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Student profiles and the development of employability skills in innovation environments

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Abstract

Objective: This study aimed to identify the skills required of accountants to work in innovation environments and to compare their predisposition to develop such skills in a multidisciplinary sample of undergraduate students.

Method: Data on desirable skills were collected from job advertisements and through interviews with managers. A questionnaire was applied to collect data on student profiles, yielding 465 responses. The content of the advertisements and the results of the interviews were analyzed using a multiple linear regression model to understand the relationships between students' characteristics and their predisposition to develop the required skills.

Results: The results showed that technology and technology-based companies value a set of skills that can be divided into two main categories: (i) intrapersonal skills, which include dynamism, autonomy, attention to detail, proactivity, resilience, adaptability, and hands-on skills; and (ii) interpersonal skills, which include oral and written communication, empathy, and teamwork. The profiles of the students in the sample showed that genders were similarly distributed, the participants were on average 25 years old, and most were white, single, enrolled in evening programs, and had attended less than two years of coursework. The analysis of the relationship between student profiles and predisposition to develop skills revealed that characteristics such as program shift, marital status, gender, extroversion, and sensation function influence this predisposition.

Contributions: This study presents significant contributions, as it fosters debate on teaching with an emphasis on employability skills. Furthermore, by revealing the importance of these skills and providing information to support curriculum development, it aids in training more qualified professionals. For employers, educators, and program coordinators, it can support planning and highlight the need for teaching methods that serve all students in diverse ways.

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1 Introduction

Technological transformations have significantly impacted the labor market and education, widening the gap between academic instruction and professional practice. In this context, educators worldwide are challenged to provide students more opportunities for the development of employability skills (Tsiligiris & Bowyer, 2021; Webb & Chaffer, 2016).

Relevant changes were witnessed among accounting professionals as well, especially in terms of skills. Studies, such as Bala and Singh (2021), Banasik and Jubb (2021), Mhlongo (2020), Miranda et al. (2021), Lira et al. (2021), Phan et al. (2020), Santos et al. (2021), and Tsiligiris and Bowyer (2021), show that companies require, in addition to specific knowledge, adaptability, proactivity, commitment, good communication, strong interpersonal skills, the ability to manage conflicts effectively, dynamism, flexibility, and team spirit. These are considered essential skills for employability and can provide the foundation for entering and remaining in the job market.

Other studies, such as those by Briggs et al. (2007), Suddaby et al. (2009), and Wetmiller and Barkhi (2021), have investigated the effect of personality on performance, changes in cognitive styles, and new market demands. These studies sought to understand how to better align students' personalities with the accountant's profile and how the traditional image of an accountant, associated with specific personality traits, can influence career choice. In this context, the need for educational institutions to recognize students' profiles and develop strategies to reorganize teaching is reinforced, as confirmed by Ketonen et al. (2016, p. 147): "Recognizing different student profiles can facilitate the provision of personalized support to them."

Thus, understanding the job market's skill requirements for future accounting professionals, as well as students' predisposition to develop these skills, may be essential to minimizing the gap noted by Jackson (2020), Landsberg and Van Den Berg (2023), and Phan et al. (2020).

From this perspective, in addition to elements of human capital theory—such as qualification, income, and experience—the literature increasingly highlights aspects related to cultural and social capital as important predictors of academic performance, especially in light of recent technological transformations and social pressures (Tsiligiris & Bowyer, 2021; Helal et al., 2007; Draelants & Ballatore, 2021; Mikus et al., 2020; Raudenská, 2022).

Given the previous discussion, this study aimed to identify the skills required of accountants working in innovation environments and to compare them with students' predisposition to develop such skills in a multidisciplinary sample of higher education students. Accordingly, the study proposes to analyze students' profiles based on constructs derived from Schultz's (1961) human capital theory, Bourdieu's (1998) cultural and social capital, and Jung's (1991) psychological types.

Although several studies have already addressed the topic, it remains unclear whether the phenomenon of "skills-based qualification" applies uniformly across companies in different cultural, professional, and educational contexts. Prior research has examined the organizational environment and the role of universities in professional training, as well as the skills most in demand in the job market and the impact of students' profiles on academic performance. This study, however, offers an innovative approach by simultaneously considering psychological, social, cultural, and economic dimensions and their relationship with students' predisposition to develop the skills most needed in work environments characterized by greater uncertainty. In addition to interviews, the analysis of job advertisements from technology companies helped identify these skills by providing a broader view of the market.

This study's results corroborate previous research, emphasizing the importance of intrapersonal skills such as dynamism, attention to detail, proactivity, resilience, and adaptability; and (ii) interpersonal skills, including oral and written communication, empathy, and teamwork (Banasik & Jubb, 2021; Miranda et al., 2021; Mhlongo, 2020; Lira et al., 2021; Phan et al., 2020; Santos et al., 2021; Tan & Laswad, 2018; Tsiligiris & Bowyer, 2021; WEF, 2023). The only intrapersonal skills not supported by the literature are autonomy and a hands-on approach.

Furthermore, the relationship between students' profiles and their predisposition to develop skills was analyzed using a multiple linear regression model to examine the extent to which human capital, cultural capital, social capital, and psychological types influence employability skills development. The results indicate that program shift, marital status, and gender were statistically significant predictors in the model. Additionally, the psychological types "extroverted attitude" and "sensation function" were significant, suggesting the model explains these relationships. The remaining characteristics (human capital, social capital, cultural capital, income, and age) were not statistically significant. Although Briggs et al. (2007), Swain and Olsen (2012), and Wetmiller and Barkhi (2021) also examined the psychological profiles of accounting students, they did not identify a relationship with predisposition for skill development, which limits direct comparison with the present findings.

Nevertheless, this study suggests that more extroverted students are more likely to develop interpersonal skills, while those with a stronger sensation function are more likely to develop intrapersonal skills. This interpretation is plausible, considering that extroverts tend to be more sociable and communicative, whereas individuals with a sensation orientation are typically more grounded, practical, and focused on concrete details.

