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Job perception and expectations scale: a new scale for assessing self-perceived employability, job quality, and gender equity

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Numerous studies have identified *career prospects* as a key determinant in students' decisions to pursue a STEM degree. The challenge lies in understanding the perceptions and expectations of the new generations regarding Career Prospects in a given field. To address this, the present study proposes a new scale focused on analyzing the perception of employability and expectations of job quality in the field, using the most commonly considered elements in the literature. Gender equity, or the lack thereof, is also related to job satisfaction for some individuals. Therefore, it has also been included in the analysis to better assess its differential impact across genders. The scale evaluates four dimensions: generic employability, sector-specific employability, gender equity, and job quality. In this study, a 27-item scale was designed to measure self-perceived employability both in a generic and sector-specific way, the perception of gender equity and expectations regarding job quality in the field. This questionnaire was completed by 305 first-year engineering students at a Catalan university (75 identifying as female), with an average age of 18.3 years (SD 1.1). During the study, 25 out of the 27 items were retained. High reliability and differentiation were observed for the four dimensions of the scale. The indicators of the confirmatory factor analysis suggest a reasonable fit and a robust construct validity. We believe the developed scale has significant potential to assess students' perceptions and expectations regarding employment in a field. This scale can be used as a diagnostic tool, especially for planners. For example, it could be used to analyze gender differences in perceptions and expectations within a field, or the relationship between these perceptions and the choice of university studies. This analysis could allow corrective actions to be taken in response to unrealistic perceptions and expectations, should this be the case.

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Introduction

STEM disciplines (Science, Technology, Engineering, and Mathematics) are crucial to modern society and are recognized by organizations such as UNESCO, the World Bank Group (WBG), and the Organisation for Economic Co-operation and Development (OECD) as fundamental for human development, increased competitiveness, and a country's economic prosperity (UNESCO, 2016).

The STEM field is associated with low unemployment rates and strong economic prospects. In 2023, 78.3 million people in the EU were employed in science and technology, marking a 2.9% increase compared to 2022. Looking back to 2013, data show a substantial 25% rise over the past decade, reaching 62.5 million people (EUROSTAT, 2024). However, despite these promising trends, many countries struggle with an insufficient supply of STEM graduates. As a result, there is significant interest in increasing enrollment in STEM programs, raising the question of why more students do not pursue studies in this field.

A particularly striking aspect of this issue is the gender disparity in STEM enrollment. On average, only 15% of female new entrants choose a STEM field, compared to 41% of male new entrants. These percentages remained stable between 2015 and 2022 (OECD, 2024). The gender gap is even more pronounced in Information and Communication Technology (ICT). Despite the increasing demand for ICT skills, only 6% of new tertiary education entrants, on average, were ICT students across OECD countries in 2020. The disparity is particularly severe among women: only 2% of female entrants opted for an ICT field, compared to 10% of male entrants (OECD, 2022). Over the past decade, progress in increasing female participation in the field has been minimal (Ángela Nebot and Mugica, 2023).

The factors contributing to the low attraction and retention of women in STEM fields are diverse and have been widely studied (Kim et al. 2018; Kanny et al. 2014). Some key influences include family expectations, persistent gender stereotypes, and lower self-efficacy among girls, who often approach these fields with less confidence and a greater fear of failure (Kim et al. 2018; Cheryan et al. 2015; OECD, 2015). In ICT, additional stereotypes regarding the nature of the work, workplace culture, and the values associated with the field further deter female participation (Cheryan et al. 2015).

Moreover, numerous studies have identified *Utility Beliefs*, particularly *Career Prospects*, as a key determinant in students' decisions to pursue a STEM degree (López et al. 2023). This paradox is particularly striking given the strong job market demand in IT and, in general, in the field of engineering. According to Eurostat data, the number of people employed as specialists (ICT) has grown by 50.5% in the period between 2012 and 2021 (EUROSTAT, 2022). This increase is 8 times higher than the corresponding increase in total employment (6.3%). Given the apparent contradiction that the number of enrollments in the STEM field, and in particular in the field of ICT, has not increased as expected from a strategic sector with good job opportunities, it is essential to investigate the causes of the current situation so that effective corrective policies can be designed.

