

Article

Not Practicing What You Preach: How Is Accounting Higher Education Preparing the Future of Accounting

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Abstract: The accounting profession is undergoing significant changes due to revolutions in technology and markets. It is ever more important for higher education institutions (HEIs) to understand how to prepare professionals and students for the not-so-distant future. A review of the literature was conducted using VOS Viewer, focusing on the accountant's profile in the context of the fourth industrial revolution and digital transformation. Then, the literature review's findings were compared with the curricula of all Portuguese HEI accounting courses. The results show that transversal skills will be crucial in maintaining the relevance of the accounting profession, but HEIs seem to focus their curricula almost entirely on technical competencies/hard skills. There are, therefore, substantial divergences between what literature preaches and what education practices, not unlike what is being reported the world over. The origins and solutions to this apparent paradox are explored so as to contribute to good practices in other contexts and as a cautionary tale for other countries' professional systems.

Keywords: accounting education; soft skills; digital transformation; curricula; systematic literature review; Portugal



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1. Introduction

The challenges faced by the accounting profession nowadays are unparalleled: shifts and changes generated by the acceleration of information technologies (IT) and artificial intelligence (AI), as well as social and economic changes, are so profound that the very nature of the field needs to be reimagined and reinvented, as the older, more repetitive tasks disappear from the job [1–3].

A lot has been written about the future of the accounting profession, on topics including the role of higher education institutions (HEIs) in this process, although the field is still not saturated. One of the most common criticisms of HEIs is that curricula do not seem to reflect the trends, solutions, and changes divulged in the scientific literature [4–6], which seems odd given the fact that most of this knowledge is produced by academics. This claim is usually made without concrete data to back it up and is based on researchers' individual perceptions about what is happening in the field.

In this study, we sought to provide a clear summary of the main ideas from the literature through an AI-supported process using VOS Viewer; we then contrasted our findings with all the curricula of accredited accountancy bachelor's degrees in Portugal organizing courses into areas. The main purpose was to identify what the literature and the entities that regulate accounting at an international level say about skills that accountants

should have in the context of the fourth industrial revolution and compare this with the set of skills currently developed in higher education in Portugal.

2. Theoretical Background

The accounting profession is unquestionably going through a revolutionary period, brought about by fast and furious transformations of the industrial economy into the information economy paradigm, increased globalization, and the increased availability of information, as well as the ability to process (big) data [7]. As accounting services become wider and more diversified, two seemingly contradictory consequences arise: (1) accountants need to increase their technical specialization [8,9], and (2) the rapid and unpredictable changes in the profession bring forth the need for continuous learning, flexibility, and adaptation to new circumstances [10], which is to say that accountants need to become more specialized while simultaneously keeping their options open.

One clear implication of this conundrum is that accountants and accounting students will need to have strong transversal skills, including soft skills such as self-regulation, communication, and teamwork [11], as well as IT proficiency [12–14] and technological skills such as automated systems and accounting information systems (AIS), which allow for the collection, treatment, and dissemination of financial/accounting information [15] and are a more efficient and efficacious response to clients' needs, with faster and better-supported responses [16,17].

The consensus in the literature revolves around the notion that simple book-keeping activity is nowadays considered an extremely narrow view of what the accounting profession is [18]. However, opinions are divided regarding the future of the accounting profession, including the fear of extinction brought about by AIS versus the more optimistic perspective that AI will not eliminate jobs but rather enable performance, and improve human capital, as boring and repetitive tasks will tend to disappear from accountants' to-do lists, which will make their jobs more focused on unexpected creative thinking challenges, generating an effect of 'augmented intelligence' in human capital [19,20].

In line with the latter perspective, accountants are nowadays evolving from mere financial accountancy to the field of business financial reporting, which includes variables such as human resources, production control, and stakeholder relations in companies, adding complexity and nuance to accountancy [21]. Thus, the role of accountants becomes: (1) to communicate the information produced in an understandable way for the companies' stakeholders and (2) to add value to the information produced [1,22].

As they move from bean counters to business decision-makers, accountants' competencies must change and open up to other challenges and technological processes [23–25]. Business intelligence and the ability to build interpersonal relationships with real decision-makers are more important than ever, which means that there is an increased emotional component to the job, so that communication, interpersonal, and organizational competencies are of crucial importance for accountants [26,27].

In globalized and competitive markets, companies must make decisions with higher speed and support. Accountants play a key role in companies as they collect, analyze, and disseminate information for decision-making [10,28]. Research indicates that capital markets react more favorably to financial reports that have had the intervention of professionals with an accounting degree [29,30]. Thus, accountants are required to play a more active role in assisting management in the decision-making process, for which a transformation of accountants' roles is needed, which requires a new approach to their skills.

The impact of accountants' input is more pronounced in small and medium enterprises, where these professionals undertake tasks that are performed by several departments in large companies [16]. In SMEs, which represent circa 80% of European companies, the accountant needs a greater polyvalence, which is to say they need more transversal skills, more adaptability, and better learning skills, since the training of accountants tends to focus mostly on technical skills bearing in mind more the needs of larger companies, rather than SMEs [31]. The main subject concerning the accountant's profile is related with ethical

concerns [25,32,33] and the stereotype of accountants [24,34–37]. Therefore, academic training, as well as skills developed, are important to develop professional ethics and avoid financial scandals [21,38].

