

Although there is some dispersion in the responses, the overall low values indicate that the engineering sector is perceived as relatively equitable. However, male students tend to perceive more equality and less discrimination than female students.

The Welch's t-test confirms that the difference between genders is statistically significant, with $t = -5.06$ and $p < 0.001$. The 95% confidence interval for the difference in means is [-0.86, -0.37], indicating that students identifying as male perceive the work environment as more equitable than their female counterparts. The associated effect size is moderate (Cohen's $d = -0.68$), suggesting that the observed difference is not only statistically significant but also substantively meaningful.

4.2.2. Differences by Field of Study

Table 11 and Figure 3 show that the results are very similar between the two fields of study. The ICT group presents a slightly lower mean in the GEN variable and across all its items. Again, no statistically significant difference is detected ($p = 0.180 > 0.05$). As reported in Table 8, the corresponding effect size is negligible, indicating that the observed differences are trivial in magnitude.

			Frequency							Frequency				
	Mean IE	**SD IE**	**1**	**2**	**3**	**4**	**5**	**Mean ICT**	**SD ICT**	**1**	**2**	**3**	**4**	**5**
GEN1	2.47	1.20	46	38	49	22	10	2.35	1.16	46	26	46	17	5
GEN2	2.59	1.17	37	36	62	17	13	2.48	1.27	43	28	38	21	10
GEN3	2.19	1.07	52	51	49	5	8	2.14	1.05	50	39	34	16	1
GEN4	1.89	1.00	78	38	41	5	3	1.60	0.90	89	23	24	3	1
GEN	**2.28**	**0.91**	**213**	**163**	**201**	**49**	**34**	**2.14**	**0.95**	**228**	**116**	**142**	**57**	**17**

Table 11. Statistical data of GEN dimension by field of study

It is worth noting that the ICT sample includes a smaller proportion of female participants (18%) compared to the industrial engineering field (30%). Given that significant gender differences have been observed in this dimension, this disparity in sample composition influences the aggregated results by field.

Nevertheless, when analysing the means by gender within each field, it is observed that the perception of equity is slightly higher in the ICT group:

- For female students, the mean in ICT is 2.6, compared to 2.7 in industrial engineering.
- For male students, the mean in ICT is 2.0, compared to 2.1 in industrial engineering.

These results suggest that the difference between fields is minimal, but the ICT environment might be perceived as slightly more equitable by both genders.

4.3. Job Quality Perception (EQ)

Assesses factors such as salary, status, work-life balance, and work environment that influence career preferences.

Table 12 presents the statistical results for job quality perception in the field of engineering, as well as its three subdimensions: status (EQS), work-life balance (EQB), and work environment (EQR). The data show that the subdimension with the lowest mean score is work-life balance (EQB), with a value of 3.43, while the highest mean corresponds to the work environment dimension (EQR). Across all subdimensions, the most frequently reported value is 4, and the overall mean for job quality perception (EQ) is 4.16. These results indicate that students generally perceive job quality in engineering as high, with particular emphasis on the value placed on the work environment.

	Mean	SD	1st Qu.	Median	3rd Qu.	Mode	Frequency				
							1	2	3	4	5
EQS1	3.47	0.86	3	3	4	3	6	26	122	121	30
EQS2	3.96	0.74	4	4	4	4	2	6	61	170	66
EQS3	4.02	0.78	4	4	5	4	2	10	48	164	81
EQS	**3.82**	**0.64**	**3**	**4**	**4**	**4**	**10**	**42**	**231**	**455**	**177**
EQB1	3.86	0.82	3	4	4	4	3	11	76	152	63
EQB2	3.39	0.98	3	3	4	3	8	43	119	93	42
EQB3	3.06	0.98	2	3	4	3	16	72	113	86	18
EQB	**3.43**	**0.72**	**3**	**3**	**4**	**4**	**27**	**126**	**308**	**331**	**123**
EQR1	3.92	0.92	3	4	5	4	2	18	76	116	93
EQR2	4.29	0.80	4	4	5	5	1	7	38	116	143
EQR3	4.23	0.79	4	4	5	4	3	6	32	141	123
EQR4	4.02	0.73	4	4	5	4	0	6	61	159	79
EQR5	4.26	0.79	4	4	5	5	2	7	34	130	132
EQR6	4.22	0.78	4	4	5	4	2	7	34	142	120
EQR	**4.16**	**0.56**	**4**	**4**	**5**	**4**	**10**	**51**	**275**	**804**	**690**
EQ	**3.89**	**0.48**	**3**	**4**	**4**	**4**	**47**	**219**	**814**	**1590**	**990**

Table 12. Statistical data of EQ dimension

4.3.1. Differences by Gender

As shown in Table 13, gender differences in job quality perception are generally small. In the status subdimension (EQS), female students report a slightly higher mean (3.87) than male students (3.80). Conversely, for work-life balance (EQB), male students score marginally higher (3.45) than female students (3.38). In the work environment subdimension (EQR), scores are virtually identical across genders.