In response, numerous initiatives have been launched to promote STEM disciplines, particularly among women. UNESCO, for example, has published various studies (UNESCO, 2017, 2016) to stimulate debate, analyze trends in women's participation in technological fields, and establish action plans aligned with the Sustainable Development Goals for inclusive education (United Nations, 2015).

To better understand current and future perceptions and expectations regarding career prospects—particularly in terms of gender differences—the *Job Perception and Expectations Scale* was developed. Although this study focuses on STEM fields, the scale

allows for the analysis of job perceptions and expectations across various disciplines. Specifically, it assesses:

- Self-perceived employability, both generally and within the chosen field,
- Perceptions of gender equity in the workplace, and
- Perceived job quality within the chosen field.

Given that work significantly impacts quality of life and well-being, recent studies indicate that younger generations prioritize work-life balance more than previous generations (Chalofsky and Cavallaro, 2013; Manuti et al. 2018). From this perspective, this paper presents the design and validation of a new scale, the *Job Perception and Expectations Scale*, to measure these key aspects and contribute to the development of strategies that promote equitable participation in STEM careers. It can be used as a diagnostic tool for educators, policymakers, and employers to improve workforce readiness and gender equity initiatives.

Background

Gender and career prospects in STEM. The motivations for choosing a degree in the STEM field and the gender differences in these motivations have been extensively studied. According to the classification proposed by López et al. three types of factors influence this choice: Environmental factors, social influences, and personal factors. Undoubtedly, career choice does not depend on a single factor. Among personal factors, ability has often been considered more important than interest. However, some studies suggest that ability alone is not sufficient to explain differences in career selection (Wang et al. 2017).

Numerous studies have identified *Utility Beliefs*, particularly *Career Prospects*, as a key determinant in students' interest in pursuing a STEM degree (López et al. 2023). In these studies, some of the most commonly considered elements include salary, job status, job creativity, work-life balance, and social contribution (helping people). Some research suggests that the perception of certain professions as altruistic or compatible with work-life balance, for example, may contribute to gender disparities in STEM representation (Eccles and Wang, 2016). Moreover, when interventions have been implemented to change these perceptions, the number of women in the field has increased (Diekmann et al. 2011).

In the last decade, society has experienced significant transformations in the perception of work. Factors such as the influence of social networks, the rise of remote work, and the promotion of more inclusive work environments may have changed the priorities of young people. This suggests that some of the previous perceptions about job prospects may need to be reevaluated. This study focuses on *Career Prospects* as one of the key elements in degree choice. To explore young people's perceptions and expectations in a changing society, the *Job Perception and Expectations Scale* has been designed, with a particular focus on gender-related differences.

For its development, the most commonly cited desirable elements of *career prospects* have been selected, along with some negatively stereotyped aspects of the field, including employability, status, salary, work-life balance, social impact (contribution to society), creativity and intellectual challenge, helping people, and a positive work environment. The scale focuses on individuals' self-perception regarding these aspects and has been divided into three categories: *employability*, *job quality*, and *gender equity*.

Gender equity can have a major impact on the quality of the work environment (Bilan et al. 2020) and is, at the same time, a common stereotype in the STEM field.

International differences in the composition of engineering and computer science fields seem to indicate that the surrounding

culture is a key factor in the gender composition of these professions (Stoet and Geary, 2018). On the other hand, diverse workgroups contribute to creativity, productivity, and innovation. Diversity in workgroups, in terms of skills and perspectives, leads to better outcomes when addressing complex problems (Page, 2007; Wei, 2024; Živković et al., 2024), and the resulting designs tend to cater to a broader target population (Fisher and Margolis, 2002).

Self-perceived employability. The possibility of obtaining quality employment in a field of knowledge is one of the main reasons why students say they choose a particular university degree (Skatova and Ferguson, 2014; Olmedo-Torre et al. 2018).

There has been a great deal of interest in the concept of employability in recent years, a topic that has become particularly relevant in the context of the adverse employment conditions currently affecting many Western economies. The concept, which comes from the English term employability, has attracted much attention from the political, academic and professional spheres and has been studied from different disciplines, different points of view and at different levels (individual, organizational and industrial), giving rise to multiple definitions of the term and different ways of measuring it and, therefore, making it difficult to interpret (van der Heijde and van der Heijden, 2005).