This study presents relevant contributions both to professional and educational practice and to the advancement of knowledge in the area of Accounting Sciences, with the potential to generate positive impacts on society as well.

The results highlight the need for higher education institutions to adapt their curricula to incorporate the development of intrapersonal and interpersonal skills, alongside technical knowledge. For accounting professionals, the findings reinforce the importance of cultivating a profile that aligns with the current job market demands, which increasingly value these skills. Companies, in turn, can use the findings to enhance their recruitment and selection processes by seeking professionals who possess the identified essential skill set.

This study contributes to the literature by offering an updated overview of the skills required for accounting professionals in innovation environments. It also advances knowledge by examining the relationship between students' profiles and their predisposition to develop these skills, presenting new perspectives for the field and addressing a gap left by the studies of Briggs et al. (2007), Swain and Olsen (2012), and Wetmiller and Barkhi (2021). The findings challenge the traditional view of accounting as a strictly technical field and underscore the need for more well-rounded professionals with multidisciplinary skills.

Finally, by emphasizing the importance of developing interpersonal and intrapersonal skills, this study contributes to the training of professionals who are better prepared to meet contemporary challenges. Indirectly, this may positively impact society as a whole, with professionals more capable of driving innovation, fostering economic development, and addressing complex problems.

2 The Phenomenon of Employability and its Essential Skills

Employability has been defined as the ability of individuals to apply a range of skills in new and diverse areas within an organization. The concept is associated with the workforce's capacity to adapt to the evolving demands of the labor market and organizational environments, where remaining employed requires more than technical competence or problem-solving ability—it also involves understanding symbolic, cultural, social, and value-related aspects, which are primarily shaped by human behavior (Helal & Rocha, 2011).

In addition to obtaining and retaining a job, the concept also encompasses an individual's ability to transition between jobs with relative ease, based on the knowledge and values they possess (Forrier & Sels, 2003). The literature suggests that, in a sense, employability conveys a form of job security or mobility.

According to Bala and Singh (2021), employability skills are teachable and essential for entering the job market. These skills are also referred to as essential, basic, generic, social, soft, key, behavioral, and transversal skills, among other terms.

Some authors, such as Bala and Singh (2021), Banasik and Jubb (2021), Mhlongo (2020), Miranda et al. (2021), Lira et al. (2021), Phan et al. (2020), Santos et al. (2021), and Tsiligiris and Bowyer (2021), highlighted in their studies the most common essential skills for employability, as summarized in **Table 1**. These skills were classified as intrapersonal, interpersonal, and cognitive (or intellectual). The study conducted by the World Economic Forum (WEF, 2023) also found that the most essential skills were, for the most part, behavioral (intrapersonal/interpersonal).

Table 1.
Classification of essential skills most commonly required in the literature

Intrapersonal Skills	Interpersonal Skills
Adaptability	Collaboration skills
Ethics	Oral/written communication
Presentation, discussion and defense of points of view	Listening skills
Acting in accordance with legislation	Leadership and management
Commitment	Ability to work with people from different backgrounds
Emotional intelligence	Ability to work as part of a team
Proactivity	Cognitive/Intellectual
Resilience / Motivation	Technology literate
Positive attitude	Creativity and innovation
Continuous personal and professional development	Time management
	Critical/analytical thinking
	Ability to identify/solve problems
	Decision making

In this context, it is important to consider the specific skills required to work in environments shaped by new technologies—not only technical qualifications but also interpersonal and intrapersonal skills. As demonstrated, few of the studies analyzed have addressed the skills needed in the technological (or digital) market specifically for accounting professionals, confirming a gap in the literature for this business context. Although, emerging studies such as Jackson et al. (2022), Khan et al. (2022), Landsberg and Van Den Berg (2023), Qasim and Kharbat (2020), and Tsiligiris and Bowyer (2021) have expressed concerns about teaching accounting in the context of new technologies and evolving markets.

3 Theoretical for Research Hypotheses

3.1 Human Capital Theory

Theodore W. Schultz, one of the recipients of the Nobel Prize in Economics in 1968, was a leading proponent of Human Capital Theory. Schultz (1961) defined five types of investments as key activities that enhance human capabilities: (i) infrastructure and health services available to the population; (ii) workplace training, such as vocational education; (iii) formally organized education, including primary, secondary, and higher education; (iv) adult education programs; and (v) migration of individuals and families to access new employment opportunities. Although implicit, it is important to note that these categories are broadly defined and serve as indicators used to measure the level of human capital within a region or nation.

Helal et al. (2007) summarize Schultz's categories as: education (qualification), migration, individuals' health and nutritional conditions, and professional training. These authors argue that the greater the stock of human capital, the higher the level of employability. However, employment opportunities are not determined solely by individual elements of human capital; in the current context of technological change, factors related to cultural and social capital must also be considered—particularly those tied to family, social, and organizational flexibility, such as relationship skills and other aspects associated with cultural environments, including norms and ethical behavior (Helal et al., 2007).

Thus, considering that one of the objectives is to identify the relationship between the level of human capital and the predisposition to develop essential employability skills, this study adopted qualifications, work experience, and income—both individual and aggregated—as indicators to construct the human capital variable (Helal et al., 2007).

Santos et al. (2025), Rodríguez-Hernández et al. (2020), and Brook and Roberts (2021) consider that socioeconomic conditions, qualifications, experience, and other student characteristics are important factors in explaining academic performance. Rodríguez-Hernández et al. (2020) argue that the relationship between socioeconomic conditions and academic performance in higher education changes when additional variables are taken into account. Brook and Roberts (2021) found significant relationships between internship experience and performance; students who completed internships demonstrated better overall performance. Therefore, this study assumes that students with better socioeconomic conditions, qualifications, and experience exhibit a greater predisposition to develop the skills required by the job market. Accordingly, the following hypothesis is proposed:

H1: Students' human capital has a positive impact on their predisposition to develop employability skills.