Thus, it is clear the alignment of labor market needs and accountants' training is fundamental in order to preserve the pertinence of the accounting profession as a whole. This is becoming increasingly urgent given the evolution of technologies and improvement of information systems that discard more trivial routine, predictable and structured actions, as well as globalization, which makes competition also global [39,40].

The concern with the fit between what higher education institutions (HEIs) teach and the labor market needs is not new [41], but the current circumstances make this issue paramount. However, HEIs have been slow to respond to this challenge. According to Albrecht and Sack [42], there are three main issues HEIs face concerning accounting courses are: (1) the diminution of students, (2) curricula becoming obsolete, and (3) the fact that students reportedly regret choosing accounting courses after they have started their training.

Students tend to choose the academic accounting path considering work stability, salary, the ability to use a specific skill set, high standards and ethics of the profession, career opportunities, and a friendly work environment [8,43]. However, family, friends, teachers, and other third parties seem to have a high interference in this choice, stressing the aforementioned factors as important, which may sway students who were otherwise inclined [41]. For HEIs, this means that course information and layout should be clear and well structured, focusing on the development of the competencies the job market needs in order to recruit and keep students motivated and decrease turnover [44].

Further, professional orders in accountancy have been creating preparatory courses for people to be able to register as professionals, which is clear evidence that HEI courses on their own seem to be unable to meet guild requirements [5,45]. To make matters worse, in the European context, the Bologna process contributed to the abbreviation of many graduate courses from 5 to 3 years, which brought about the need to change and reduce the variety and depth of topics in undergraduate courses [46,47], as is the case of Portugal.

So, the situation for the accounting profession and accounting education is quite challenging: on the one hand, there is a fast-changing labor market that includes technologically enhanced decision-making tools for a globalized world and discards the trivial, repetitive tasks accountants often performed in the past, and on the other hand, a slow changing HEIs landscape that is dealing with its own identity crises, with less motivated students and less time to impart all the knowledge believed to be necessary to perform the job adequately.

According to [30], excellence in technical skills is considered crucial to improving performance and creating legitimacy for the information produced; however, as years go by, non-technical competencies have been assuming greater ponderation in what the market requires of graduates [31].

Increased competitiveness in the market has made accountants sustain and develop a wider array of competencies, namely, where behavioral and IT competencies are concerned [8]. This type of competency helps perform daily tasks but also promotes the adaptation to unstructured, unexpected, new types of problems that may arise [12]. Yet, these types of competencies that are considered most critical for the future of the profession are the ones that seem to be most missing from accountants' HEI curricula [16,48].

The premise is that the development of soft skills and IT competencies will allow accountants to think and act more disruptively and originally vs. the traditional blind rule that is in tune with the stereotype most associated with the profession [24,34,37]. The idea is that education should come before training [18] in the same way that attitudes should come before skills and abilities. The International Accounting Education Standards Board (IAESB) subscribes to this idea in the International Education Standard (IES) 4, the document prescribing learning outcomes for professional values, ethics, and attitudes that the initial professional development of aspiring accountants should offer and states that behavioral competencies should be taught first and isolated from other technical skills, to

intertwin both types of competencies further on to meet the needs of the labor market [27]. Others propose that transversal competencies should always be articulated with other more technical competencies [9,17,49,50]. Regardless, what seems to be unquestionable is the consensus on the need for these competencies to be encouraged and developed.

Considering that HEIs should strive to solve asymmetries between graduate competencies and labor markets' needs, both interests should be cared for in a balanced manner [31]. Yet, in accounting, there seems to be a big difference between what HEIs teach and what students need for their future profession [4,13,51].

Challenges exist in three separate perspectives: (1) differences between what scholars and employers understand are key competencies that HEIs should develop; (2) individual and institutional limitations that restrict the development of non-technical competencies and finally; and (3) professorial limitations that are reflected in teaching approaches and methods that constrain the development of competencies by students [8].

The focus on developing soft skills and IT proficiency together with specific solid technical skills has the potential to credit the accounting profession with new prestige and an enhanced reputation [52,53]. Therefore, HEIs must not only comply with international standards such as the IES 4 developed by IAESB but also with the technical requirements imposed by the Order of Certified Accountants (*Ordem dos Contabilistas Certificados*—OCC) so that their courses are accredited and will lead to certification as an accountant. For that reason, the OCC should also consider the future needs of the accountant profession to adapt to the requirements imposed on HEIs, ensuring that the need for HEIs to adapt to OCC requirements to have their courses accredited does not neglect the new needs of the profession.

This paper investigates this reality from two different dimensions, which constitute our research questions: 'what we preach' (What does the literature tell us about the accountant's profile?) and 'what we practice' (What are the skills developed by HEIs actual accounting curricula?). To answer the first research question, a Systematic Literature Review was conducted to attain a better look into what the future of training for being an accountant will entail; and, to answer the second research question, all the curricula for training accountants in Portuguese HEIs were analyzed to figure out the kind of competencies that are being developed. Together, both dimensions give us an important perspective on what competencies we should be developing in HEIs for accountancy and why—and an overview of how well we are addressing those needs.

3. Method

3.1. Dimension 1: What We Preach

In order to answer our first research question, a Systematic Literature Review (SLR) was performed, which is a literature review that is explicit and replicable by users of the [54]. It aims to identify, evaluate, and summarize information produced by researchers, scholars, and professionals of a given subject or scientific area. Further, the SLR includes a critical analysis component [55], allowing for new ideas and perspectives to be developed, problems to be solved, and providing new sources of scientific information on a given theme [56].

