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Engineering Students' Industrial Internship Experience Perception and Satisfaction: Work Experience Scale Validation

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Abstract: An essential aspect of higher education institutions' academic curricula for engineering courses is the students' industrial internship programs. In the literature, it is well accepted that such programs provide valuable learning outcomes and increase the graduates' employment prospects. Thus, it is paramount to evaluate the internship programs' quality to identify opportunities to improve their design and implementation. However, that evaluation typically depends on self-designed academic assessment surveys of questionable validity. The purpose of this paper is to assess engineering students' perceptions of their internship experiences. For that purpose, the validation of a recently adapted version of the Work Experience Questionnaire (WEQ) was carried out on a sample of 447 engineering students that participated in industrial internship programs offered by Portuguese public universities and polytechnic schools. A confirmatory factor analysis was performed to confirm the suitability of the model proposed by the WEQ's authors on this study's sample. The psychometric qualities were evaluated through convergent and discriminant validity. The results showed that the model fit the sample well, and convergent and discriminant validity was established. The general competencies subscale was the most important for the participants—specifically, the competency of solving problems. Differences concerning the WEQ and gender, company size, and compensation were found and discussed. This study provides researchers in the field with a new tool validated explicitly for engineering students.

Keywords: industrial; internship; engineering; work experience; satisfaction; student perception

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1. Introduction

In the past few decades, higher education institutions (HEIs) have devoted increasing attention to developing mechanisms for facilitating the integration of graduates into the labor market [1], partly driven by the acknowledgment of the high youth unemployment rates (in Portugal, that rate was 25.4% as of June 2021 [2]), even among educated people, as job competition has become much tighter among tertiary graduates with basically the same credentials [3]. One such mechanism is the internship, having had a notable increase in recent years [4]. Indeed, internships are usually seen to provide students with working skills and facilitate the graduates' transition from HEIs to the market [5] with a considerable amount of work experience [3]. Developed as an optional or compulsory component of many HEIs' programs, internships deliver multiple benefits for participating students [6].

For instance, a study by Gault, et al. [7] indicated significantly more full-time opportunities for graduates with internship experience. In another study, Nunley et al. [8] showed that graduates with internship experience could boost their job interview rate by 14%. Inceoglu et al. [9] found that graduates who completed an internship found employment more quickly.

The combination of formal classroom learning with exposure to the labor market into a designed study program is usually known as work-integrated learning (WIL) [5], although other terms are often used in the literature to address work–education experiences (e.g., vocational education and training, work placement, project-based learning, and experiential education) [10]; also in addition, there are several designations for programs built to provide work–education experiences, namely, cooperative education and internships. Gardner and Bartkus [10] describe the internship as "structured and supervised, involves academic credit, focuses on relevant work experience, and provides students with an opportunity to apply classroom knowledge to real-world practice". An internship is a pedagogical strategy of WIL [1] and means an opportunity for undergraduate students to embody work-related experience into their formal education in an HEI by participating in supervised and planned work in authentic professional environments [11]. Many students that participate in cooperative programs consider internships to be the best strategy to move into the careers they choose [4].

In the engineering education landscape, internships have long been incorporated in curricula, either as an optional experience or compulsory internship courses [1,12–14]. In Portugal, engineering internships tend to be part of the curricula as optional; compulsory internships do not seem to generally create positive effects on labor market outcomes [13]. Although the benefits that internships may bring are well accepted, namely, the development of technical and soft skills, HEIs should manage and improve the effectiveness of their internship programs to provide interns with good learning outcomes [6]. For such a purpose, it is imperative to evaluate the quality of engineering internships to determine better opportunities to improve their design and implementation [12].

In this regard, several studies have been performed, despite having a diversified focus. For instance, Gilbert et al. [15] and Nghia and Duyen [6] studied students' perceived learning outcomes from their internship experiences, such as knowledge and skills. Jackson [5] claimed that the skills-based approach is too short and stated the need for career-management skills. Similarly to Courtney-Pratt et al. [16] and Smith [17], other authors focused on assessing students' perception of their internship's learning environment, namely, authenticity, integrated learning support, feedback from the workplace supervisor, and alignment of teaching and learning activities. Tymon [18] addressed the matter through the students' perspectives on employability and found that there was limited alignment between students' and stakeholders' views. Some studies, in addition, addressed the students' satisfaction with the internship experience [19–29] and suggested measures to improve internship effectiveness, namely, clarification of tasks, communication, and expectations on challenging assignments to be completed in reasonable time [30], together with feedback and mentoring [31].