Although gender is not part of the Human Capital construct, it was included as a control variable. There is a consensus in the literature regarding the relevance of gender in explaining academic performance. Studies such as those by Al Husaini and Shukor (2022), Cornachione et al. (2010), Rahman et al. (2023), Nasu (2020), B. Rodrigues et al. (2016), D. Rodrigues et al. (2017), Santos (2012), and Takeuchi (2022) highlight the importance of gender in understanding study habits and styles, time to graduation, learning levels, and personal behavior, among other aspects (Al Husaini & Shukor, 2022).

Rahman et al. (2023), Cornachione et al. (2010), and Takeuchi (2022) argue that female students perform better than male students, while B. Rodrigues et al. (2016), D. Rodrigues et al. (2017), and Santos (2012) found evidence that male students tend to outperform female students. Although there is no consensus in the literature (Nasu, 2020), evidence suggests that female students may be more predisposed to developing interpersonal skills. This hypothesis is supported by studies indicating a greater effect of training in interpersonal and socioemotional skills among women (Ajayi et al., 2022; Camargo et al., 2021; Acevedo et al., 2020). These studies link the development of such skills in women to their increasing participation and qualification in the labor market. The study by Acevedo et al. (2020) demonstrated positive labor market outcomes and greater development of personal skills among women. Additionally, the literature points to female advantages in skills such as oral communication (Braga et al., 2014), cooperation (Cunningham et al., 2016), empathy (O'Brien et al., 2013), and leadership (Paola et al., 2018). In this context of transformations in the Brazilian labor market and the pursuit of gender equality, the following hypothesis is proposed:

H2: Being a woman positively impacts the levels of predisposition for the development of skills.

3.2 Theory of Cultural Capital

The Theory of Cultural Capital, developed by French sociologist Pierre Bourdieu in the mid-1960s, sought to explain disparities in students' academic performance. At the time, Bourdieu examined the relative influence of economic and cultural factors on students' educational outcomes and argued that cultural factors play a more significant role in shaping academic achievement (Draelants & Ballatore, 2021, p. 2).

The concept of cultural capital has evolved since its inception, but it remains one of the core ideas in the sociology of education (Draelants & Ballatore, 2021). According to Raudenská (2022), DiMaggio and Bourdieu offer the most influential explanations regarding the significance of cultural capital.

Thus, the variables were selected based on Bourdieu's definition of Cultural Capital, using DiMaggio's approach to construct the Cultural Capital measure. Proxies were chosen to better align with the proposed model, drawing on adaptations from Mendes and Costa (2015) and Raudenská (2022). These variables quantify the frequency of: (i) visiting museums and art exhibitions; (ii) attending plays, violin concerts, and classical music performances; (iii) traveling to explore new cultures; and (iv) reading literary fiction.

As research has confirmed that cultural capital positively impacts student performance and fosters "dispositions that provide better development in formal education" (Mendes & Costa, 2015, p. 80, free translation), the following hypothesis is proposed by analogy:

H3: Students' cultural capital positively impacts their predisposition to develop skills.

3.3 Theory of Social Capital

The Theory of Social Capital has been developed and disseminated by various authors over the years. Beginning with Bourdieu in the 1970s and 1980s, the concept was systematized within the field of sociology and later expanded by other schools of thought. According to Milani (2004, p. 105), Bourdieu defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition." Bourdieu argues that social capital, along with its various forms—economic, historical, symbolic—can be applied to different aspects of capitalist society and other modes of production, as long as these forms are understood within the social and historical contexts in which they are produced (Milani, 2004, p. 105).

Some studies address the extrafamilial benefits of social capital for educational performance, as discussed by Ahmed et al. (2020), Behtoui and Neergaard (2016), Brouwer et al. (2016), Etcheverry et al. (2001), and Salimi et al. (2022). For instance, Etcheverry et al. (2001) investigated the effects of social capital among university students in Canada on the development of knowledge, skills, and attitudes. Their theoretical model showed that, to some extent, students' social capital positively influences their educational performance and the achievement of academic goals.

Brouwer et al. (2016) and Behtoui and Neergaard (2016) examined whether social capital is related to students' academic success and found positive, significant relationships with student performance. Based on this discussion, the following hypothesis is proposed:

H4: Students' social capital positively impacts their predisposition to develop skills.

3.4 Theory of Psychological Types

Some foundations of analytical psychology were used to determine the students' psychological profile based on Jung's Theory of Psychological Types (1991). Jung's psychological types were developed along two dimensions: types and functions. The dimension of types includes Extroversion and Introversion, also considered attitudes, defined as "a readiness of the psyche to act or react in a certain way" (Jung, 1991, p. 395). The functional dimension comprises four functions: Thinking, Feeling, Sensation, and Intuition. These attitudes (extroverted or introverted) combine with the functions to form eight psychological types: 1) extroverted thinking, 2) introverted thinking, 3) extroverted feeling, 4) introverted feeling, 5) introverted sensation, 6) extroverted sensation, 7) introverted intuition, and 8) extroverted intuition (Von Franz & Hillman, 2016, p. 12).

The Thinking and Feeling functions are considered rational and opposed to each other, while the Sensation and Intuition functions are considered irrational and likewise opposed. The Thinking function is opposed to the Feeling function, and the Sensation function is opposed to the Intuition function, just as the Extraverted attitude is opposed to the Introverted attitude (Von Franz & Hillman, 2016). According to the framework, one attitude tends to be dominant over the other, and one of the four functions also becomes dominant over its opposite. A function is considered dominant in the sense that it is the one a person uses most frequently, not in terms of value judgment (Sharp, 2021). For example, a person may have a predominance of Extraverted attitude with dominant functions of Thinking and Intuition. In another combination, an individual may display a predominance of Introverted attitude with dominant functions of Thinking and Sensation, or Thinking and Intuition, among other possibilities.

