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Paper Title

University Accounting Education for Internal Control and Cybersecurity in Companies

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ABSTRACT: The present study of the Research Project: Analysis of IFRS Sustainability in Companies with University Accounting Education of the Technical University of the North (UTN) was carried out in Ecuador, with the objective of identifying the guidelines of university accounting education, with application of internal control and cybersecurity for companies, according to scientific supports and innovative ideas that enhance the improvement of skills of students in technical careers, to counteract the risks and technological threats existing in the business world. The methodological support of the research was exploratory, descriptive and correlational, supported by the statistical method, the survey technique and the questionnaire. The test was applied to 60 undergraduate students of the Accounting and Auditing Degree (CCA) of the academic unit of study. The processed results reached a Cronbach's Alpha of 0.8 with relevance of the study; according to the first analysis of the statistical processing, with the relation of variables: accounting education, internal control and information security, 43.3% of total student satisfaction was achieved and through the second data analysis, with the processing of cross tables, a dispersion of responses was found on an intermediate scale with 58.3% of student acceptance, with respect to the examined variables. These results affirm the unification of academic efforts for the implementation of technical mechanisms for the strengthening of university accounting training, with sustainable innovative educational guidelines, which invigorate educational attention in the control, sustainability and security of business data, with effective professional responses in accordance with modern trends and technological requirements of the globalised world.

Keywords: University students. Accounting Education. Internal Control. Cybersecurity. Sustainable Enterprise

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1. Introduction

Education in higher education institutions is relevant to the shared responsibility in the academic function, which strengthens the university training of students for the creation of innovative actions. Universities create and expand practical work to manage quality, communicate their results and obtain institutional notoriety. [1]. In the field of university accounting education, assistance with internal control and information security is of paramount importance.

Because internal control and risk management have changed today, due to the transformation of the global and organisational environment. [2]. Where risk management education prevails to achieve organisational objectives, companies worldwide consider this approach to align the tactics, subjects, processes, technologies and knowledge that underlie the components of the internal control system.

Worldwide, science and technology are advancing in the modern revolution, with the development of innovative educational skills through the practical application of pedagogical technologies. [3] for future professionals in public accounting, because companies need to comply with control measures, to strengthen the transparency of operational activities, with the disclosure of financial reports, access to sources of financing and other operations, which enable the increase of global competitiveness.

The academies strengthen university students, with teaching support, with the analysis of regulations, reports and institutional documents on open science. [4], productivity, quality and efficiency, but in common practice, the academic profession in many universities is regulated by clientelism. [5]. Where concrete actions need to be taken, with attention to student records that may affect the academic system. [6].

Faced with multiple cases of data insecurity, where technology has revolutionised the world, it is ideal to implement new mechanisms, programmes and educational strategies, with the analysis of teaching guides for the subjects taught. [7] to strengthen the learning process of students in the course of accounting specialisation.

The scientific contributions of multiple institutions contribute to the joint strategic educational action, with the strengthening of control filters in financial systems with data cybersecurity. Because South American companies need to drive digital transformation, with cooperation and alliances with other companies, as 81% of Latin American executives emphasised the increase of regional investments in new technologies with greater training of human capital. [8] to increase profitability with a sustainable approach.

The main objective of the study was: to analyse university accounting education, with the application of internal control and cybersecurity for businesses, by identifying scientific supports on accounting education, by scrutinising innovative ideas, according to academic plans and programmes, with educational and business contributions, to counteract existing technological risks and threats in business; to examine the university education provided for the accounting and auditing speciality, with the support of internal control and information security provided in the study sector, to determine the analysis of the elementary aspects in accounting education and control, which contribute to sustainable development.

In this sense, with the collaboration of teachers and students, an academic reflection was carried out: How is university accounting education contributing to the strengthening of students for the development of internal control and cybersecurity in companies?