Other authors addressed the WIL experience by analyzing the relationship between students' perceived learning outcomes and different learning environment factors, e.g., [12,32,33], of which Luk and Chan [12] highlighted four factors. The first factor is the students' perception of clear goals; intended learning outcomes and assessment standards should be adequately communicated to students to form their expectations and enhance their motivation [12]. Martin [33] established that perceived clear goals were positively related to students' learning outcomes. Nevertheless, students often do not know or understand those outcomes [34]. The second factor is the support provided by the workplace supervisor and other staff. This workplace support includes training, advice, regular meetings or discussions with the workplace supervisor, feedback, and discussion of ideas with professionals, thus improving problem-solving, critical thinking, or communication skills [35]. Students' perception of workplace support is positively related to the development of

their generic competencies [35]. The third factor is university support, which is mainly ensured by an academic supervisor (often also playing the internship coordinator role), who prepares the students for the internship, monitors their performance, interacts with the organization when any issue arises, and helps students reflect on their experiences when the internship is over [12]. Student supervision is a key factor underpinning the success of WIL programs [36]. The students' perceived ability to contact their academic supervisor seems to affect self-efficacy, but not other generic competencies [32]. Finally, the fourth factor is the development of generic competencies, which include soft skills, personal attributes, and attitudes [12]. A study by Kelley and Gaedeke [37] found several career preparation skills to be important: oral and written communication, problem solving, analytical skills, computer applications, and leadership and teamwork skills. Floyd and Gordon [38] added that analytical ability, computer applications, creative thinking, information searching, and problem solving were found to be significant to several disciplines, with different degrees of importance with respect to the industry. As engineering education is concerned, defining what skills and qualities a graduate engineer should master to better face market needs has been debated [39,40]. A set of attributes that should be met in engineering education, covering technical aspects and soft skills, include: applying knowledge of mathematics, science, and engineering, using the techniques, skills, and modern engineering tools necessary for engineering practice, designing and conducting experiments, designing a system, component, or process to identify, formulate, and solve engineering problems, and analyzing and interpreting data [41]. Several research studies reported that engineering students referred to communication and interpersonal, teamwork, problem-solving, time management, critical thinking, adaptability, confidence, independence, creativity, and perseverance skills as learning outcomes from their internship experiences [11,42]. However, there are differences in students' perceptions of soft skills improvement following their internship experiences; not all competencies are perceived to develop to the same extent [42,43], which implies that a single internship course providing the development of all generic competencies is questionable [44].

Despite the afore-mentioned importance of assessing engineering students' perceptions of their internship learning experiences, the reported studies that evaluated WIL courses in different fields [6,16,17,33] did not necessarily apply to the engineering scope. Current evaluations of engineering internship courses primarily depend on self-designed assessment instruments with weak or no validity evidence [11,12].

To specifically evaluate the engineering students' internship experiences, Luk and Chan [12] developed and validated an instrument adapted from Martin's Work Experience Questionnaire [33]. This instrument consists of four scales, forming a questionnaire covering the concepts mentioned above: clear goals (four items), workplace support (three items), university support (three items), and generic competencies (five items). Luk and Chan [12] applied this questionnaire to a sample of 271 engineering students within Hong Kong's tertiary education context; they found it reliable and valid in reflecting engineering students' perceptions of clear goals, workplace support, university support, and development of generic competencies in their internship courses.

This study aims to assess the perception of the internship experience through the validation of a recently adapted version of the WEQ by applying it to a sample of 447 engineering students from Portuguese universities and polytechnic schools and assessing students' satisfaction concerning their internship work experience. Our hypotheses are:

Hypotehsis 1 (H1). *The validated WEQ instrument presents a well-adjusted model to the sample.*

Hypothesis 2 (H2). *The general competencies subscale is the most valued and the university support subscale is the least valued.*

The remainder of the article presents the materials and methods, followed by the results obtained and the respective discussion.

2. Materials and Methods

2.1. Procedures

After requesting authorization from the authors of the instrument for it to be used in the Portuguese population, we proceeded with its translation and back-translation according to the guidelines of Streiner et al. [45] and Harkness et al. [46]; these authors suggested a four-stage process of translation: (1) forward translation, (2) back-translation, (3) expert reviews, and (4) adjustments. Table 1 (Appendix A) shows the Portuguese resulting version of the Working Experience Questionnaire. The study was publicized through Facebook and LinkedIn to attract participants. The criteria for inclusion of participants in the study were to have Portuguese nationality and to be over 18 years old. The survey protocol was published using SurveyMonkey® and included an informed consent form, which described the study's objectives. Data were collected between 1 April and 15 May 2021. The anonymity and confidentiality of the data were guaranteed.