Some studies have investigated the effects of personality on performance and changes in cognitive styles using Jung's typological model. For instance, Briggs et al. (2007) conducted a study examining trends among U.S. accounting students. The research aimed to identify personality types that align more closely with the profile of the modern accountant. The results indicated a predominant preference for the Introversion–Thinking–Sensation (ITS) typology and found no substantial or consistent changes in students' overall personality profiles over time. The authors noted some significant differences in the Judging–Perceiving dimension across students from different academic years, though these did not follow a clear temporal trend. They also observed a relatively balanced distribution between Extraverts and Introverts.

Swain and Olsen (2012) identified the nature of the impact of personality profiles on students who choose to pursue a degree and career in accounting, as well as the types of individuals attracted to the field and motivated to remain in it long term. The study found no statistically significant differences in Introversion or Extraversion preferences. Regarding functions, there was a predominant preference for Feeling (F) and concrete experience (Sensation), indicating a partial FS typology. Students with a Judging (J) profile were more likely to be attracted to and retained in the field, both in academic and professional contexts. The evidence suggested that individuals with an Intuitive (N) preference are less likely to pursue accounting academically or professionally. According to the authors, the accounting profession has traditionally valued individuals who rigorously collect data and make decisions in a structured and orderly manner.

Although both studies were conducted in the USA, the findings of Swain and Olsen (2012) partially diverge from those of Briggs et al. (2007). While Briggs et al. identified a preference for the Introversion-Thinking-Sensation (ITS) typology; Swain and Olsen found no significant difference in introversion/extraversion preferences but did report a predominance of the Feeling function (F). However, both studies converge in identifying a preference for concrete experience (Sensation).

Wetmiller and Barkhi (2021) investigated differences between the traditional personality traits and cognitive styles associated with accounting professionals and those of students (from undergraduate accounting programs at three large universities in the USA) entering the profession. Although the results revealed a nearly even distribution, a partial prevalence of the Introversion-Thinking-Sensation (ITS) typology was identified, aligning with the findings of Briggs et al. (2007).

The previous discussion led to the following hypotheses:

H5: The level of a student's extraverted attitude is positively related to their predisposition to develop skills.

H6: The level of a student's introverted attitude is negatively related to their predisposition to develop skills.

H7: The level of a student's thinking function is positively related to their predisposition to develop skills.

H8: The level of a student's feeling function is negatively related to their predisposition to develop skills

H9: The level of a student's sensation function is positively related to their predisposition to develop skills

H10: The level of a student's intuition function is positively related to their predisposition to develop skills.

4 Methodological Aspects

This study's data were collected from: (i) technology-based companies located in the Southeast of Brazil, to identify the skills most required of accounting professionals; and (ii) students enrolled in undergraduate Accounting Sciences or other programs. All students attended a public institution in the Southeast region of Brazil. By selecting this sample, the aim was to understand the students' profiles and relate them to their predisposition to develop skills.

Students attending other programs were also included in the sample for several reasons. First, this diversity broadens the reference base, allowing for more robust comparisons. Additionally, the analysis of job advertisements showed that many positions for financial analysts or finance-related roles often required degrees in fields such as Accounting, Business Administration, and Economics, with some technology companies also considering candidates with degrees in Computer Science. This range of educational requirements reflects the absence of a single, clear specification for these vacancies.

Second, we acknowledge the possibility that restricting the sample to accounting students would have resulted in a considerably smaller sample size. Although comparing different fields was not the initial objective of the research, we consider it valuable to explore potential differences—particularly regarding psychological aspects and predisposition to skill development.

Therefore, the decision to include students enrolled in Business Administration, Economics, Computer Science, and other fields of knowledge was motivated both by the broad scope of the vacancies analyzed and by an interest in gaining a deeper understanding of the predisposition for skill development in a multidisciplinary professional context.

Data were collected from companies in two phases between May 1 and June 30, 2023. First, job advertisements published on the LinkedIn, Vagas.com, and Glassdoor platforms were analyzed, generating a sample of 80 companies. Additionally, interviews were conducted with managers from eight other companies using a semi-structured script. This script included open-ended questions covering introductory topics about the companies' characteristics, the interviewees' profiles, and the skills required to work in a technology or technology-based company.

A list of the skills most in demand by companies was compiled based on the data collected from the advertisements and interviews. This list was then used to design the instrument for collecting data from students and to measure their predisposition to develop these skills. Students were asked to rate their predisposition to develop each skill during their academic program, using a scale from 1 to 5, where 1 indicated No Predisposition and 5 indicated High Predisposition. The total score could range from a minimum of 12 (12×1) to a maximum of 60 (12×5).

Regarding the students' profile, the measures were based on the theories of cultural, social, and human capital, as well as on Jung's Theory of Psychological Types (1991) to assess psychological profiles. Accordingly, the data collection instrument was a semi-structured questionnaire comprising 62 items divided into three sections: (i) the first section, with 20 items, aimed to identify the general characteristics related to the first set of profiles; (ii) the second section, with 30 items, sought to determine the psychological profile; and (iii) the third section, with 12 items, focused on essential skills.

Content validation procedures were applied in the analysis of psychological types, although the study did not aim to assess students' personality. Psychometric techniques were employed following the procedures recommended by Borsa et al. (2012), Fernandez-Nieto (2002), and Ferrando and Lorenzo-Seva (2018) to evaluate the quality of the factor scores.

For the internal structure validation phase, the instrument was administered in a pilot study with 299 students, and Exploratory Factor Analysis (EFA) was conducted following the procedures of Asparouhov and Muthén (2010) and Brown (2015). The model demonstrated satisfactory fit indices.