Following Xiao and Watson's [57] methodology, 4 stages were considered in the present SLR: (1) planning stage, establishing the purpose and relevance of the SLR as well as defining the research strategy; (2) selection stage, defining the scope of the subject; (3) extraction and treatment of the information pertaining the scope in our sources; and (4) analysis of the information obtained in the third step, in order to dissect key ideas of each of the articles selected for study, as well as to expose the different perspectives presented by the articles, including gaps and unexplored areas of study which in turn give rise to new proposals for research issues [57].

The research strategy consisted of researching the Web of Science database using a Boolean expression (Table 1) and a few inclusion criteria (Table 2). Subsequently, the VOS Viewer software for scientific literature analysis was used, where VOS stands for

visualization of similarities [58]. The mapping technique used by VOS Viewer was used to support the selection of the most relevant literature in this field. In order to obtain the layout and the clustering of the map generated, this software uses both a mapping and a clustering technique that jointly provide a framework [59]. Here, the layout (i.e., the location of the terms or authors in the map) is determined by the mapping technique, whereas clustering technique groups the terms or authors by color.

Table 1. Boolean equation used on Web of Science research.

Title (TI)		Title (TI)		Title (TI)		Title (TI)	
account * education	OR	account * competences OR account * skills	OR	account * future	OR	account * profile	

* Indicates that the Boolean expression should look for all words that start with the expression preceding it. This is a common artifact to include all words from the same family and frequently occurring variations.

Table 2. Inclusion criteria used on Web of Science research.

Timeline	Documents Type	Keywords	Web of Science Areas
2007–2019	peer reviewed papers	account * education account * competences account * skills account * future account * profile	Education Educational Research, Business Finance, Economics, Education Scientific Disciplines, Management, Business, Ethics, Computer Science Information Systems, Multidisciplinary Sciences, Computer Science Artificial Intelligence, and Computer Science Interdisciplinary Applications.

* Indicates that the Boolean expression should look for all words that start with the expression preceding it. This is a common artifact to include all words from the same family and frequently occurring variations.

When our sample was narrowed down thusly, a deep dive into the literature was assisted by a PICOS analysis. The PICOS methodology consists of a tabulated systematization of the information contained in the analyzed articles by the Population, Intervention, Comparison, Outcome, and Study type [60].

The sample of 24 articles refers to the articles analyzed in detail and in full in the SLR. This sample results from the application of the PICOS methodology to a sample of 29 articles, 5 of them excluded at this stage, in order to verify papers' relevance to the SLR vs the need to exclude them based on the five parameters (Population, Intervention, Comparison, Outcome and Study type); 5 papers were excluded at this stage. The application of the PICOS methodology took place in a 2nd phase after submitting the initial sample of 488 articles to a bibliometric analysis using VOSViewer.

3.2. Dimension 2: What We Practice

According to the Portuguese Higher Education Board (Direção Geral do Ensino Superior—DGES), higher education is organized in a binary system that integrates both university education and polytechnic education and involves both public and private institutions. University education integrates universities, institutes, and other higher teaching institutions. Polytechnic education includes polytechnic institutes and also other practical teaching institutions. In parallel, there is a regulatory organization that aims to ensure the quality of higher education by carrying out evaluations in order to accredit higher education institutions and their study cycles: the Portuguese Agency for the Evaluation and Accreditation of Higher Education (*Agência de Avaliação e Acreditação do Ensino Superior—A3ES*).

In Portugal, the accounting profession is recognized as being of public utility and as well regulated by a professional order, the Certified Accountants Association (*Ordem dos Contabilistas Certificados—OCC*). To be registered as a certified accountant in the OCC, the candidates must meet three requirements: to have a degree recognized by the OCC as

suitable for registration; to carry out a internship; and to pass the entry exam performed by the OCC.

Thus, to address our second research question, we selected only courses which were officially accredited to grant a degree by the Portuguese Agency for the Evaluation and Accreditation of Higher Education ($n = 110$) and with direct access to the OCC's admission exam ($n = 73$); 27 other courses were excluded because despite fitting with the above-mentioned criteria because they were included in an institution with more than one such course but had a more generic scope (e.g., entrepreneurial sciences) and did not include the word 'accounting' or similar. Of the remaining 46 courses, 11 were excluded because they had ceased to function, and graduate accountants, which resulted in a final sample of 35 courses distributed over 16 of the 18 districts of Portugal.

A content analysis was performed on the study plans of the 35 courses using the public legal documents with the study plans to understand the importance given by the HEIs to different areas and competencies. For this purpose, we analyzed the study plans in terms of the number of curricular units and in terms of the credits attributed to each curricular unit in different areas, namely: (1) technical skills, (2) generic skills such as IT, English and all others considered interdisciplinary, (3) ethics and deontology, and (4) behavioral skills such as critical thinking and communication. Optional curricular units were attributed a special category and treated separately due to variability in content.

4. Results

4.1. Dimension 1: What We Preach

This SLR aimed to identify the profile that an accountant should have in today's context and what kind of changes are expected to occur in the context of this paradigm-shifting reality. The analysis of the state of the art regarding the accountant's profile and the construction of this profile focused on identifying the main skills that the literature considered to be essential for an accountant in the exercise of their duties.

Thus, the 488 papers collected using the Boolean equation in Table 1 were then put through VOS Viewer's analysis of co-citations, where authors co-cited more than 10 times were considered. The purpose of this analysis was to highlight the authors and respective articles that are most relevant to the sample, as well as how they relate to each other.