2.2. Sample

The sample consisted of 447 participants, and most of the sample was male (N = 324; 72.5%), with a mean age of 23.59 years (SD = 4.30), and was mostly from the north of Portugal (N = 395; 88.4%).

Participants were all engineering students from different specialties, mainly electrical engineering (N = 267; 59.7%), followed by civil engineering (N = 55; 12.3%), chemical engineering (N = 31; 6.9%), electronic engineering (N = 29; 6.5%), mechanical engineering (N = 25; 5.6%), computer engineering (N = 17; 3.8%), environmental engineering (N = 11; 2.5%), biomedical engineering (N = 7; 1.6%), and other (N = 5; 1.1%). All students carried out an industrial internship during their training; 344 (77%) carried out theirs just before the COVID-19 pandemic and 103 (23%) did so during it.

Only four participants (0.9%) performed an internship that extended over a year. The internships lasted between 11 and 12 months for 27 students (6%), between 8 and 10 months for 49 (11%), between 5 and 7 months for 187 (41.8%), and between 2 and 4 months for 157 (35.1%). Finally, 23 students (5.1%) performed an internship with a duration equal to or less than one month. Most internships (N = 421; 94.2%) took place in Northern Portugal. A large proportion of the companies where those internships occurred were small companies (N = 190; 42.5%), followed by large companies (N = 162; 36.2%) and medium companies (N = 95; 21.3%). Most of the sample (N = 245; 54.8%) did not receive any economic compensation for having completed the internship. About a quarter of the sample (N = 120; 26.8%) received a food subsidy; 18 people (4%) received support for transport, and three (0.7%) received service mobile phones; finally, 61 people (13.6%) received other compensations.

2.3. Instrument

The investigation protocol contained a sociodemographic questionnaire and the Work Experience Questionnaire (WEQ). The sociodemographic questionnaire included questions related to gender, age, birth country zone, scientific area of expertise, duration, period of internship (before or after the COVID-19 pandemic), locale of internship, company size, and compensation.

The WEQ used in this study was the modified version of Martin's questionnaire [33] by Luk and Chan [12]. Martin [33] developed the WEQ to measure students' learning experiences in placements by using students from different courses. The WEQ was based on the Course Experience Questionnaire (CEQ) [47], assesses students' teaching and learning experiences in their university courses. According to the authors of the modified version [12], the WEQ aims to evaluate the perception of the internship experience, although those authors validated it only on engineering students. This version of the questionnaire includes 15 items distributed among four subscales (clear goals, university support, work support, and generic competencies). The 15 items were answered on a five-point Likert scale: 1—strongly disagree, 2—disagree, 3—neutral, 4—agree, and 5—strongly agree. The higher the questionnaire value, the better the perception of the internship experience. The

authors reported Cronbach's alpha for the four subscales: clear goals ($\alpha = 0.63$), university support ($\alpha = 0.70$), work support ($\alpha = 0.72$), and generic competencies ($\alpha = 0.79$).

The protocol includes an item that assesses overall satisfaction with the internship; however, this item is not part of the WEQ.

2.4. Data Analysis

Descriptive statistics were calculated to assess the data distribution's normality and characterize students' demographics and their internship experiences. The skewness and kurtosis values guaranteed the assumption of normality, supporting the use of parametric tests for the subsequent data analysis. For Hair et al. [48] and Byrne [49], data are considered normal if skewness is between −2 and +2 and kurtosis is between −7 and +7.

Confirmatory factor analysis (CFA) was carried out to investigate whether the items followed the hypothesized factor structure proposed by the authors. A good fit is generally suggested by a comparative fit index (CFI) value of above 0.95, a Tucker–Lewis' coefficient of above 0.95, a standardized root mean square residual (SRMR) value below 0.08, a root mean square error of approximation (RMSEA) value below 0.05 and a PCLOSE value above 0.050 [50,51]. Reliability, convergent, and discriminant validity were assessed to evaluate the quality of the model. Reliability was examined with the Cronbach's alpha values; according to Cortina [52], a minimum α coefficient should be between 0.65 and 0.8 (or higher); α coefficients that are less than 0.5 are unacceptable. Convergent validity was calculated with the composite reliability (CR) and average variance extracted (AVE) values; discriminant validity was assessed with the AVE square roots. The AVE and CR should be higher than the thresholds of 0.50 and 0.70, respectively; the square roots of the AVE values should be higher than the cross-correlations [53].