The stability of the factors for replicability was assessed using the H-index (Ferrando & Lorenzo-Seva, 2018). The results showed that most factors had values above 0.80. However, factors 1 (Intuition) and 2 (Feeling) yielded values of 0.77 and 0.75, respectively—below the recommended threshold—indicating that caution should be exercised when replicating these two factors in future studies, as they may be unstable (Ferrando & Lorenzo-Seva, 2018).

The questionnaire was administered online between August 14 and October 10, 2023, using the Google Docs platform accessed via a link. A total of 467 responses were received; however, two were excluded due to attention bias, resulting in a final sample of 465 responses. The majority (57%) was submitted by undergraduate students in Accounting Sciences, with the remainder from other programs (Table 1). In 17 cases—originating from a single institution—students completed only the first part of the questionnaire, suggesting a possible localized system failure. These responses were retained and treated as missing data for the incomplete sections, without compromising the research. Sample sizes are detailed in Table 1.

Table 1
Number of participants per program

Program	Classification	No. of participants	%
Accounting Sciences	1	267	0,57
Business Administration	2	56	0,12
Economics	3	51	0,11
Computer Sciences	4	51	0,11
Other programs	5	40	0,09
Total	**–**	**465**	**1,00**

The data were analyzed using Multiple Linear Regression (MLR). In the MLR model, the level of predisposition for skill development (PredDes) was used as the dependent variable. The constructs of human capital, cultural capital, social capital, psychological types and gross family income were used as independent variables. The following variables were used as control variables: program shift, marital status, and gender, as per Equation 1.

$$PredDes = \beta0 + \beta1(CapHum) + \beta2(Capculttot) + \beta3(Capsoctot) + \beta4(Extrovtot) + \beta5(Introvtot) + \beta6(Penstot) + \beta7(Senttot) + \beta8(Senstot) + \beta9(Intuitot) + \beta10(Cgenero) + \beta11(CTurno) + \beta12(CEstCiv) + \varepsilon \quad (1)$$

Where:
PredDes: is the predisposition to develop skills (dependent variable), calculated as the sum of the essential skills items.
β0: intercept (PredDes value when all the other variables are equal to zero)
β1, β2, β3, ... β12: regression coefficients for the independent variables (represent the effect of each variable on PredDes, keeping the others constant).
CapHum: is a proxy obtained from the sum of qualification, experience, and gross family income.
Capculttot: is a proxy obtained from the sum of frequencies of participation in cultural activities.
Capsocttot: is a proxy obtained from the sum of frequencies of participation in social relationship networks.
Extrovtot: proxy variable representing the sum of the extroverted attitude items.
Introvtot: proxy variable representing the sum of the introverted attitude items.
Penstot: proxy variable representing the sum of the items of the thinking function.
Senttot: proxy variable representing the sum of the items in the feeling function.
Senstot: proxy variable representing the sum of the items of the sensation function.
Intuitot: proxy variable representing the sum of the items of the intuition function.
Cgenero: binary control variable represented as dummy variables to control for the effects of gender classification.
CTurno: control variable that corresponds to the set of dummies to control the effects of the program shift classification.
CEstCiv: binary control variable represented as dummy variables to control for the effects of marital status classification.
ε: Random error (represents the part of the PredDes variability not explained by the model).

All regression assumptions were verified, validated, and/or corrected. The Kolmogorov–Smirnov test was used to assess the normality of the residuals. For standardized residuals (K–S (448) = 0.060, $p < 0.001$), the result indicates a rejection of the null hypothesis of normality. To address this, the resampling technique of bootstrapping was applied (Haukoos & Lewis, 2005). To test whether the residuals were random and independent, the Durbin–Watson test was used. The result (1.677) suggests no serial autocorrelation, as values closer to 2 indicate better independence. Values below 1 or above 3 may suggest problems (Field, 2018). To assess heteroscedasticity, the Breusch–Pagan and Cook–Weisberg tests were conducted. The Cook–Weisberg result ($\chi^2(1) = 30.70$, $p < 0.001$) rejected the null hypothesis of homoscedasticity, indicating non-constant variance in the residuals. This issue was addressed using robust regression, as recommended by Field (2018). Multicollinearity was assessed using the Variance Inflation Factor (VIF). With values below 1.2, a mean of 1.06, and 1/VIF < 1.0, the results indicate no multicollinearity concerns (Fávero & Belfiore, 2017).

Thus, to improve model fit, the Stepwise method and Bootstrapping estimation were applied to address non-normality, and 1% winsorization was used to correct for outliers (Dwivedi et al., 2017; Konietschke & Pauly, 2014; Haukoos & Lewis, 2005).

A free and informed consent form approved by the Institutional Review Board (Opinion No. 6,015,838) was agreed to by the companies and students before the questionnaires were administered.

5 Data Presentation and Analysis

Regarding the descriptive data, as presented in Table 2, the sample is characterized by a balance between female and male participants, with an average age of 25 years. Most participants were between 18 and 25 years old. The majority were single, predominantly enrolled in evening programs, and had been in their program for less than two years.

Regarding the skills considered most essential, as identified through company advertisements and interviews with managers (see Table 4), the research classified the skills required of accounting professionals into two categories: intrapersonal and interpersonal. The findings corroborate previous studies that emphasize the importance of: (i) intrapersonal skills, including dynamism (Miranda et al., 2021; Santos et al., 2021), attention to detail (WEF, 2023), proactivity (Miranda et al., 2021; Santos et al., 2021), resilience (Mhlongo, 2020; Lira et al., 2021; Phan et al., 2020; Tan & Laswad, 2018; WEF, 2023), and adaptability (WEF, 2023; Tsiligiris & Bowyer, 2021); and (ii) interpersonal skills, such as oral and written communication (Banasik & Jubb, 2021; Mhlongo, 2020; Lira et al., 2021; Phan et al., 2020; Tan & Laswad, 2018; Tsiligiris & Bowyer, 2021), empathy (WEF, 2023), and teamwork (Bala & Singh, 2021; Mhlongo, 2020; Lira et al., 2021; Phan et al., 2020; Tan & Laswad, 2018). However, the intrapersonal skills of autonomy and hands-on experience were not corroborated by the literature.