	Mean Male	SD Male	Frequency					Mean Female	SD Female	Frequency				
			1	2	3	4	5			1	2	3	4	5
EQS1	3.41	0.85	5	23	92	92	17	3.65	0.86	1	3	30	28	13
EQS2	3.94	0.76	2	5	45	129	48	4.00	0.72	0	1	16	40	18
EQS3	4.04	0.82	2	9	32	120	66	3.96	0.69	0	1	16	43	15
EQS	**3.80**	**0.64**	**9**	**37**	**169**	**341**	**131**	**3.87**	**0.63**	**1**	**5**	**62**	**111**	**46**
EQB1	3.86	0.84	3	8	56	112	50	3.83	0.76	0	3	20	39	13
EQB2	3.41	0.98	6	30	92	67	34	3.32	0.97	2	13	27	25	8
EQB3	3.07	0.99	12	53	85	64	15	3.00	0.96	4	19	28	21	3
EQB	**3.45**	**0.74**	**21**	**91**	**233**	**243**	**99**	**3.38**	**0.66**	**6**	**35**	**75**	**85**	**24**
EQR1	3.94	0.94	2	15	52	86	74	3.85	0.85	0	3	24	29	19
EQR2	4.29	0.81	1	5	31	81	111	4.28	0.75	0	2	7	34	32
EQR3	4.21	0.82	3	5	25	104	92	4.29	0.69	0	1	7	36	31
EQR4	4.01	0.74	0	5	46	120	58	4.05	0.73	0	1	15	38	21
EQR5	4.26	0.82	2	6	25	94	102	4.25	0.72	0	1	9	35	30
EQR6	4.21	0.76	1	4	30	106	88	4.25	0.84	1	3	4	35	32
EQR	**4.15**	**0.58**	**9**	**40**	**209**	**591**	**525**	**4.16**	**0.49**	**1**	**11**	**66**	**207**	**165**
EQ	**3.89**	**0.50**	**39**	**168**	**611**	**1175**	**755**	**3.90**	**0.42**	**8**	**51**	**203**	**403**	**235**

Table 13. Statistical data of EQ (EQS, EQB, EQR) by gender

As reported in Table 6, Welch's t-test reveals no statistically significant differences in EQ between genders ($p = 0.894 > 0.05$), nor in any of its subdimensions (EQS, EQB, EQR). Figure 4 illustrates the distribution of scores across all dimensions related to job quality perception.

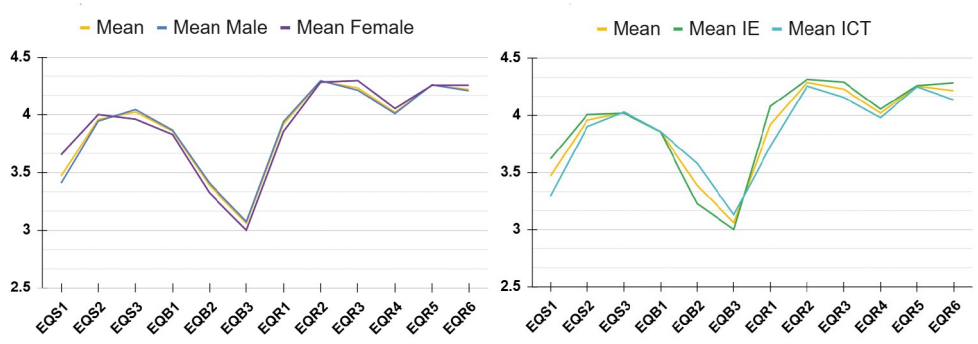

Figure 4. EQ by gender and field of study

4.3.2. Differences by Field of Study

Table 14 and Figure 4 present the results by field of study, comparing industrial engineering (IE) and information and communication technologies (ICT). The overall mean EQ score is slightly higher for the IE group (3.92) compared to ICT (3.86).

By subdimension, IE students score higher in both EQS and EQR across all items, except for EQS3, where the scores are nearly identical. In contrast, work-life balance (EQB) receives higher ratings from ICT students in all items.