Differences were tested with a *t*-test for dichotomous variables and ANOVA for variables with three or more response modalities. In addition, Pearson correlation analyses were used to investigate the relationships between the four factors identified in the CFA and their relations with continuous variables.

Statistical analysis was performed using SPSS version 27.0, and confirmatory factor analysis (CFA) was run using AMOS version 27.0.

3. Results

3.1. Descriptives

Table 1 shows the descriptive statistics of the Work Experience Questionnaire items and subscales. Regarding the items, item 3 of the generic competencies subscale ('The internship has developed my ability to solve problems') had the highest mean, and item 1 of the university support subscale ('My department was very helpful in preparing me to look for an internship') had the lowest. Concerning the subscales, the general competencies subscale presented the highest mean, and the university support subscale presented the lowest one. All items and subscales presented skewness and kurtosis values within the reference values, ensuring their normal distribution. Cronbach's alpha values were also within the reference values.

3.2. Work Experience Questionnaire Validation

A confirmatory factorial analysis of the WEQ was carried out based on the data from this study to confirm the model proposed by the authors' instrument. However, the model fit was found to be poor [$\chi^2(91) = 3.927$; CFI = 0.924; TLI = 0.912; RMSEA = 0.081; PCLOSE = 0.000; SRMR = 0.056]. After establishing the correlations between the errors (all correlations within the same factor) suggested by the modification indices (higher than 11; $p < 0.001$) [54], the model fit the data well [$\chi^2(80) = 2.550$; CFI = 0.965; TLI = 0.954; RMSEA = 0.059; PCLOSE = 0.069; SRMR = 0.051] (Figure 1).

Table 1. Description of the items and subscales of the Working Experience Questionnaire and Cronbach's alpha (N = 447).

	Min	Max	M	SD	Sk	Kt
Clear goals (α = 0.84)	1	5	3.55	0.88	−0.42	−0.22
1. It was clear right from the start what I was expected to learn from the internship.	1	5	3.62	1.03	−0.41	−0.25
2. I was clear about how I would be assessed.	1	5	3.44	1.13	−0.39	−0.60
3. It was easy to know the standard of work expected of me in the internship.	1	5	3.52	1.06	−0.42	−0.41
4. I usually had a clear idea of what I was doing during the internship.	1	5	3.61	1.05	−0.59	−0.14
University support (α = 0.72)	1	5	3.41	1.07	−0.43	−0.50
1. My department was very helpful in preparing me to look for an internship.	1	5	3.20	1.45	−0.21	−1.30
2. My academic supervisor (i.e., university training manager) was extremely supportive.	1	5	3.57	1.29	−0.50	−0.88
3. My academic supervisor helped me speak to the company when a problem arose.	1	5	3.47	1.25	−0.46	−0.71
Workplace support (α = 0.85)	1	5	3.68	1.01	−0.69	−0.12
1. My work supervisor tried to make the work experience interesting.	1	5	3.81	1.14	−0.84	−0.02
2. I was given useful feedback on my work.	1	5	3.47	1.18	−0.42	−0.71
3. My work supervisor motivated me to do my best work.	1	5	3.76	1.16	−0.78	−0.17
Generic competencies (α = 0.86)	1	5	3.75	0.85	−0.80	0.70
1. The internship helped to develop my ability to plan and organize my day-to-day work.	1	5	3.89	1.03	−0.92	0.46
2. The internship sharpened my analytic skills.	1	5	3.86	0.99	−0.83	0.48
3. The internship developed my ability to solve problems.	1	5	3.92	0.97	−0.79	0.35
4. The internship developed my ability to work as a team member.	1	5	3.65	1.21	−0.64	−0.46
5. As a result of the internship, I feel confident about tackling unfamiliar work-based problems.	1	5	3.45	1.03	−0.45	−0.24
Global assessment						
Globally, I was satisfied with my internship.	1	5	3.70	1.05	−0.63	−0.10

Min = minimum; Max = maximum; M = mean; SD = standard deviation; Sk = skewness; Kt = kurtosis.