One of the measures related to employability is perceived employability, or self-perceived employability, defined as the individual's perception of his or her own employability. That is, the individual's perception of his or her chances of obtaining and keeping a job (Vanhercke et al. 2014).

It is important to note that perception is a key element in an individual's assessment of employability. Perceived employability is a current assessment of an individual's ability to *navigate the world of work in the future* (Rothwell et al. 2008). Thus, the motivation that students wield as one of the most important in the choice of a university degree, i.e., the possibility of obtaining quality employment in the chosen degree, is profoundly affected by the perceived employability of the student.

In order to improve the understanding of students' perceived employability, several studies have been carried out on the factors that determine it (Rothwell et al. 2008; Jackson and Wilton, 2017; Pitan and Muller, 2020; Monteiro et al. 2021).

Perceived employability is affected by external and internal factors. External factors include the characteristics and general state of the labor market and specific qualifications, the perceived prestige of the chosen field of study, the subjective availability of jobs in the field of study, and the perceived fit of skills to employers' requirements. Internal factors include individual knowledge, skills, and competencies, work experience, personal development planning, personality traits, social capital, and individual attributes (Fudali-Czyż et al. 2022).

From the point of view of internal dimensions, Dacre Pool and Qualter (Dacre Pool and Qualter, 2013) and Moreau and Leathwood (Moreau and Leathwood, 2006) identified some demographic factors that influence the subjective analysis of students' perceived employability. These factors include gender, subject of study, type of university attended, age and/or social class.

In the present study, the scales related to perceived employability (domain-oriented and non-domain-oriented) were based on the scales proposed by Rothwell (Rothwell et al. 2008), Jackson (Jackson and Wilton, 2017), and Pitan (Pitan and Muller, 2020).

Job quality. People's quality of life is closely related to their work, to which we devote a large part of our time. On average, a person in an (OECD) country spends 37 hours a week at work and an increasing proportion of his or her adult life in paid work. Thus, work is strongly related to people's quality of life and well-being. Moreover,

quality jobs are an important driver of increased labor force participation, productivity, and economic performance (Cazes et al. 2015).

This may have great relevance especially for the generation of graduates called Generation Y or Millennials and beyond, who have a different relationship to work than previous generations having for example, more interest in pursuing work-life balance (Chalofsky and Cavallaro, 2013; Manuti et al. 2018).

There is no standard definition of Job Quality in the academic literature. Traditionally, salary-related indicators have been used to analyze Job Quality. Although it has been identified that satisfaction varies with income, the happiness-income paradox warns us that this correlation decreases to some extent over time (Easterlin, 1974; Easterlin et al. 2010).

More recent work has emphasized that wages and working hours alone are not sufficient to evaluate job quality. The sociological perspective highlights the intrinsic rewards of work, i.e., the benefits related to the characteristics of the job itself, as opposed to monetary or extrinsic aspects. A job with intrinsic rewards is usually interesting and challenging, allows individuals to use their skills and abilities, provides opportunities for discretion and learning, fosters autonomy, and offers recognition for a job well done (Cascales Mira, 2021; Green and Mostafa, 2012; Muñoz de Bustillo et al. 2011).

Currently, scholars agree that job quality is a multidimensional concept (Cascales Mira, 2021; de Bustillo et al. 2009), because several different work-related dimensions, such as earnings, job security, learning and development opportunities, autonomy, work intensity, physical and social work environment, and working time have been shown to be of high relevance for workers' health and well-being (Eurofound, 2017).

Different indicators have been developed for the measurement of job quality that vary according to the content, number and weighting of the underlying predictors (de Bustillo et al. 2009). The present study analyzes the perception of job quality in a sector following the steps of (from) the OECD Job Quality Framework (Cazes et al. 2015).

OECD Job Quality Framework draws on existing research in economics, sociology and occupational health to identify the main aspects of jobs that contribute to workers' well-being. Three key dimensions of job quality are identified: earnings, labor market security and work environment.