			Frequency							Frequency				
	Mean IE	**SD IE**	**1**	**2**	**3**	**4**	**5**	**Mean ICT**	**SD ICT**	**1**	**2**	**3**	**4**	**5**
EQS1	3.62	0.89	4	10	55	72	24	3.29	0.78	2	16	67	49	6
EQS2	4.01	0.71	0	3	32	91	39	3.90	0.78	2	3	29	79	27
EQS3	4.02	0.73	0	4	30	90	41	4.03	0.85	2	6	18	74	40
EQS	**3.88**	**0.63**	**4**	**17**	**117**	**253**	**104**	**3.74**	**0.64**	**6**	**25**	**114**	**202**	**73**
EQB1	3.85	0.75	0	5	45	84	31	3.86	0.89	3	6	31	68	32
EQB2	3.22	0.93	5	27	74	44	15	3.58	1.00	3	16	45	49	27
EQB3	3.00	1.03	12	41	57	45	10	3.13	0.92	4	31	56	41	8
EQB	**3.36**	**0.70**	**17**	**73**	**176**	**173**	**56**	**3.52**	**0.74**	**10**	**53**	**132**	**158**	**67**
EQR1	4.08	0.90	1	8	30	64	62	3.73	0.91	1	10	46	52	31
EQR2	4.32	0.80	1	4	17	63	80	4.26	0.79	0	3	21	53	63
EQR3	4.29	0.78	2	3	12	76	72	4.16	0.80	1	3	20	65	51
EQR4	4.05	0.72	0	3	29	89	44	3.98	0.75	0	3	32	70	35
EQR5	4.26	0.82	2	4	15	72	72	4.25	0.77	0	3	19	58	60
EQR6	4.28	0.70	0	2	17	78	68	4.14	0.87	2	5	17	64	52
EQR	**4.21**	**0.56**	**6**	**24**	**120**	**442**	**398**	**4.08**	**0.55**	**4**	**27**	**155**	**362**	**292**
EQ	**3.92**	**0.46**	**27**	**114**	**413**	**868**	**558**	**3.86**	**0.50**	**20**	**105**	**401**	**722**	**432**

Table 14. Statistical data of EQ (EQS, EQB, EQR) by field of study

While the overall EQ difference between the two groups is not statistically significant ($p = 0.288 > 0.05$), separate analyses of the subdimensions reveal near-significant trends, with EQS approaching significance ($p = 0.055$) and EQB showing a similar pattern ($p = 0.052$). In both cases, the 95% confidence interval includes zero, and the associated effect sizes are small, so it cannot be stated with certainty that there are significant differences by field of study. Further research with larger and more diverse samples would be needed to determine whether these tendencies reflect stable differences across fields.

For the work environment subdimension (EQR), Welch's t-test shows a statistically significant difference between groups ($t = 2.03$, $p = 0.044$), with a 95% confidence interval of [+0.004, +0.255]. However, the corresponding effect size is small, suggesting that although the difference reaches statistical significance, its practical impact is modest. This indicates that IE students tend to perceive their work environment slightly more positively than ICT students, but the magnitude of this gap remains limited.

4.4. Effects of Work Experience

Table 2 presented the characteristics of the sample in relation to students' work experience. Section 3 also describes the students' years of work experience and how many were working actively at the time of completing the questionnaire.

We analysed whether work experience might be related to responses across the different questionnaire dimensions.

Tables 15 and 16 summarize the results of the group comparisons by prior work experience and current employment status. Descriptive statistics, significance tests, and effect sizes are reported for each dimension. The following paragraphs highlight the most relevant findings.

	Mean with experience	SD with experience	Mean without experience	SD without experience	t(df)	p-value	95% CI	Cohen's d
GEP	3.32	0.90	3.00	0.99	2.67(178.93)	0.008	[0.08, 0.54]	0.34
OEP	4.20	0.62	4.25	0.61	-0.66(196.72)	0.511	[-0.20, 0.10]	-0.08
GEN	2.20	0.92	2.26	0.95	-0.46(187.24)	0.643	[-0.28, 0.17]	-0.06
EQ	3.90	0.48	3.86	0.50	0.62(186.37)	0.534	[-0.08, 0.16]	0.08
EQS	3.86	0.66	3.73	0.57	1.80(220.41)	0.074	[-0.01, 0.28]	0.21
EQB	3.39	0.74	3.52	0.67	-1.54(212.63)	0.126	[-0.30, 0.04]	-0.18
EQR	4.18	0.54	4.10	0.59	1.06(180.7)	0.291	[-0.06, 0.21]	0.13