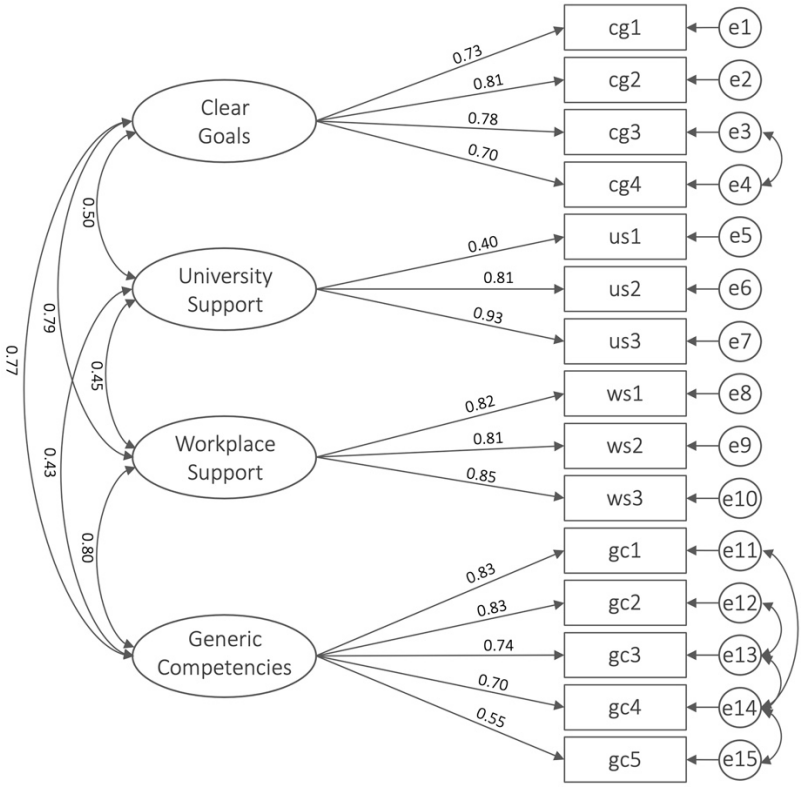

Figure 1. Confirmatory factorial analysis of the WEQ.

3.3. Convergent and Discriminant Validity

Table 2 presents the inter-scale correlations along with the convergent and discriminant validity coefficients. Convergent validity was calculated with the composite reliability (CR) and average variance extracted (AVE) values. The results show that the AVE and CR were higher than the thresholds of 0.50 and 0.70, respectively [53]. The results also show that each factor was significantly correlated with the other ($p < 0.01$). The square roots of the AVE values (reported in the off-diagonal, Table 2) were higher than the cross-correlations; therefore, the convergent and discriminant validity of the WEQ were established.

Table 2. Correlations between the WEQ subscales, AVE, AVE square roots, and CR.

	1	2	3	4	AVE	CR
1 Clear goals	0.822				0.676	0.893
2 University support	0.383 *	0.708			0.501	0.741
3 Work support	0.647 *	0.342 *	0.757		0.573	0.801
4 Generic competencies	0.658 *	0.330 *	0.671 *	0.807	0.652	0.903

* $p < 0.001$; AVE = average variance extracted; CR = composite reliability; bold (diagonal) = AVE square roots.

3.4. Differences

No statistically significant differences were found in the values of the WEQ subscales in relation to gender, except for the work support subscale [$t(445) = 2.288$; $p = 0.023$; $d = 1.01$], where males ($M = 3.75$; SD = 0.98) presented higher values than females ($M = 3.50$; SD = 1.08). In addition, concerning the size of the company where the internship took place, no statistically significant differences were found in the values of the WEQ subscales, except for the university support subscale [$F(2, 444) = 6.847$; $p = 0.001$; $\eta^2 = 0.030$], where participants who took part in an internship in small companies ($M = 3.20$; SD = 1.09) had significantly lower values than those who took part in a medium ($M = 3.52$; SD = 0.97) or large company ($M = 3.60$; SD = 1.05). Finally, participants who did not receive any type of remuneration ($M = 3.65$; SD = 0.88) had lower values in the generic competencies subscale than those who received any type of remuneration ($M = 3.87$; SD = 0.78) [$t(445) = -2.728$; $p = 0.007$; $d = 0.84$]. No differences were found in the values of the WEQ subscales concerning the period of the internship (before or during the COVID-19 pandemic).