Table 2
Students' basic personal profiles by academic program

Types of profiles	Total sample (N=465)		Accounting (N=267)		Types of profiles	Total sample (N=465)		Accounting (N=267)	
	Abs.	%	Abs.	%		Abs.	%	Abs.	%
Gender					**Age:**				
Female	228	0,49	142	0,53	Mean	25	-	26	-
Male	217	0,47	112	0,42	Mode	21	-	21	-
Chose not to disclose	2	0,00	0	0,00	**Shift:**				
Non binary	1	0,00	1	0,00	Evening	225	0,48	148	0,55
No response	17	0,04	12	0,04	Afternoon	13	0,03	6	0,02
Marital status:					Morning	26	0,06	7	0,03
Single	366	0,79	194	0,73	Full-time	122	0,26	33	0,12
Married	53	0,11	43	0,16	Afternoon/Evening	59	0,13	69	0,26
Stable union	22	0,05	15	0,06	Morning/Afternoon	20	0,04	4	0,01
Divorced	2	0,00	2	0,01	**Time enrolled in the program**				
Chose not to disclose	3	0,01	1	0,00	Up to 1 year	191	0,41	112	0,42
Other	2	0,00	0	0,00	From 1 to 2 years	89	0,19	61	0,23
No response	17	0,04	12	0,04	From 2 to 3 years	51	0,11	34	0,13
					More than 3 years	134	0,29	60	0,22

Considering the results related to income, educational qualifications, and human capital indicators, the majority of students—both in the total sample and among Accounting Sciences students—reported a personal income of up to two times the minimum wage and held secondary or technical education qualifications.

Furthermore, regarding qualifications, a higher proportion of students already held an undergraduate and/or graduate degree. This finding suggests that participants were seeking opportunities for professional repositioning and/or aiming to improve their income, since, as shown in the previous analysis, this sample had a higher average age and demonstrated greater financial independence, with a lower proportion of students without income compared to the total sample, as well as higher levels of human capital (considering qualification level, work experience, and average personal income).

Regarding the measures of cultural capital, gross family income was included as the economic capital necessary to possess cultural capital, as suggested by the literature. The results revealed a low level of cultural capital among students. When comparing the total sample and the Accounting sample, the indices were very similar, except for gross family income, in which the total sample had a higher average income than the Accounting sample. This result suggests that other variables may influence this relationship, such as time availability, family size, debt levels, geographic location and commuting distance, marital status, or marital and/or legal issues, among others.

Regarding the social capital indexes, which were quite similar for both samples, it is worth noting that the highest score was observed for the activity of reading a book (3.2). Although the literature recognizes this as a measure of social capital, it reflects a more individual practice that can nonetheless support skill development. Other forms of participation in university-based groups—whether focused on reading, research, or other relationship networks—are also highlighted as strong predictors of social capital. These forms of engagement can positively influence learning outcomes and social integration by promoting knowledge sharing and enhancing academic performance, as supported by Ahmed et al. (2020) and Salimi et al. (2022).

Finally, the psychological type scores of the students are presented in Table 3. It is important to note that, according to Jungian typology, the analysis considers the highest scores within the polarities of the type dimension (extraversion vs. introversion) and the function dimension (thinking vs. feeling and sensation vs. intuition). To analyze the results, the data were segmented by total sample and by selected academic programs, with the aim of identifying potential differences across fields of study.

The results for the total sample show a balance between the attitudes of Extraversion (16.89) and Introversion (16.74). Regarding the functions, Thinking (19.15) predominates over its opposite, Feeling (13.43), and Sensation (19.05) over Intuition (16.68). These patterns are consistent across different programs in terms of functions. However, notable differences emerge in the type attitudes. Introversion is slightly more prevalent (17.10) in Accounting students than Extraversion (16.64). In the case of Computer Science and Information Systems students, Introversion is also more pronounced. For other programs, Extraversion is the dominant attitude, with Business Administration students showing the highest score (18.52).

Table 3
Students' psychological type score

Psychological type	Total sample (N = 465)	Accounting (N = 267)	Business (N = 56)	Economics (N = 51)	Computer/Info System (N = 62)	Others (N = 29)
Extroversion	16,89	16,64	**18,52**	**17,04**	15,63	**18,41**
Introversion	16,74	**17,10**	15,79	15,88	**17,03**	16,24
Thinking	19,15	19,42	19,14	18,86	18,84	17,83
Feeling	13,49	13,54	13,23	13,20	13,15	14,72
Sensation	19,05	19,20	19,46	18,53	18,15	19,69
Intuition	16,68	16,41	16,88	16,65	17,27	17,62

Thus, when comparing the results with those of other studies, it appears that the findings are relatively consistent, despite differences in methodology and geographic context. For instance, Briggs et al. (2007) identified a predominance of the Introversion/Thinking/Sensing (ITS) typology in a sample of Australian students. Similarly, Wetmiller and Barkhi (2021) also found the ITS typology among groups of students in the USA, although with a more uniform distribution.

Therefore, the Accounting students in the sample present a profile of predominant psychological types for Introversion, Thinking, and Sensation (ITS), in line with the literature. The result of the Accounting Science program is also similar to the profile of the Computer Science and Information Systems students and different from the profiles of the remaining students in the sample.

After presenting the profile data, Table 4 shows the development of skills predisposition scores for the total sample, broken down into Accounting, Business Administration, Economics, Computer Science, Information Systems, and other programs. In general, the values indicate that the vast majority demonstrated a high predisposition for the development of the listed skills, considering that the individual measurement scale ranged from 1 to 5, where 1 means No predisposition and 5 represents High predisposition; therefore, scores above 4 can be considered indicative of a high level of predisposition.