- Earnings quality captures the extent to which earnings contribute to workers' well-being in terms of average earnings and their distribution across the workforce.
- Labour market security captures those aspects of economic security related to the risks of job loss and its economic cost for workers. It is defined by the risks of unemployment and the benefits received in case of unemployment.
- Quality of the working environment captures non-economic aspects of jobs including the nature and content of the work performed, working-time arrangements and workplace relationships. These are measured as incidence of job strain characterized as high job demands with low job resources.

This study has used the OECD Job Quality Framework as a reference to measure the perception of job quality in a field of knowledge. This could also allow us to contrast the perception of the respondents with the measures collected by the OECD in a specific field.

Method

Participants. To conduct this study, 1209 first-year engineering students at Universitat Politècnica de Catalunya (UPC)(Spain) were invited to complete an anonymous on-line questionnaire during the first semester of the 2023–24 academic year.

First-year engineering students were chosen for this study because their perceptions are largely shaped by initial motivations and expectations, as they have had minimal professional exposure. Additionally, selecting a homogeneous academic cohort ensures consistency in educational background, reducing external variability in responses. This approach also provides a foundation for future longitudinal studies on the evolution of career perceptions throughout their academic journey.

A total of 305 responses were received, giving an overall response rate of 25.2%. Following the recommendations of Henson & Roberts (Henson and Roberts, 2006) and Kline (Kline, 2023), we conclude that the sample size is sufficient for the number of questionnaire items used.

A total of 176 students (54 identifying as female) were from the industrial engineering field and 129 students (21 identifying as female) were from the computer engineering 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).

Instruments: development of the job perception and expectations scale. This study introduces a scale designed to assess how students perceive their career prospects. Specifically, it evaluates:

- Self-perceived employability - Measures students' confidence in their ability to enter the labor 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 final scale consists of 27 items rated on a five-point Likert scale. Additionally, the questionnaire included demographic questions regarding gender, age, degree program, and work experience. The full questionnaire items related to the scale are provided in Appendix 1.

Table 1 shows the number of questions asked for each dimension, along with the personal data requested.

To measure self-perceived generic and domain-oriented employability, 9 items have been designed, 4 to measure generic employability (not oriented to any particular field of knowledge)

Table 1 Survey sections.

	Items
Personal Data	5-7
Non-oriented employability (generic employability)	4
Oriented employability (sector-specific employability)	5
Gender equity (in the specific sector)	4
Job quality (in the specific sector)	14
	27

and 5 items to measure employability oriented to a specific sector. These items correspond to the variables GEP1...GEP4 and OEP1...OEP5 respectively. The design is based on the work of Rothwell, Herbert & Rothwell (Rothwell et al. 2008). Specifically, we used the component related to the state of the external labor market and the component related to confidence and opportunity to access employment, both from the point of view of a specific field of study and from the generic point of view. Trullas' adaptation of the Rothwell scale was also used for the design (Trullas et al. 2018).

Four items have been designed to measure the perception of gender equity in jobs in a specific field. These items correspond to the variables GEN1 to GEN4.

For job quality perception, the OECD Job Quality Framework has been used as a reference. Fourteen items related to three components have been designed:

- Income and job status: 4 items. These items correspond to the variables EQS1...EQS4. Based on Pitan & Muller (Pitan and Muller, 2020) and Rothwell, Herbert & Rothwell (Rothwell et al. 2008), with adaptations by Trullas (Trullas et al. 2018).
- Work-life balance: 3 items. These items correspond to variables EQB1...EQB3.
- Work environment quality: 7 items. These items correspond to the variables EQR1...EQR7.

Table 2 provides detailed information on the variables corresponding to each dimension and the associated sub-dimensions.

Procedure. The 27 items shown in Appendix 1 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.

Data analysis. To assess the internal consistency of each dimension of the scale, Cronbach's Alpha coefficient was calculated (Hogan et al. 2000). The reliability study seeks to evaluate whether the scale provides sufficiently stable and consistent results in terms of the rigor with which the different indicators or items measure the same concept.

Additionally, an Exploratory Factorial Analysis (EFA) was also carried out to analyze the interdependence relationships between a set of items, calculating the set of factors that explain these relationships with a smaller number of dimensions.