Considering the VOS Viewer output, 24 outstanding papers were selected due to being the most co-cited in the field and were then submitted to further analysis using the PICOS methodology. Figure 1 shows the co-citations analysis map. The references for the 24 papers are presented in Appendix A.

The population of the papers analyzed in the SLR cover the perspective of employers and certified accountants, teachers, directors, institutions, courses of higher education, and the accountant profession. These populations can be grouped into three main dimensions: (1) individual (students, teachers, and employers in focus); (2) institutional (courses and companies are analyzed); and (3) historical (the focus is to document and analyze different aspects of the evolution of the accounting profession).

The main contributions made by the papers included in the SLR to the state of the accountant profession were: (1) identification and analysis of perceptions, expectations, and degree of importance in relation to the competencies that are part of the accountants' profile in the past, in the present, and in the future, based on the opinion of employers, accountants, teachers, and students; (2) analysis of the state of the profession and its evolution over the centuries as well as the role of the accountant and the way accountants create value to the society; (3) identification of the most appropriate methodologies for the development of skills by accountants and accounting students, as well as the main obstacles to such development; and (4) study of the future challenges of the accountant profession resulting from the changes that the profession has been and will be targeted with. Although there are different approaches to the subject, all the papers are focused on understanding how the accounting profession's competency profile should adapt to present and coming changes,

by comparing what employers want and what HEIs are doing, by analyzing trends, or even by questioning recent graduates how well they think their courses have prepared them.

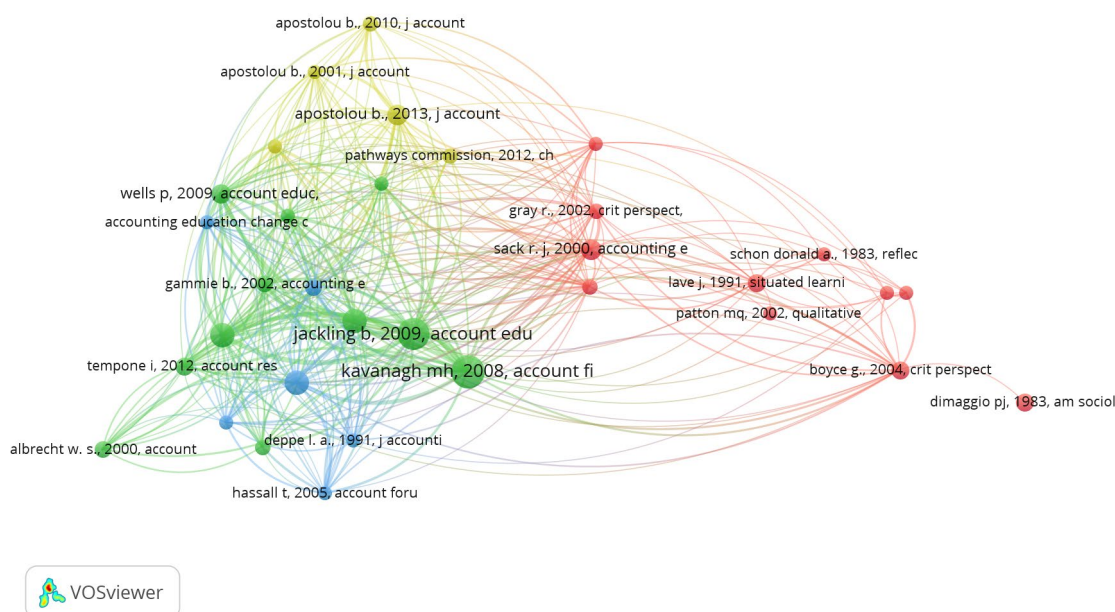


Figure 1. Co-citations analysis map from VOSviewer.

The comparison parameters mostly used by the authors of the papers analyzed in the SLR were: (1) accountants' needs regarding the development of skills identified by the literature; (2) the awareness, the level of appreciation and the importance given by regulators, international accounting institutions, employers and educational institutions as to the type of skills to be held by accountants; (3) the traditional concept of the accountant's profile; (4) the guidelines of international accounting bodies; (5) the fourth industrial revolution and digital transformation, the globalization of markets and the development of artificial intelligence; (6) methodologies already implemented by higher education institutions in accounting for the development of skills; and (7) evolution and changes in other scientific areas such as medicine. After analyzing the conclusions presented by the authors of the papers, and considering the comparisons mentioned above followed by each of them, there seems to be a consensus on the need for more transversal and generic needs, be it on an interpersonal level and in terms of emotional intelligence, as well as in terms of technologies, especially Information and Communication Technologies (ICT).

From the results of SLR, it appears that accountants today must develop and hold skills in oral and written communication skills, teamwork skills, unstructured problem analysis and management skills, technology skills, and interpersonal relations skills. Although the competencies described above are considered the core competencies in the future, the development of these competencies should not compromise the continuing development of technical competencies. The development of generic and behavioral skills such as those described above should enable accountants to develop their emotional intelligence, which Richins et al. [61] and Fernandez and Aman [62] say are the human competence most difficult to replicate for AI.