Table 15. Differences by work experience

	Mean working	SD working	Mean not working	SD not working	t(df)	p-value	95% CI	Cohen's d
GEP	3.36	0.88	3.17	0.96	1.58(131.09)	0.116	[-0.05, 0.43]	-0.21
OEP	4.26	0.59	4.21	0.63	0.67(127.13)	0.503	[-0.11, 0.21]	-0.09
GEN	2.30	0.89	2.19	0.94	0.93(126.54)	0.354	[-0.13, 0.35]	-0.12
EQ	3.96	0.42	3.87	0.50	1.64(142.22)	0.103	[-0.02, 0.21]	-0.21
EQS	3.95	0.64	3.77	0.63	2.06(120.01)	0.042	[0.01, 0.34]	-0.28
EQB	3.38	0.72	3.45	0.72	-0.75(120.59)	0.456	[-0.27, 0.12]	0.10
EQR	4.26	0.51	4.12	0.57	2.02(134.51)	0.045	[0.003, 0.28]	-0.26

Table 16. Differences by current employment status

4.4.1. Perception of General Employability (GEP)

First, a Welch's t-test was applied to compare mean GEP scores between the group with work experience and the group without. The results show a statistically significant difference ($t = 2.67$, $p = 0.008$), with a

mean of 3.32 for the experienced group and 3.00 for the non-experienced group. The 95% confidence interval for the mean difference is [0.08, 0.55], suggesting that work experience is associated with a modest but significant increase in perceived general employability. The corresponding effect size is small (Cohen's d = 0.34), indicating that although the difference is statistically significant, its magnitude remains limited in practical terms.

Additionally, a linear model was fitted to assess whether years of work experience predict GEP. Years of experience significantly predicted GEP, $\beta = 0.18$, $t(204) = 3.15$, $p = 0.002$. The overall model was significant, $F(1, 204) = 9.94$, $p = .002$, explaining 4.6% of the variance ($R^2 = .046$). Although statistically significant, the effect size is small, indicating that years of experience have a limited practical impact on perceived general employability.

4.4.2. Perception of Job Quality: Status (EQS) and Work Environment (EQR)

Welch's t-tests were applied to examine whether being employed at the time of the survey influenced perceptions of job quality in two subdimensions: status (EQS) and work environment (EQR).

For EQS, the results show a statistically significant difference between those who were working and those who were not ($t = 2.06$, $p = 0.042$), with means of 3.95 and 3.77, respectively. The 95% confidence interval for the difference in means is [0.01, 0.34], suggesting a slightly higher assessment of status among those who are working. The associated effect size is small (Cohen's d = -0.28), suggesting that the observed difference, while statistically reliable, represents a modest shift rather than a substantial gap.

For EQR, a significant difference is also observed ($t = 2.02$, $p = 0.045$), with a mean of 4.26 for the employed group and 4.12 for the non-employed group. The confidence interval is [0.003, 0.281], indicating that those who are employed perceive better relational/work-environment quality. The associated effect size is small (Cohen's d = -0.26), indicating a limited practical impact despite statistical significance.

4.4.3. Analysis of the Remaining Dimensions

Other relationships between work experience and questionnaire dimensions were explored, with no statistically significant findings. The most relevant case is detailed below: A linear model was fitted to assess whether years of experience could predict the value of the GEN dimension (perception of gender equity). Although a positive trend was observed ($\beta = 0.10$, $SE = 0.06$), the effect did not reach statistical significance, $t(204) = 1.72$, $p = 0.087$. The overall model was not statistically significant, $F(1, 204) = 2.95$, $p = 0.087$, and explained only 1.4% of the variance ($R^2 = 0.014$). These results indicate a modest and statistically non-significant tendency, suggesting a potential association between years of experience and perceived gender equity, although the strength of this relationship appears limited within the present sample.

5. Discussion and Conclusion

This study presents the results of applying the Job Perception and Expectations Scale developed by López et al. (2025), with the aim of analyzing employability perceptions and expectations regarding job quality among first-year engineering students. Specifically, the study examines general perceived employability, employability in the engineering field, perceptions of equity in the professional environment, and expectations concerning job quality. The scale demonstrated high reliability and construct validity across all dimensions and subgroups, confirming its value as a tool for understanding students' views on their career prospects.

The findings provide a nuanced picture of how engineering students perceive their employability, gender equity in the professional sphere, and the expected quality of employment.