2. Theoretical Overview of the Main Concepts

Education, with the support of public management, underpins the economic advancement of countries, with constitutional law applied in state intervention for the development and political optimisation of related issues in educability. [9]. It is essential to point out the need for adjustments in the educational system for a reorganisation of the teaching process, which promotes meaningful learning with adequate competences for students, for performance in professional life, with the application of adequate tools that allow for the resolution of labour conflicts existing in the entities. [10]. Because the accountant stands out as the link between the accounting team and other areas of the company. [11].

University Accounting Education: Evolution, Approaches and Innovation

University accounting education has traditionally focused on technical training and the acquisition of skills related to financial accounting, auditing, and taxation. Today, accounting practices have changed, with the use of information technology (IT)-based accounting information systems, in line with technological advances, which have transformed the way accounting information is recorded, processed and reported [12]. Because the evolution of the business environment demands a change in the educational approach, integrating transversal competences such as internal control and cybersecurity.

Accounting education must adapt to new market demands [13], incorporating content that prepares students to face the technological and regulatory challenges that characterise modern organisations. Accounting education in universities must go beyond the simple transmission of technical knowledge; it must train professionals capable of thinking critically and adapting to changes in the business environment. [14]. This broader approach responds to the needs of the labour market and the dynamic context in which organisations operate.

Because today's new ways of strengthening accounting education, learning outcomes and professional competencies must respond to the needs demanded by organisations, the state, families and the community at large. [15], according to the requirements in professional accountancy education, as stated in international training pronouncements [16]. The formation of professional competencies is one of the fundamental foundations of university accounting education. These competencies include technical, analytical and ethical skills, which are necessary for accountants to perform their roles effectively. The key competencies are detailed in Table 01.

Table 01
Professional Competencies and their Relation to Accounting Education

Technical Skills	Critical Thinking and Problem Solving	Ethics and Professional Responsibility
They comprise the competencies of an accountant with a command of accounting and legal principles and standards, with a solid understanding of, and support for, accounting tools and software. These skills are fundamental for the preparation of financial statements and audits. [17] the pre-professional practice of the accountant plays a decisive role, because technical skills are the foundation of the accounting trainees.	It is the ability to make informed decisions and analyse complex situations and is essential in modern accounting. Thus, accounting education should foster critical thinking and problem-solving skills, especially in the identification and mitigation of financial and operational risks.	Ethics is a crucial component of accounting education, given the impact of accounting decisions on society. Accounting education should emphasise the importance of acting with integrity and responsibility.

Adapted from (Valera, F. L.; Matos, P. K. 2017) summary of professional competencies.

By fostering an environment that emphasises technical knowledge, critical thinking, communication and innovation, universities can ensure that graduates are well equipped to thrive in the constantly evolving accounting landscape. [18].

The benefits of education transcend the individual sphere, from the home and in the development of society, with significant external contributions to economic growth and innovation. [19]. Where the educational work with project-based learning, favours the student's research to contribute with an intelligent solution to solve the problems of the situational reality. [20].
Innovation in accounting education includes the integration of technologies such as accounting software, data analysis tools and online learning platforms. These technologies not only facilitate learning, but also prepare students for the use of tools that will be fundamental in their professional lives. For [21] who stress that the use of advanced technologies in accounting education not only improves understanding of complex concepts, but also prepares students for a working environment where digitalisation is the norm.

Internal Control in Accounting Education

Accounting education plays a key role in this context, as it provides the conceptual and practical basis for designing and evaluating internal control systems. According to [22], A sound internal control system is essential to prevent fraud, errors and to ensure the integrity of financial information. In noting [23] that a practical approach to the teaching of internal control is crucial for students to understand how internal control is applied in different types of organisations and how it contributes to the prevention of fraud and error.

Accounting education contributes to the organisation, in the application of internal operational controls, to know its real situation, by having a planning capable of verifying compliance and supervision, with better vision in business management. [24], with the use of additional guidance for companies to implement effective internal control over sustainability reporting (ICSR), using the globally recognised COSO Internal Control-Integrated Framework (ICIF) [25]. Because internal control describes the set of procedures and policies established by an institution to ensure the efficiency and effectiveness of its processes, the reliability of its financial reporting and compliance with applicable laws and regulations.