Higher education in accounting thus assumes a preponderant role both in the preparation of accounting students who aspire to exercise the profession and in offering continuing education to accountants already inserted in the labor market to ensure the updating of their knowledge. On the one hand, there is an agreement between academics and professionals on the skills that are critical to success as an accountant (although the form with both parties hierarchizes these skills are different). On the other hand, the opinion of accounting students about these same skills is that they are not sufficiently developed in the study plans in accounting in higher education, apart from basic technical skills; this

opinion is corroborated by the opinion of employers claiming that students who represent the supply of the market, do not have the skills considered critical for the exercise of the accounting profession today [63,64]. This demonstrates that students do not seem to be very aware of the importance of soft skills for the future of their jobs and their profession, unlike employers who place a high value on this type of skills, and both recent graduates and employers seem to consensually agree that HEIs are doing a poor job in preparing their students in this matter. Even so, it is also concluded that accountants often master both technical and generic skills in their theoretical genesis but present some difficulty in establishing the bridge between the academic context and the work context in the application of these same skills.

The main methodology used in the 24 papers analyzed was the SLR ($n = 11$), followed by surveys and thorough interviews, both with accounting teachers and students, as well as with employed accountants and their employers ($n = 9$) and other methodologies such as case studies were also used in the remaining four papers, especially to study how the accountant's profile has been developing and what the answer to be given by educational institutions with accounting courses to follow this evolution.

Our SLR seems to indicate that accountants must develop, strengthen and retain skills including oral and written communication skills, teamwork skills [11], analysis and management skills for unstructured problems [65], competencies in the field of technologies, and those related to interpersonal relationships [66]. Although these are considered core skills in the profile of the accountant of the future, according to Albin and Crockett [66], the development of these skills should not be an obstacle to the continuous development of technical competencies. One problem identified on this issue by Rebele and St. Pierre [67] is the fact that although it is not a zero-sum proposition, it is clear that as the emphasis on soft skills development increases, there has to be a decreased emphasis on technical issues given the class time constraints.

The development of generic and behavioral skills such as those described above should allow accountants to develop their emotional intelligence, which will potentially be the human competence most difficult to replicate by AI [61,62]. Accounting training institutions—especially HEIs—assume a preponderant role both in the preparation of accounting students who intend to exercise the profession of certified accountant in the future and in offering continuous training to accountants already inserted in the labor market to guarantee their knowledge update.

There is an agreement between academics and professionals about the skills that are critical for success and value creation by accountants, although the way in which these skills are hierarchized by them is different [18,46]. Furthermore, in a study developed by Dolce et al. [13], these differences in the ranking were also observed: students assessed the importance of soft skills and provided perceptions of how much they possessed the soft skills' most important attributes, and both graduates and professionals ranked teamwork as most important [11], but rankings of other items varied considerably namely, local knowledge, international knowledge, ability to communicate in a foreign language, public speaking, and ability to respect cultural norms.

Additionally, the opinion of accounting students about considering that these same skills are not sufficiently developed in the study plans in HEIs, except for technical skills, is corroborated by the opinion of employers that the graduates who represent the market offer do not have the skills considered critical for the exercise of the accountant profession nowadays [10]. Specifically, in the Portuguese context, Leão et al. [36] reflect that the main skills of accountants appreciated by employers are linked to core skills for accounting tasks, accounting competence, proficiency with numbers, and writing and business talent, in line with the Portuguese 'traditional accountant' stereotype with a distinguishing feature related to their financial management roles are the most appreciated by employers.

Considering that accountants who have developed both technical and generic skills in HEIs, still report difficulty in adapting this knowledge from the academic context to the work context and the real problems, Robley et al. [68] suggest an annual review of the

study plans so that all market changes are replicated at the academic context. Such changes should follow guidelines from regulatory/professional bodies, namely OCC and A3ES at the Portuguese national level and IAESB at the international level, to ensure that all requirements for the accounting profession are achieved.

Traditionally, the accountant was seen as a ‘bean-counter’ who would need only technical skills because they would mostly be concerned with processing financial information and reporting without any type of personal contact with customers and other stakeholders [38]. In the past, the success or failure of an accountant was mostly dependent on their technical skills; a clearly changing reality due to IT and AI developments. Hence, accountants are becoming more involved in decision-making processes in companies, as advisors in financial as well as non-financial departments, requiring greater relational and communication skills [69,70].

4.2. Dimension 2: What We Practice

All analyzed courses ($n = 35$) are composed of six semesters and a total of 180 credits distributed over the 3 years of the study cycle. Figure 2 shows the distribution of the curricular units by curricular areas. In absolute terms, out of a total of 1143 curricular units that make up the 35 courses analyzed, 940 curricular units (82%) fall within the development of technical skills; followed by 129 (11%) curricular units that aim to develop generic skills; then by 34 (3%) curricular units that are optional; 25 (2%) curricular units related to ethics and deontology of the accounting profession; and, finally, 15 (1%) curricular units focused on the development of behavioral skills.

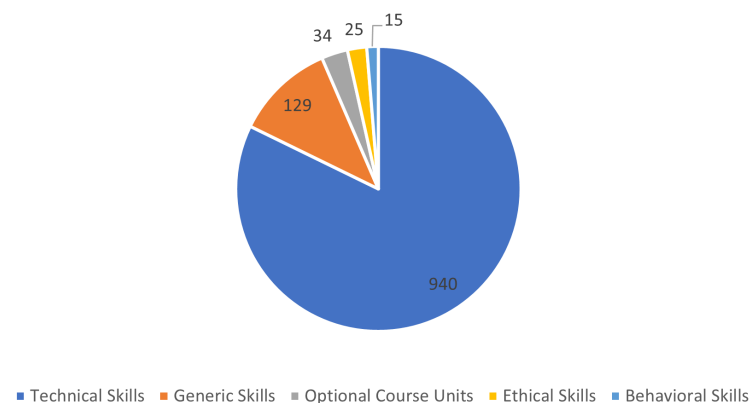


Figure 2. Distribution of curricular units for the 35 courses analyzed.