The resulting model has been validated by means of a Confirmatory Factor Analysis (CFA), which allows the robustness of the construct to be checked (Cea d'Ancona, 2004).

Following the recommendations of Henson & Roberts (Henson and Roberts, 2006) and Kline (Kline, 2023), we conclude that the sample size meets the recommended criteria for both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

Table 2 Scales.

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
Job quality (in the specific sector)		EQ	14
	<i>status</i>	EQS	4
	<i>work-life balance</i>	EQB	3
	<i>reward</i>	EQR	7

The adequacy of the sample size will be further evaluated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s test of sphericity to confirm factorability.

Results

Analysis and validation of the scale. Once the empirical data were obtained, internal consistency and robustness were analyzed.

The internal consistency of each dimension of the scale was assessed using Cronbach’s alpha coefficient. The value of Cronbach’s alpha will indicate to what extent the items of each dimension represent a single concept.

Table 3 shows the Cronbach’s alpha of each variable together with its mean and standard deviation. We can see that the values indicate high reliability for all variables.

We have analyzed how the alpha value varies if one of the items is removed. We observed, for the GEN dimension, that the elimination of GEN4 would lead to a significant improvement in alpha (Cronbach’s Alpha: from 0.85 to 0.93), although it already indicated a high reliability. The increase is not considered relevant enough to eliminate the item, and the final decision is postponed until the confirmatory factor analysis results are reviewed.

Table 4 shows the Cronbach’s alpha for the subdimensions of the EQ variable. In this case, the alpha of EQB is a little below what is commonly accepted as high consistency (0.7).

We have also analyzed how the value of alpha varies if one of the items is eliminated. In 2 cases, for items EQS1 and EQR7, we observed that alpha would increase slightly, for EQS alpha would increase to 0.80 and for EQR to 0.79. As in the previous case, the increase is not considered relevant enough to eliminate the corresponding items, and the final decision is postponed until the confirmatory factor analysis results are reviewed.

In order to analyze and validate the scales, an exploratory factor analysis (EFA) and a confirmatory analysis (CFA) were performed.

The purpose of Exploratory Factor Analysis (EFA) is to analyze the interdependence relationships between a set of items, calculating the factors that explain these relationships with a smaller number of dimensions.

The suitability of factor analysis for the scales was evaluated with the Kaiser-Meyer-Olkin index and Bartlett’s test of sphericity.

A principal components analysis (PCA) and the Varimax rotation technique were used. Kaiser’s criterion (eigenvalues of one or more) extracted seven components. The scree plot showed a clear break after the sixth component. Given this divergence, a parallel analysis was performed using Monte Carlo PCA as recommended by Henson & Roberts (Henson and Roberts, 2006). This analysis indicates that the maximum number of factors to be extracted in the PCA was six.

Table 5 shows the principal components matrix, calculated with Varimax rotation, for six components, where we can see the relationship between items-variable and factors. The correlation matrix was inspected for correlation coefficients greater than to 0.3.

The item analysis confirms that there are sub-dimensions within the EQ variable, as expected.

Table 6 shows the dimension mainly represented by each component.

We observed that there was a moderate overlap between items related to sector status (C4) and employability in a specific sector (C2). Specifically, items EQS2 and EQS3 have a relatively weak relationship with component 2 and load more strongly on component 4. In contrast, item EQS4 loads with equal intensity on the 2 previous components (C2 and C4) and also has a

Table 3 Cronbach's Alpha.

Variable	Cronbach's alpha	mean	SD
GEP	0.90	3.2	0.94
OEP	0.84	4.2	0.62
GEN	0.85	2.2	0.93
EQ	0.84	3.9	0.47

Table 4 Cronbach's Alpha.

Variable	Cronbach's alpha	mean	SD
EQS	0.78	3.9	0.61
EQB	0.68	3.4	0.72
EQR	0.75	4.1	0.51

Table 5 Principal Components Analysis.