Internal control and sustainability arguments should also be included in the management accounting books to support educators in determining the structure and content of management accounting courses [26]. Considering the challenges of conducting sound research with best practices for accounting and auditing [27]. With the simple value-added accounting model of the financial sector, which can corroborate the growth of investments, to achieve a more productive economy that would generate economic growth [28].

Security and Cybersecurity in the Business Context: Approach, Role and Challenges

Cybersecurity has emerged as a critical area in business management, directly affecting accounting and finance. The protection of financial information and the prevention of cyber-attacks are aspects that must be integrated into accounting training. Para [29], establishing the inclusion of cybersecurity in the accounting curriculum is a necessary response to the growing threats in the digital environment, where financial information is a frequent target of cybercriminals. The inclusion of cybersecurity in accounting education programmes is essential to develop professionals who can protect organisations' digital assets and ensure the reliability of accounting information [29]. Thus modern accountants cannot limit themselves to understanding only accounting principles; they must be aware of cyber vulnerabilities that can compromise the integrity of financial and operational data, [30]. Cybersecurity training enables accountants to identify, assess and respond to these threats effectively.

The integration of topics such as internal control and cybersecurity in accounting education is essential to develop professionals capable of responding to contemporary risks. Because accounting education must incorporate risk management and cybersecurity competencies, given that modern accountants play a crucial role in protecting organisations' financial and operational information. [31]. Thus, cybersecurity should be seen not only as a responsibility of the IT department, but as an integral part of the business strategy that involves all levels of the organisation, including accounting and finance [32].

Cybersecurity is a discipline concerned with protecting information systems, networks and data from attacks, unauthorised access, and other cyber threats. In the business environment, cybersecurity is critical to protecting digital assets and ensuring business continuity because it is not only the responsibility of the IT department; it is an essential component of internal control that requires the collaboration of all areas of the organisation, including accounting and finance. [33]. The digital business environment is exposed to a variety of cyber threats that can seriously affect the operations and financial security of companies. The main cyber threats are listed in Table 02.

Table 02
Cyber threats

Threats	Concept
Phishing and Electronic Fraud	Phishing is one of the most common tactics used by cybercriminals to obtain sensitive information, such as login credentials or financial data. Businesses need to be constantly vigilant and educate their employees on how to identify and avoid these attacks.

Ransomware	This type of malware encrypts company data, demanding a ransom in exchange for the decryption key. Ransomware can bring an organisation's operations to a halt and cause significant financial losses.
Denial of Service Attacks (DDoS)	These attacks seek to make an online service unavailable by overloading servers with malicious traffic. A DDoS attack can disrupt a company's operational continuity and damage its reputation.

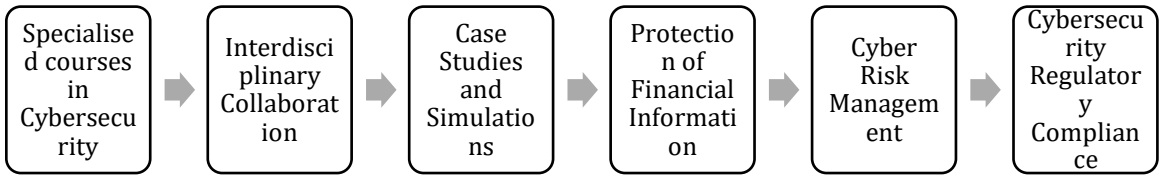
Note: Today's cyber threats are affecting the business environment. With the exponential growth of cyber attacks in recent years proving that no organisation is immune, the importance of robust cyber security is underlined [34].

The Role of Cybersecurity in Corporate Accounting

Cybersecurity should be an integral part of accountants' training, as they are the guardians of financial information and must be trained to protect it from potential threats [35]. Because internal control and cybersecurity are intrinsically linked, as both seek to safeguard the organisation's assets, guaranteeing the integrity of information, ensuring operational efficiency.