Students generally rate their employability positively, particularly in relation to the specific field of engineering. Overall, the results suggest that students perceive relatively high employability, with significantly higher scores within engineering compared to the broader labor market. For both genders,

employability is perceived as stronger in the engineering domain than in the general labor market. While male students reported slightly higher values, the differences were not statistically significant. This outcome aligns with some previous studies (Ananthram, Bawa, Bennett & Gill, 2024), although others (Fudali-Czyż et al., 2022; Sánchez-Queija, Sánchez-García, Rothwell & Parra, 2023; Yepes-Zuluaga & Granada, 2023) significant gender differences in internal employability (i.e., confidence in one's own competencies to secure a suitable job), but not in external employability (i.e., perceptions of the labor market). In this study, both internal and external employability were assessed within a single dimension, making them indistinguishable; this may help explain the absence of statistically significant gender differences.

Regarding gender equity, the overall mean score was relatively low (suggesting a perception of reasonable equity) but statistically significant differences between genders were found. Female students scored higher, indicating a greater perception of inequality; in other words, male students tend to perceive more equality and less discrimination than their female peers. These results are consistent with recent research on workplace gender equity, which shows that women in STEM (including ICT and engineering) typically report greater discrimination and more barriers to career advancement than men. Such perceptions are particularly pronounced in male-dominated environments (Funk & Parker, 2018; Guzmán, Fischer & Kok, 2024).

This divergence points not only to the persistence of structural challenges but also to a perceptual gap that may limit a shared understanding of gender dynamics in the engineering labour market. From an institutional perspective, this finding highlights the potential value of initiatives aimed at increasing awareness of these dynamics. Faculties or schools could, for example, implement seminars presenting contextualised labour market data, guided discussion spaces, mentoring programmes featuring diverse role models, or curricular activities that incorporate reflection on professional culture and implicit bias. The aim would be to foster a more informed and collectively grounded understanding of perceived inequalities and their structural dimensions.

An interesting pattern emerges when considering the relationship between equity and employability perceptions. Although female students report significantly lower perceptions of gender equity in the engineering work environment, no corresponding differences are observed in self-perceived employability. One possible interpretation is that women who enrol in STEM programmes may already possess relatively high levels of academic self-efficacy. At the same time, they may be more aware of structural gender imbalances in engineering as a traditionally male-dominated field. This combination may explain the coexistence of comparable employability perceptions with lower equity assessments. This interpretation aligns with research suggesting that women in STEM often feel the need to demonstrate higher levels of preparation to achieve comparable recognition, and deserves further empirical exploration.

With respect to job quality, students reported generally high expectations, especially valuing the work environment. However, the dimension related to work-life balance (EQB) received slightly lower scores, pointing to latent concerns or more moderate expectations in this area. The comparatively lower valuation of work-life balance may warrant further reflection. On the one hand, this pattern could reflect actual structural conditions in certain engineering sectors, where workload intensity or availability expectations are perceived as demanding. If so, the issue would not be merely perceptual but organisational, suggesting that industry-level practices may need to evolve, particularly in contexts marked by shortages of qualified professionals.

On the other hand, it is also possible that students' expectations are influenced by partial or stereotyped representations of engineering careers and may not fully correspond to the diversity of existing professional trajectories. From an educational perspective, faculties could therefore consider initiatives aimed at providing more evidence-based and contextualised information about career paths in engineering, particularly regarding workload patterns, flexibility, and emerging organisational models.

It is also important to note that the survey was administered to students who had already chosen engineering degrees. The fact that work-life balance receives comparatively lower evaluations even within this committed group raises questions about how such expectations might operate at earlier stages of decision-making. It is plausible that perceptions related to work intensity or limited flexibility could act as one additional factor -among many- in shaping degree preferences, especially among students who have not yet opted for a STEM pathway. Future research using comparative and longitudinal designs could help clarify the extent to which these expectations influence choice, persistence, or field mobility.

Some subgroup differences also emerged. In the work environment subdimension, industrial engineering students reported significantly more favorable perceptions than ICT students. Differences also appeared in status and work-life balance. However, these did not reach statistical significance and should therefore be interpreted cautiously. Industrial engineering students reported higher perceived status, while ICT students rated work-life balance more positively. These descriptive patterns require further investigation in larger or independent samples.