There were statistically significant differences in global satisfaction with the internships in relation to gender [$t(445) = 2.202$; $p = 0.028$; $d = 0.233$], where males ($M = 3.77$; SD = 1.02) presented higher values than females ($M = 3.53$; SD = 1.09). There were statistically significant differences concerning overall satisfaction with the internships depending on the size of the company [$F(2, 444) = 3.219$; $p = 0.041$; $\eta^2 = 0.120$], with students who carried out an internship in a large company expressing more satisfaction ($M = 3.87$; SD = 1.06) with the internship than those who carried out an internship in a medium ($M = 3.62$; SD = 1.04) or small company ($M = 3.60$; SD = 1.01). No differences were found in the values of the global satisfaction with the internship concerning the period of the internship (before or during the COVID-19 pandemic).

3.5. Correlations

Age only correlated significantly with the clear goals subscale, although the correlation coefficient was very low ($r = 0.099$; $p < 0.050$). In addition, the internship duration was positively and significantly correlated with the generic competencies subscale ($r = 0.167$; $p < 0.001$).

The item that assessed overall satisfaction with the internship was positively and significantly correlated with all WEQ subscales: clear goals ($r = 0.671$; $p < 0.001$), university support ($r = 0.356$; $p < 0.001$), work support ($r = 0.680$; $p < 0.001$), and generic competencies ($r = 0.813$; $p < 0.001$). Overall satisfaction also correlated positively and significantly with company size ($\rho = 0.110$; $p < 0.01$).

4. Discussion and Conclusions

The purpose of this paper was to assess the perception of the internship experience through the validation of a recently adapted version of the Work Experience Questionnaire (WEQ) in a sample of 447 engineering students who participated in industrial internship programs offered by Portuguese public universities and polytechnic schools, as well as to explore their satisfaction.

To this end, the psychometric qualities of the WEQ were analyzed; all items and subscales presented skewness and kurtosis values within the reference values, ensuring their normal distribution [42,43]. Furthermore, the Cronbach's alpha values were also within the reference values; according to Cortina [52], a minimum α coefficient should be between 0.65 and 0.8 (or higher), and α coefficients less than 0.5 are unacceptable.

In addition, a confirmatory factorial analysis of the WEQ was carried out to confirm the model proposed by the authors' instrument; after establishing the correlations between the errors (all correlations within the same factor) suggested by the modification indices (higher than 11; $p < 0.001$) [48], the model fit the data well. Convergent validity, which was assessed by using the CR and AVE values, was achieved, and AVE and CR were higher than the thresholds. The square roots of the AVE values were higher than the cross-correlations; therefore, the discriminant validity of the WEQ was established [47]. Each factor was significantly correlated with the others. These results confirmed our first hypothesis (H1).

The mean values of all items and all subscales are above the mean and at least one standard deviation, which means that, globally, students perceived the internship as something positive and as a source of learning, meeting what the institutions that provide this type of learning think [4,5]. The item of the generic competencies subscale that assessed the statement 'The internship has developed my ability to solve problems', as well as the general competencies subscale, presented the highest mean. These results confirmed our second hypothesis (H2). This is in line with the authors who considered an internship as an activity focused on relevant work experience that provides students with an opportunity to apply classroom knowledge to real-world practice [10,11]. These results also meet those of Jackson [5], who found that the skills-based approach is too short and stated the need for career-management skills. In addition, several authors showed the importance of generic skills, namely, Kelley and Gaedeke [37] and Floyd and Gordon [38].

Despite institutions' commitment to internships, this study's sample showed that the item of the university support subscale 'My department was very helpful in preparing me to look for an internship' was the lowest valued, along with the university support subscale. This may be related to the fact that engineering internships in Portugal tend to be optional because compulsory internships do not seem to raise positive effects on labor market outcomes [13]. However, research suggests that student supervision is a key factor underpinning the success of WIL programs [30].

Significant differences were found in the values of the WEQ subscales, especially in gender for the work support subscale, where males presented higher values than females. These results contradict those of Wahlqvist et al. [55], who found that female students had significantly more work experience than men (in health care). Smith and Gayles [25] suggested that women experience bias in both academic and work settings, and even more often in the workplace through internship experiences. This may explain why there were statistically significant differences in global satisfaction with an internship in relation to gender, as males presented higher values than females.