Item	C1	C2	C3	C4	C5	C6
GEP1	0.86					
GEP2	0.88					
GEP3	0.87					
GEP4	0.79					
OEP1		0.68				
OEP2		0.71				
OEP3		0.74				
OEP4		0.77				
OEP5		0.75				
GEN2			0.90			
GEN3			0.92			
GEN4			0.89			
GEN5			0.57			
EQS1				0.64		
EQS2		0.34		0.69		
EQS3		0.39		0.50		
EQS4		0.44		0.44	0.34	
EQB1					0.61	0.36
EQB2					0.63	
EQB3					0.74	
EQR1						0.52
EQR2						0.73
EQR3						0.82
EQR4					0.37	0.59
EQR5						0.75
EQR6					0.35	0.50
EQR7				0.45	0.48	

Table 6 Components.

Component	
C1	Generic employability
C2	Oriented employability (sector-specific employability)
C3	Gender equity (in a specific sector)
C4	Job quality—Status of a specific sector
C5	Job quality—Work-life balance in a specific sector
C6	Job quality—Work reward of a specific sector

somewhat weaker relationship with component 5, related to work-life balance in a specific sector.

As we have seen, in the items of the EQS dimension, related to status in a specific sector, there was moderate overlap with the

Table 7 Confirmatory factorial analysis.

Indicator	Value
Chi2	898.802
Df	318
IFI	0.846
GFI	0.802
AGFI	0.765
CFI	0.845
TLI	0.829
RMSEA	0.077

component related to domain-oriented employability. We believe that this overlap may be related to the field in which the questionnaires were conducted, engineering. Occupations with high status and high social prestige tend to be associated with higher employability (Strinić et al. 2022).

In the EQB dimension, related to work-life balance in a specific sector, we observed that item EQB1 had a weak relationship with C6 in addition to the stronger relationship with C5.

We also observed that there was a moderate overlap between items related to work reward in a specific sector (C6) and work-life balance in a specific sector (C5). Specifically, items EQR4 and EQR6 have a relatively weak relationship with component 5 and load more heavily on component 6. In both items, there is minor ambiguity regarding the terms *good environment* and *stability* in items EQR4 and EQR6, respectively, which may be the source of some overlap.

In the case of item EQR7, it loads with similar intensity on components C5 and C4 that do not correspond to the subdimension related to work reward.

In order to minimize interference between the different variables of each dimension or subdimension, we decided to eliminate items EQS4 and EQR7, which do not load significantly on any single component. Their elimination hardly implies any change in the internal consistency (alpha), and therefore their elimination can be considered. In the future, we could try to reformulate these items if deemed necessary.

The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.84, above the recommended value of 0.60 (Pallant, 2020). Bartlett's test of sphericity was significant at $p < 0.001$. The six factors explain about 63% of the variance. We conclude that the use of factor analysis is appropriate for the scales used.

Table 7 shows the main indicators of the confirmatory factor analysis (CFA). The results indicate a reasonable fit and validate the robustness of the construct.

Discussion and conclusion

This study presents the *Job Perception and Expectations Scale*, a new instrument designed to assess self-perceived employability, as well as measuring perceived gender equity and job quality expectations in a specific domain. The results indicate that the scale has high reliability and construct validity, making it a useful tool for understanding students' perceptions of employment prospects.

The findings suggest that career prospects play a crucial role in students' choices of university degrees, aligning with previous research on utility beliefs and career decision-making (Eccles and Wang, 2016; Wang et al. 2017). Notably, gender differences persist in perceptions of employability and job quality, which may partially explain the underrepresentation of women in STEM disciplines. Similar patterns have been observed in prior studies examining gendered career expectations (Diekmann et al. 2011; Kanny et al. 2014).

The scale developed is composed of 27 items. The most commonly cited elements of *career prospects* were selected, including employability, status, salary, work-life balance, social impact (contribution to society), creativity and intellectual challenge, helping people, and a positive work environment. The scale focuses on individuals' self-perception regarding these aspects and has been divided into three categories: *employability* (both generally and within a specific field), *job quality*, and *gender equity*.

The scale showed high reliability for all four dimensions (generic employability, sector-specific employability, gender equity, and employability quality), with values between 0.84 and 0.90.