Finally, the results indicate that prior work experience has a significant effect on certain key dimensions, especially general employability perceptions, and to a lesser extent, perceptions of status and work environment. Nonetheless, the explanatory power of these relationships is modest, suggesting that work experience acts as a moderating rather than determining factor within a complex system of perceptions and expectations. No statistically significant differences were found in other dimensions. An emerging tendency was observed for gender equity: students with more experience tended to report slightly greater perceptions of inequality, though this effect was not statistically significant and accounted for only a small portion of variability.

Overall, the findings suggest a student profile that feels reasonably prepared for the engineering labor market and values its professional future positively, while also showing moderate but statistically differentiated perceptions of gender equity between male and female students, and expressing some concern about work-life balance.

The results provide an initial diagnostic perspective, though they must be interpreted with caution. The sample consisted solely of students from a single university, limiting the generalizability of the findings to other institutions, academic disciplines, and geographic contexts. Future research should therefore extend the analysis to different academic fields, cultural contexts, and, importantly, to secondary education.

A key line of inquiry would be to examine how these perceptions evolve over the course of university studies. Longitudinal analyses of changes in self-perceived employability and job expectations could clarify the factors that reinforce or undermine students' confidence. Extending the study to earlier educational stages, such as upper secondary or even compulsory schooling, could also reveal whether initial perceptions shape study choices and whether gender differences in expectations contribute to the persistent underrepresentation of women in STEM.

Given the growing evidence on the influence of media narratives in shaping professional stereotypes (Cheryan et al., 2015; Kim et al., 2018), future research should also consider experimental designs to assess how such representations shape students' expectations and aspirations.

These findings have practical implications. For higher education leaders (e.g., deans or academic advisors), the results may serve as a basis to assess whether students hold accurate and realistic views of career prospects before choosing a degree program. For policymakers and labor market analysts (e.g., government agencies or labor economists), they provide insight into gender inequalities in job expectations and can guide policies to promote equity in high-demand sectors. For industry and human resources professionals, the results can inform recruitment strategies, the alignment of job descriptions with young professionals' expectations, and the development of inclusive work environments.

In sum, this study provides an initial diagnostic account of employability, equity, and job quality perceptions among engineering students. It highlights the need for further research into the individual and contextual determinants shaping these perceptions, with the goal of designing more effective educational, policy, and organizational strategies to reduce inequalities and foster more equitable and sustainable career trajectories.

There is broad consensus that students who are better informed about labor market opportunities and who feel motivated make more accurate career decisions (Qenani, MacDougall & Sexton, 2014). From this perspective, the university experience should be regarded as a key space for strengthening realistic and equitable perceptions of employability, while continuing to examine how job expectations, shaped by both personal and contextual factors, influence academic and professional choices.

The contribution of this study is twofold. Methodologically, it provides evidence on the psychometric performance of a multidimensional scale that can serve as a comparable measurement infrastructure across cohorts, institutions, and countries. A logical next step is to subject it to confirmatory factor analysis and to tests of invariance by gender, subfield, and national context. Practically, it offers actionable indicators for institutions to design early interventions based not only on aggregate labor market signals but also on students' actual perceptions at the outset of their degree programs, or even before choosing a major, when expectations and decisions remain malleable.

Several operational implications follow from this. At the institutional level, it is useful to measure regularly and disaggregate by subfield in order to identify gaps and adjust actions aimed at, for example, strengthening equity or revising workloads and organizational structures in specific sectors. It may also help bring the professional world closer to subfields with lower perceived employability through early internships or high-demand specialization pathways. In relation to employers, aligning job descriptions, expectations, and workplace cultures with what students value and expect can reduce information asymmetries and facilitate fairer transitions.

This study presents two main limitations. First, the analyses are based on the same dataset used for the initial validation of the scale and therefore do not constitute an independent replication of the results. Second, although the institutional context is structurally comparable to other public European polytechnic schools operating within the European Higher Education Area (EHEA), the data derive from a single institution and a single national context, particularly relevant given documented cross-national differences in STEM participation and gender gaps. Extending the study to independent samples and additional institutions would allow for a more thorough examination of the consistency and scope of the observed patterns, as well as the identification of potential nuances associated with institutional factors or regional labour market dynamics. Future research could also follow cohorts longitudinally to model changes in perceived employability, gender equity, and job quality over time, and experimentally assess the impact of targeted interventions such as career modules, mentoring programmes, or the provision of realistic information about working conditions.

Taken together, placing perceptions of employability, equity, and job quality at the center of the university experience offers a lever for change that aligns with both institutional capabilities and higher education policy objectives. The proposed scale enables informed decision-making, monitoring of disparities, and cross-system comparison, contributing to STEM pathways that are more inclusive, realistic, and sustainable.

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