In addition, concerning the size of the company at which the internship took place, statistically significant differences were found concerning the university support subscale. The participants who took an internship in small companies had significantly lower values than those in medium or medium-large companies. These results suggest that there is more investment by academic supervisors when an internship takes place in a large company, which is in line with the findings of Kramer-Simpson [26], who stated that academic internship coordinators find it most effective to select strong industry mentors from strong companies and then cultivate these relationships across years of internship

interactions. This may contribute to an explanation of why there are statistically significant differences concerning overall satisfaction with the internship depending on the size of the company, with students who carried out an internship in a large company expressing more satisfaction with the internship than those who carried out the internship in a medium or small company.

Participants who did not receive any remuneration had lower values in the generic competencies subscale than those who received some sort of compensation. According to Jeske and Axtell [27], reward conditions are determined based on the (un-)availability of training and payment in internships; also, when interns are provided remuneration and have access to training, they may be considered as being in the higher reward condition.

The internship duration was positively and significantly correlated with the generic competencies subscale; the longer the internship, the more generic competencies could be acquired. According to Azmi et al. [30], the length of six months is the optimal period for an undergraduate to learn technical and non-technical skills and to gain work experience. Azmi et al. [28] found that employers prefer the period of six months for engineering students in order for them to identify, study, comprehend, and employ the skills learned during the internship.

The item that assessed overall satisfaction with the internship was positively and significantly correlated with all WEQ subscales, especially with the generic competencies. This is in line with the findings of [12], who found that most engineering interns perceived the development of technical competencies (e.g., information technology skills), but also generic non-technical competencies (e.g., teamwork skills and positive attitudes). Moreover, satisfaction with internships is related to how well it prepares the students for their entry into the world of work [29].

In conclusion, this study provided evidence of the reliability and validity of the WEQ in a sample of engineering students in Portugal. It was found that, globally, students appreciated their internship positively and expressed satisfaction with it. Gender, internship duration, and remuneration are key factors that impact students' appreciation of an internship. We now have a validated instrument with which to assess engineering students' perceptions of and satisfaction with internships; no instrument that allowed for studying those dimensions existed until now. It allows one to tailor the internship offer by considering what students think is important to them.

One can mention the relatively small sample size and the quantitative nature of the study as its limitations. In fact, some aspects addressed by the questionnaire would deserve to be deepened through a qualitative methodology. Thus, future studies should expand the questionnaire with the inclusion of open questions on the topics covered. In addition, the inclusion of more engineers in the labor market could provide a medium- and long-term perspective on the role of internships in preparing engineers.

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Appendix A

Adapted WEQ—Portuguese Version.

Table 1. Working Experience Questionnaire items (Portuguese version).

	Discordo Totalmente				**Concordo Totalmente**
1—Ficou claro desde o início o que era esperado aprender com o estágio	☐	☐	☐	☐	☐
2—A avaliação do trabalho de estágio estava bem definida	☐	☐	☐	☐	☐
3—Foi fácil perceber a dimensão do trabalho que me era esperado pela empresa	☐	☐	☐	☐	☐
4—Tinha uma ideia clara das tarefas a desenvolver durante o estágio	☐	☐	☐	☐	☐
5—A experiência de estágio ajudou a desenvolver a minha capacidade de planear e organizar o trabalho diário	☐	☐	☐	☐	☐
6—O estágio desenvolveu as minhas competências analíticas	☐	☐	☐	☐	☐
7—A experiência de estágio desenvolveu a minha capacidade de resolver problemas	☐	☐	☐	☐	☐
8—O estágio desenvolveu as minhas competências de trabalho em equipa	☐	☐	☐	☐	☐
9—Em resultado do estágio, sinto-me preparado(a) para resolver qualquer problema que seja proposto	☐	☐	☐	☐	☐
10—A instituição de ensino ajudou-me na angariação do estágio	☐	☐	☐	☐	☐
11—O orientador académico deu-me todo o apoio necessário	☐	☐	☐	☐	☐
12—O orientador académico interferiu quando surgiu algum problema no estágio	☐	☐	☐	☐	☐
13—O orientador na empresa tentou que a minha experiência de estágio fosse interessante	☐	☐	☐	☐	☐
14—A empresa foi dando retorno sobre o desenvolvimento do meu trabalho de estágio	☐	☐	☐	☐	☐
15—O orientador na empresa incentivou-me a dar o meu melhor	☐	☐	☐	☐	☐
16—Globalmente, fiquei satisfeito/a com o meu estágio.	☐	☐	☐	☐	☐

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