As previously mentioned, table 5 shows that the dimensions are separable from each other, although there are some correlations between sector-specific employability and employability quality. We suggest that this overlap may be related to the field of study. Occupations with high status and high social prestige tend to be associated with higher employability. There was also evidence that the 3 sub-dimensions of employability quality (status, work-life balance, and reward) are separable, although they also have some correlations between them. Two items (EQS4 and EQR7) were detected that did not significantly load on a single item. In order to minimize interference between the different variables of each dimension or sub-dimension, we decided to eliminate items EQS4 and EQR7. Their elimination hardly implies any change in the internal consistency (alpha), and therefore, their elimination can be considered. In both cases, the rest of the items correctly measure the corresponding sub-dimension.

The indicators of the confirmatory factor analysis indicate a reasonable fit and validate the robustness of the construct.

We believe that the scale developed has great potential for assessing perceptions and expectations of younger generations regarding employability and job prospects. This scale can be used as a complete scale or as several scales associated with the 4 developed dimensions. In either case, it can serve as a diagnostic tool for key stakeholders. The scale is particularly relevant for higher education administrators (e.g., university deans or academic advisors) as they ensure that students receive accurate and realistic information about career prospects before choosing a degree; policymakers and labor market analysts (e.g., government agencies or labor economists) who can use the scale to identify gender disparities in job expectations and implement policies to promote gender equity in high-demand sectors; and industry and human resources professionals, who can leverage these insights to improve recruitment strategies, align job descriptions with young professionals' expectations, and foster inclusive work environments.

The consensus among employability scholars is that if students are better informed about labor market opportunities and motivated, they will make better career choices (Qenani et al. 2014).

Although the study provides valuable insights, it is not without limitations. First, the sample consists exclusively of first-year engineering students from a single university, which may limit the generalizability of the findings to other academic disciplines or geographical contexts. Future research should explore how the perceptions measured by the scale vary across different institutions, academic fields, and cultural settings. Applying the scale in secondary education settings appears to be particularly relevant. The scale certainly has great potential but there is also room for further improvement. Although the reliability scores of the Job Quality subscale are acceptable for a newly developed measure, future research should aim to refine the relatively weaker work-life balance component to enhance overall reliability. In general, the distinction between status, work-life balance, and reward is clear.

While the scale captures perceptions of job quality and gender equity, it does not directly assess the influence of external factors—such as media representations, industry role models, or institutional policies—on students' career decisions. Given the growing body of research on the impact of media narratives on professional stereotypes (Kim et al., 2018; Cheryan et al., 2015), future research could integrate experimental designs to examine how media portrayals shape career expectations.

The *Job Perception and Expectations Scale* provides a valuable framework for assessing students' employment expectations and perceptions of gender equity in different professional fields. While this study focuses on STEM disciplines, the scale can be adapted to other sectors, offering a broader understanding of how young professionals navigate career decision-making. Addressing gender disparities and job quality concerns remains a priority for educators, policymakers, and employers alike. Future research should continue to refine this instrument, integrating broader contextual factors such as media influence, industry culture, and global labor market trends.

Data availability

Data sets generated and analyzed during the current study are available from the corresponding author on reasonable request.

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Author contributions

All authors listed have significantly contributed to the development and the writing of this article.

Competing interests

The authors declare no competing interests.

Ethical approval

This study was conducted in accordance with the ethical standards laid down in the Declaration of Helsinki and Spanish data protection legislation (Ley Orgánica 3/2018). Our study was exempt from formal ethical approval. The exemption was granted following the ethical guidelines of our institution, the Universitat Politècnica de Catalunya (UPC), which align with Spanish legislation (Ley Orgánica 3/2018) and the European GDPR (Reglament UE 2016/679). In accordance with these guidelines, studies based on fully anonymous, voluntary surveys involving adult participants and conducted through online platforms without the collection of sensitive or identifiable data are exempt from full ethical review. As the data collection in this study fulfilled these conditions, formal ethical approval was not required. The survey was conducted during first semester of the 2023–24 academic year, under the supervision of academic staff and in accordance with institutional ethics policy.

Informed consent

Informed consent was obtained from all participants at the beginning of the survey, which took place during first semester of the 2023–24 academic year (from November to January). They were informed about the research purpose, data usage, and their right to withdraw at any time. No personally identifiable information was collected.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-025-05133-y>.

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