Table 4
Skill development predisposition scores

Habilidades essenciais	Total sample (n = 448)		Accounting (n = 255)	Business (n = 51)	Economics (n = 51)	Computer/ Info Systems (n = 62)	Others (n = 29)
	Total	Mean					
Intrapersonal Skills							
Dynamism (agility, practicality, compliance with deadlines)	2011	4,49	4,49	4,53	4,51	4,40	4,59
Autonomy and independence	2010	4,49	4,51	4,57	4,49	4,35	4,45
Attention to detail, focus, concentration and objectivity	2001	4,47	4,59	4,45	4,45	4,24	3,93
Proactivity	1987	4,44	4,42	4,49	4,29	4,45	4,72
Resilience	1982	4,42	4,48	4,45	4,27	4,19	4,62
Adaptability and/or Flexibility	1967	4,39	4,47	4,43	4,22	4,24	4,28
Hands-on approach	1963	4,38	4,40	4,41	4,25	4,24	4,66
Interpersonal Skill							
Oral communication	1989	4,44	4,44	4,57	4,49	4,26	4,55
Empathy	1912	4,27	4,25	4,63	4,04	4,03	4,69
Teamwork and collaboration	1851	4,13	4,13	4,29	4,25	3,97	4,03
Written communication	1849	4,13	4,25	4,22	4,24	3,55	3,97
Creativity and Innovation	1929	4,31	4,29	4,24	4,20	4,48	4,35

Table 4 shows that the highest scores identified for accounting students were in the skills of dynamism, autonomy, and attention to detail, indicating a certain alignment with the Introversion/ Thinking/Sensation psychological typology. These skills are considered intrapersonal—that is, they are primarily performed individually and rely on personal initiative, with a preference for practical activities and a results-oriented focus. Such characteristics are more common in individuals with introverted, rational, and pragmatic behavior, as noted by Zacharias (2017), Von Franz and Hillman (2016), and Sharp (2021).

5.1 Analysis of the Relationship Between Profiles and Skill Development Predisposition

The RLM was conducted to verify the extent to which the characteristics of human capital, cultural capital, social capital and psychological types impact one's predisposition for developing employability skills (PredDes). The results demonstrated that the general model presented statistical significance (Prob > chi^2=0.000) for some of the respondents' characteristics, as shown in Table 5. The characteristics Cgender, CTurn and CStCiv, as well as the psychological types Extrovtot attitude and Senstot function indicate that the relationships can be explained by the model, supporting hypotheses **H2, H5,** and **H9.**

Table 5
The relationship between profiles and skill development predisposition

PredDes	Observed	Bootstrap			Normal-based
	Coefficient	Std. Err.	z	P>z	[95% Conf. Interval]
CTurno	-.3231405	.1345213	-2.40	0.016	-.5867973 -.0594836
CEstCiv	-1.495.918	.6146018	-2.43	0.015	-2.700516 -.2913207
Cgenero	-1.197.556	.3998921	-2.99	0.003	-1.98133 -.4137822
Extrovtot	.2461998	.0648051	3.80	0.000	.1191842 .3732154
Senstot	.5402164	.1099599	4.91	0.000	.324699 .7557339
_cons	4.231.312	2.414.869	17.52	0.000	37.58006 47.04618

Notes: Wald $chi^2(5)$ =74.03 / Prob > chi^2=0.000 / R^2 = 0.1390 / Adjusted R^2 = 0.1292 / Root MSE = 61572 / No. of observations = 448

Since the predictor measures use different scales, interpretation is based on variations in standard deviation. In the case of program shift classification, for each classification level (from 1 to 5), each one-standard-deviation increase is associated with a 0.3231 decrease in the predisposition to develop skills, as indicated by the negative coefficient. A plausible explanation for this finding is that students in higher classification levels—such as morning or full-time programs—may not yet be focused on employment or may already possess these skills to a greater extent and therefore feel less inclined to further develop them. In contrast, students in evening programs may feel a greater need to develop these skills, either because they are actively seeking employment or aiming to improve their professional standing.

Regarding marital status classification—where 1 indicates single and 2 represents all other categories—each one-standard-deviation increase is associated with a 1.495918 decrease in the predisposition to develop skills, as indicated by the negative coefficient. This greater negative impact suggests that married, separated, or divorced individuals tend to show less interest in developing the listed skills. Possible explanations may include a lower motivation to enhance interpersonal skills, current employment status, or other unobserved factors.

Regarding the gender classification, in which 1 indicates female and 2 represents male and other cases, each one-standard-deviation increase is associated with a 1.197556 decrease in the predisposition to develop skills. This indicates that male participants and other cases showed less interest in skill development, confirming **H2**, which posits that the female gender positively influences predisposition to skill development. This result aligns with the findings of Rahman et al. (2023), Cornachione et al. (2010), and Takeuchi (2022), but differs from those reported by B. Rodrigues et al. (2016), D. Rodrigues et al. (2017), and Santos (2012).

Regarding the psychological characteristics of Extraversion and Sensation, the result indicates positive coefficients of 0.246 and 0.540, respectively. The finding indicates that, with each standard deviation that increases in the coefficients, the greater the predisposition to develop skills. It was found that the highest averages for the levels of extroverts and sensors are of the female gender (1), corresponding to a higher average in the level of interest in developing these skills. These results confirm Hypotheses **H5** and **H9**, in which H5 indicates that the highest level of extraverted attitude is positively related to the predisposition to develop skills, and H9 indicates that the highest level of the sensation function is positively related to the predisposition to develop skills.