Concerning the credits attributed to each curricular unit, the tendency to favor the development of technical skills is accentuated, with a relative percentage of 85% of total credits. As we can see in Tables 3 and 4, there were no statistically significant differences between private and public HEIs in either number of curricular units or credits attributed to them.

Table 3. Comparison of the number of curricular units by curricular area between private and public HEIs.

	Private		Public		df	p-Value	t
	Mean	Standard Error	Mean	Standard Error			
Behavioral skills	0.190	0.393	0.111	0.361	103	0.303	1.035
Technical skills	8.905	1.509	8.984	1.732	103	0.806	0.246
Ethics and deontology	0.238	0.426	0.238	0.426	103	1.000	0.000
Generic skills	1.357	1.065	1.143	1.082	103	0.323	0.993
Optional	0.310	0.707	0.333	0.690	103	0.866	0.169

Table 4. Comparison of the number of credits by curricular area between private and public HEIs.

	Private		Public		df	p-Value	t
	Mean	Standard Error	Mean	Standard Error			
Behavioral skills	0.881	1.905	0.413	1.590	103	0.197	1.299
Technical skills	50.595	7.007	51.540	6.346	103	0.489	0.694
Ethics and deontology	0.810	1.547	0.730	1.461	103	0.795	0.260
Generic skills	6.286	5.266	5.286	5.105	103	0.342	0.954
Optional	1.429	3.506	2.032	4.645	103	0.455	0.749

However, when we compare universities vs. polytechnic institutes, we find some statistically significant differences. As we can see in Table 5, in university HEIs, the number of curricular units related to behavioral skills, and the number of optional curricular units is greater than in polytechnic HEIs. In turn, the number of curricular units related to technical skills is greater in the polytechnic than in the university education.

Table 5. Comparison of the number of curricular units by curricular area between university and polytechnic HEIs.

	University		Polytechnic		df	p-Value	t
	Mean	Standard Error	Mean	Standard Error			
Behavioral skills	0.333	0.537	0.067	0.249	103	0.015	2.477
Technical skills	7.867	1.384	9.387	1.540	103	0.000	4.663
Ethics and deontology	0.133	0.340	0.280	0.449	103	0.078	1.782
Generic skills	1.500	1.118	1.120	1.045	103	0.120	1.566
Optional	0.600	0.917	0.213	0.549	103	0.040	2.080

These results suggest that Polytechnic Institutes seem to focus more on their training on technical skills, while universities had a comparatively higher investment in behavior skills, as the sheer number of offered courses stands. When considering credits attributed to the curricular units (Table 6), the afore mention tendency is confirmed, and two more areas appear as significantly different: ethics and deontology (higher focus in polytechnics) and generic skills (universities).

Table 6. Comparison of the number of credits by curricular area between university and polytechnic HEIs.

	University		Polytechnic		df	p-Value	t
	Mean	Standard Error	Mean	Standard Error			
Behavioral skills	1.667	2.724	0.173	0.789	103	0.007	2.766
Technical skills	46.667	7.277	52.960	5.397	103	0.000	3.986
Ethics and deontology	0.367	0.948	0.920	1.639	103	0.036	2.128
Generic skills	7.933	6.049	4.787	4.504	103	0.015	2.477
Optional	3.367	5.701	1.160	3.277	103	0.057	1.921

From the analysis of the curricular units and credits distribution over the 3 years that make up the study cycles (Figures 3 and 4), we see that the largest percentage of curricular units and credits aimed at developing behavioral competencies and generic competencies are in the first year.

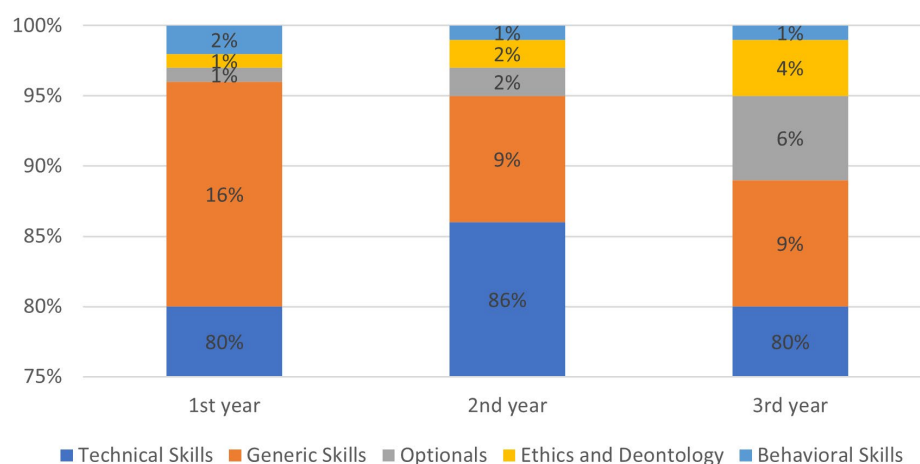


Figure 3. Distribution of curricular units by curricular area over the years of the study cycle.