In the studies by Briggs et al. (2007), Swain and Olsen (2012), and Wetmiller and Barkhi (2021)—some of the few that examine the psychological profiles of Accounting students—it is not possible to make direct comparisons, as these works focus solely on identifying psychological typologies without exploring their relationships. Nonetheless, it can be inferred that students with a more extroverted profile may be more predisposed to developing interpersonal skills, while those with a predominant sensation function may be more inclined toward intrapersonal skills, as they tend to be more focused, rely on logical processes, and act based on concrete sensory input—what they can see, hear, touch, or feel—rather than abstraction. However, further investigation is needed to better understand these dynamics, including potential interactions between the variables, given that the dependent variable (PredDes) encompasses both interpersonal and intrapersonal skills, and the RLM model does not support the analysis of multiple dependent variables.

The other characteristics—such as human capital, social capital, cultural capital, income, age, and the psychological types of introversion, thinking, feeling, and intuition—were not statistically significant in explaining the model. Therefore, hypotheses **H1, H3, H4, H6, H7, H8,** and **H10 could not be confirmed** based on the explanations proposed in the study.

6 Final Considerations

This study aimed to identify the skills required by the job market and examine their relationship with students' predisposition to develop them. In addition to mapping the skills demanded by technology-based and technology companies, the study also sought to understand the characteristics of students and their predisposition to develop essential employability skills.

The survey results revealed a growing demand for interpersonal skills, particularly those related to socio-emotional competencies, self-efficacy, autonomy, proactivity, adaptability, and practicality. These findings align with studies by Jackson et al. (2022), Khan et al. (2022), Qasim and Kharbat (2020), and Tsiligiris and Bowyer (2021), suggesting a trend toward companies favoring more independent professionals with stronger self-regulation. Although interpersonal skills remain important, the survey indicates that intrapersonal skills appear to be in higher demand, as shown in Table 4.

Given the students' profiles, evidence could initially suggest a challenge in developing the skills required for work in technological innovation environments. However, the results showed a high predisposition among students to develop these skills—particularly intrapersonal skills—supporting the needs identified in company interviews and the perspective of Jackson (2020). Therefore, the Accounting Science students in the sample demonstrate the potential to contribute meaningfully to innovation, provided that educational institutions adopt effective strategies that take their specific characteristics into account. Furthermore, the research found that certain student characteristics—such as marital status, gender, program shift, extroversion, and the sensation function—affect their level of predisposition to develop these skills.

This study's findings have implications for multiple stakeholders, as they indicate that, despite the lack of classification by profile, students demonstrated a high predisposition to develop intrapersonal skills—those most in demand according to the business models examined. In the context of working in a company's accounting department, a student profile characterized by a predominance of the Sensation and Thinking functions may support greater attention to detail, focus, and objectivity. Additionally, balance between introverted and extroverted attitudes may also favor the development of certain interpersonal relationships.

Based on the results and analysis of the findings, this study advances previous research and presents originality in the following aspects:

i. a multidimensional approach, as the research innovates by simultaneously analyzing psychological (Jung's psychological types), social (social capital), cultural (cultural capital), and economic (human capital) aspects in relation to students' predisposition to develop skills—whereas most studies focus on only one or two of these dimensions;

ii. a focus on skills for innovation environments, as the study concentrates specifically on skills required in innovation-driven contexts characterized by high uncertainty and rapid technological change, setting it apart from more general research on labor market skills;

iii. a detailed comparative analysis, as the research contrasts the skills identified in companies with those emphasized by organizations such as the World Economic Forum (WEF), offering a broader and more up-to-date perspective on labor market trends; and

iv. an effort to fill a gap in the literature by investigating the relationship between students' profiles and their predisposition to develop skills—particularly in the Brazilian context. While previous studies, such as those by Briggs et al. (2007), Swain and Olsen (2012), and Wetmiller and Barkhi (2021), examined the psychological profiles of Accounting students, they did not explore their relationship with skill development predisposition.

The research findings highlight the need for higher education institutions to adapt their curricula to include the development of intrapersonal and interpersonal skills, in addition to technical knowledge. This calls for the adoption of more active teaching methodologies to foster these competencies.

For accounting professionals, the findings reinforce the importance of developing a profile that aligns more closely with the demands of the current job market, which values skills such as adaptability, emotional intelligence, leadership, strategic vision, and negotiation abilities. Companies, in turn, can use these results to enhance their recruitment and selection processes by seeking professionals who possess the skill set identified as essential.

This study contributes to the literature by providing an updated overview of the skills required of accounting professionals in innovation environments. It also advances knowledge by examining the relationship between students' profiles and their predisposition to develop these skills, offering new perspectives to the field. Moreover, it challenges the traditional view of accounting as a strictly technical discipline by highlighting the need for more well-rounded professionals with multidisciplinary and behavioral competencies. These findings may encourage updates to Accounting curricula, better preparing future professionals for the challenges of the 21st-century job market.

By highlighting the importance of developing skills such as communication, collaboration, and adaptability, the research contributes to the training of professionals who will be better prepared to meet the challenges of contemporary society. Indirectly, this can benefit society as a whole by fostering professionals who are more capable of driving innovation, supporting economic development, and addressing complex problems.

Finally, the impossibility of making statistical generalizations to other populations constitutes a limitation of this study. This is due to the non-probabilistic nature of the sample, which was collected exclusively from a few public higher education institutions at a regional level. Additionally, future research should further explore potential interactions among interpersonal, intrapersonal, and cognitive skill variables. A deeper analysis of these combinations could yield more detailed insights into the complex dynamics involved.

Future studies are recommended to apply the proposed model with its constructs to explain the predisposition to develop skills, using a larger and more heterogeneous sample that includes other regions of Brazil and diverse academic programs, such as those in the health and exact sciences. This would allow for testing the external validity of the instrument. Additionally, the use of structural equation modeling is suggested to provide a deeper understanding of the relationships between observed and unobserved (latent) variables and to enable the analysis of multiple dependent variables.

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