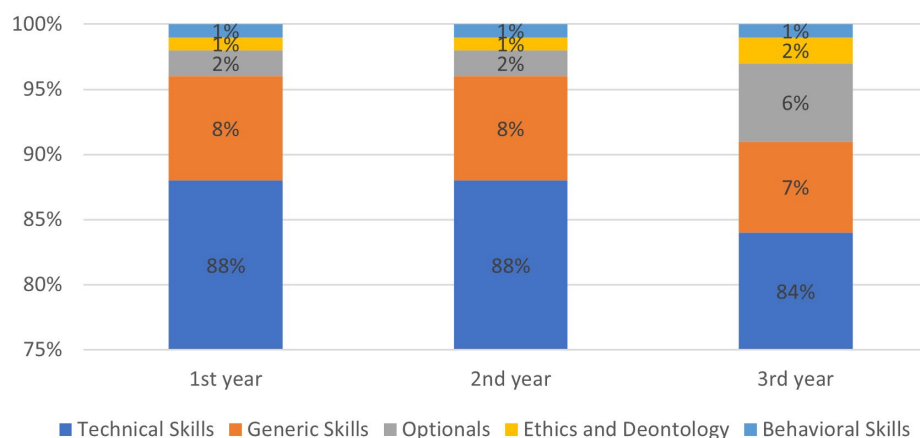


Figure 4. Distribution of credits by curricular area over the years of the study cycle.

In the second year of the study cycle, based on the number of curricular units and consequently the number of credits awarded, it can be concluded that the weighting given to technical skills is higher. Still, for the second year, on average, only 7 out of the 60 credits allocated to the year concern curricular units dealing with non-technical skills. It should also be noted that it is in the third year that the number of optional curricular units tends to be higher; they may therefore be associated with the development of both technical and non-technical skills. However, non-technical skills represent in relative terms only 6% of the total curricular units of the year, being on average one curricular unit per year.

Thus, Portuguese HEIs seem to be mostly concerned with technical skills and only residually focus on developing the transversal skills (behavioral, IT, etc.) and ethical values that are not directly related to accounting in the view of Arial et al. [32]. We believe this might be happening for a couple of reasons. First, it is important to acknowledge that guidelines and demands from the national (OCC) and international (IAESB) regulatory boards are not totally compatible, in the sense that the local guild requires a very large amount of specific technical knowledge and skills, whereas the IAESB has been increasingly calling out to the importance of developing transversal competencies (including soft skills) to promote the adaptability of accountants to a changing professional paradigm. Further, as in other European countries, the Bologna process has reduced the number of years previously dedicated to the initial training of accountants from 5 to 3 years, which left little space in accounting courses for curricular units that develop skills other than technical ones. Yet there seems to be a greater concern among universities vs. polytechnic institutes regarding the development of behavioral skills. The development of these skills occurred mainly through the curriculum of integrated masters, which are exclusive to universities,

allowing students to immediately enroll in a corresponding master's, in the same institution, after their degree. Polytechnic institutes, in contrast, did not have this possibility while traditionally being more focused on the practical requirements of the labor market, which led to a philosophy of greater concern with technical skills at the undergraduate level, considering the possibility students would have further on to pursue a masters in any other complementary area. Conversely, the greater concern with ethics of polytechnics vs. universities may also be related to this concern with possible immediate integration into the accounting profession after graduation.

5. Discussion

Comparing our SLR to the analysis of curricula composition, there is a clear gap, which points to the need to review and restructure the accounting study plans—an idea supported by international regulatory bodies such as IAESB and the International Federation of Accountants (IFAC) [71,72]. Active teaching methodologies should be put into practice, as the example of the pause method applied by Chen et al. [73] in two HEIs in China that revealed significant differences (*t*-tests compared two neutral responses) for five items for both university groups: communication skills (oral communication skills, written communication skills, interpersonal communication skills); beneficial to the learning process; and a more enjoyable learning experience. Or the study developed by Madsen [74] introduced a selection/transformation framework and provided examples of how the framework can generate accounting education research questions such as materialistic values among students, communication skills, and low diversity auditing profession.

Although the technical component already has a greater weight in the study plans than in past versions of the curricula, the development of behavioral and ethical/deontological skills still represent a residual part of the study plans, contributing to a mismatch between the skills held by students and the needs of the labor market [33]. In the future, the importance attributed by HEIs to non-technical skills is expected to be higher, to meet the growing needs of the labor market and paradigm shifts in the accounting profession.

These changes should also be embraced and supported by other institutions, including the local and international regulatory bodies in both the accounting profession and higher education accreditation, a fundamental element so that courses may be accredited and validated [75]. In addition, other types of organizations should be considered as influencing the construction of the accountants' profile, including student organizations, that may (1) provide significant knowledge and opportunities in several activities that support student development, and the transition from college to professional careers, (2) result in tangible outcome benefits, such as career preparedness and increased job placement opportunities, (3) are strongly valued by all stakeholders, and (4) are recommended by both participants and non-participants [76].

The development of these transversal skills, as well as a greater sense of ethics and value from the beginning of the accountancy professional training and through lifelong learning, is fundamental to prevent the profession from becoming obsolete [63].

6. Conclusions

In this study, we have shown that consistently the literature reflects the increased need for soft skills in accountants in the present and in the future, a reality in stark contrast with the curricula analyzed in this paper. The development and implementation of AI in daily life have been the defining event for the beginning of the fourth Industrial Revolution, which has been intensifying technological changes with impact in nearly all sectors of human life, including work all over the world.

The accounting profession, due to the highly structured and repetitive nature of many core tasks, has become one of the areas in which this progress has had the most impact [17,77]. Thus, AI systems have been automating structured, planned, and repetitive functions previously performed by humans. This has allowed large amounts of information to be processed in short periods of time—but the impact of AI in accounting is not expected

to stop here because these systems are predicted to develop the capacity for self-learning and, consequently, be able to deal with unstructured tasks and with great complexity in a not-so-distant future [20].

These changes—which have already begun taking place—are bound to change deeply not only accounting processes and working methods but also the accounting professional's duties and responsibilities. In light of this fact, it is essential that accountants are equipped with a set of skills that allow them to continue to offer value to the market and to make the existence of the profession relevant [8].

Considering that higher education plays a major role in improving and broadening the skills of accountants [18], the development of new skills and the improvement of the accountant's curricula are emerging needs.

The trend in focusing on technical skills in accounting HEIs training instead of the transversal ones seems to be more or less global (although we found no other in-depth national studies of this sort elsewhere in the literature). The key lesson here is that HEIs should start focusing more on the sustainability of the accounting profession and labor market since HEIs, students, graduates, and employers have compatible advantages for the development of different types of professional skills and knowledge [78]. This innovation must therefore also be supported by the professional guilds and agencies in charge of accrediting accounting courses.

This study has important theoretical and practical contributions. Theoretically, it extends the literature on the accountant's profile, in particular on the gap between the competencies that Portuguese HEIs develop with their curricula and the skills the profession currently needs. In practical terms, this study pointed out some shortcomings of the accounting curricula in Portuguese HEIs that may justify a new approach to their contents in future course reviews.

Despite its contributions, this study has some limitations. In Dimension 1, there was only one database used to collect papers (Web of Science), and perhaps a wider search with different databases could yield a larger number of papers that could enrich the results. Dimension 2 focused on courses' curricula but only had access to curricular units' names since syllabi are usually not made public in Portugal. This means that curricular units with the same name could have different contents and methodologies, which may also have an impact on the developed competencies and on the results.

Future research should further this study and keep shedding light on the chasm between 'what we preach' and 'what we practice' in accounting education the world over. It is important to keep reflecting on the future of accounting education and strategies to adapt to the 4.0 world and to comply both with professional guilds and accreditation agencies' requisites and the labor market demands.

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Appendix A

Table A1. Papers analyzed in the Systematic Literature Review.

Year	Authors	Title
1991	Albin, M. J. & Crockett, R.	Integrating Necessary Skills and Concepts into the Accounting Curriculum
1998	Usoff, C. & Feldmann, D.	Accounting Students Perceptions of Important Skills for Career Success
2001	Parker, L. D.	Back to the Future: the broadening accounting trajectory
2002	Jackson, R. B. & Cherrington, J.O.	IT Instruction Methodology and Minimum Competency for Accounting Students
2003	Howieson, B.	Accounting practice in the new millennium: is accounting education ready to meet the challenge?
2003	Mohamed, E. K. & Lashine, S. H.	Accounting Knowledge and Skills and the Challenges of a global Business Environment
2003	Scapens, R. W. & Jazayeri, M.	ERP systems and management accounting change: opportunities or impacts? A research note
2005	Hassal, T., Joyce, J., Montanto, J. L. & Anes, J.A.	Priorities for the Development of Vocational Skills in Management Accountants: a European Perspective
2005	Robley, W., Whittle, S. & Murdoch-Eaton, D.	Mapping Generic Skills Curricula: a Recommended Methodology
2006	De Lange, P., Jackling, B. & Gut, A.	Accounting graduates' perceptions of skills emphasis in undergraduate courses: an investigation from two Victorian universities
2006	Duncan, J. & Schmutte, J.	Change in Accounting Programs: the impact of Influences and Constraints
2007	Hill, W. Y. & Milner, M. M.	The Placing of skills in Accounting Degree Programmes in Higher Education: Some Contrasting Approaches in the UK
2008	Kavanagh, M. H., & Drennan, L.	What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations.
2009	Jackling, B., & De Lange, P.	Do Accounting Graduates' Skills Meet The Expectations of Employers? A Matter of Convergence or Divergence.
2009	Wells, P. K., Kranenburg, I., Gerbic, P. & Bygrave, J.	Professional Skills and Capabilities of Accounting Graduates: The New Zealand Expectation Gap?
2010	Bui, B., & Porter, B.	The Expectation-Performance Gap in Accounting Education: An Exploratory Study.
2010	Carnegie, G. D. & Napier, C. J.	Traditional Accountants and Business Professionals: Portraying the Accounting Profession after Enron
2010	Paisey, C. & Paisey, N. J	Comparative research: An opportunity for accounting researchers to learn from other professions
2011	Severin V. G., Stewart A. L., & Pamela J. S.	A Review of ERP Research: A Future Agenda for Accounting Information Systems
2012	Carnegie, G. D. & Napier, C. J.	Accounting's past, present and future: the unifying power of history
2014	Carnegie, G. D	The present and future of Accounting History
2017	Richins, G., Stapleton, A., Stratopoulos, T. C. & Wong C.	Big Data Analytics: Opportunity or Threat for the Accounting Profession?
2018	Akhter, A. & Sultana, R.	Sustainability of Accounting Profession at the Age of Fourth Industrial Revolution
2018	Fernandez, D. & Aman, A.	Impacts of Robotic Process Automation on Global Accounting Services

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