The integration of cybersecurity into internal control systems is essential for effective risk management. Because an internal control system that does not consider cybersecurity is incomplete and exposes the organisation to significant risks in an increasingly hostile digital environment. [36], Cybersecurity training for accountants should therefore cover a variety of technical topics to enable them to understand and mitigate cyber risks. Among the most effective strategies are listed in Figure 01

Figure 01
Cybersecurity education strategies



Note: The graph shows the strategies according to the main topics that currently influence student knowledge, in order to maintain adequate control of business resources, an alternative are the specialised courses in cybersecurity and risk management, with audits of information systems, and vulnerability analysis. (Cepretec, 2021).

3. Methodology

Research methodology
The study applied the quantitative approach with the systematisation of procedures for the abstraction of learners' data. [37]. Because the quantitative approach makes it possible to solve the problem posed, [38] following the methodological approach, with the aim of analysing higher education accounting, internal control and the different aspects of cybersecurity, which students need to master for future professional performance in companies.

To identify scientific supports in accounting education. To apply the diagnostic assessment to students in the study sector and to analyse the support of the results of the accounting education aspects. By reviewing the control variables (accounting education and internal control with cybersecurity) used by the researchers, to reflect on the data, according to the existing aspects of influence between variables. The research methodology was reflected in Table 03.

Table 03
Research Methodology

Quantitative Research	Methodology		
	Exploratory	**Descriptive**	**Correlational**

The application of quantitative research combined elements of exploration, description and correlation, analysing accounting education, internal control and cybersecurity, with the involvement of students at the final level of the accounting and auditing degree.	The exploratory methodology made it possible to identify and understand the different aspects related to university accounting education and internal control, according to the opinion of students with an exit profile for the labour market.	The descriptive methodology provided a detailed and structured view of the accounting characteristics in learners, the review of standards, control and present and future remains on the accounting educational input. Based on the research questions formulated. [39].	The correlational methodology made it possible to analyse the existing relationships between accounting education, internal control and cybersecurity, according to the criteria of the university students investigated, ensuring significant links between variables and factors, according to the evolution of university education and its influence on new professionals. It was important to analyse the possible relationships between control variables of the study and other indicators that contributed to business performance.

Method

The study used the statistical method, which contributed to the quantification of scientific information. [40], because the data were processed in the "Statistical Package for Social Sciences" [41] to obtain the information for the analysis of the study. The overall reliability of the questionnaire was found by means of the coefficient "Alfa de Cronbach" [42]. In this sense, the methodological design adopted was non-experimental and descriptive, based on the tables presented, because the variables were not manipulated, but were observed and analysed as they appeared in the reality of the participants.

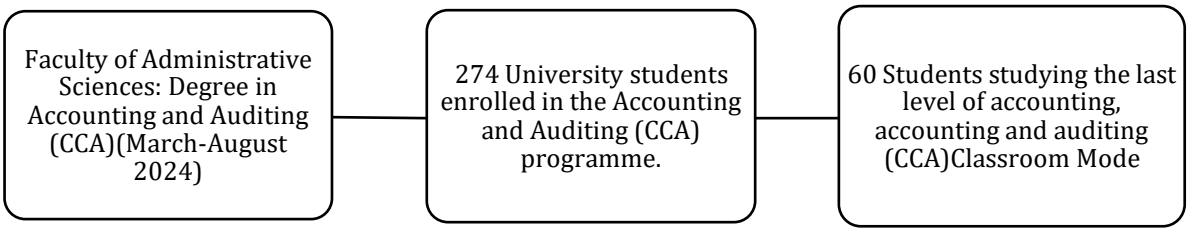
Non-experimental design is characterised by observing phenomena in their natural environment in order to establish relationships between variables, without the intervention of the researcher. [43]. In this way, the analysis of the quantitative data obtained from the surveys used the statistical software (SPSS), with which the analyses were carried out according to descriptive and correlational statistics. To obtain the results, which were represented through frequency tables and cross tabulations, which made it possible to identify patterns and trends according to the participants' responses.

Population

In this research, a finite population of sixty collaborators was considered, because the exact number of elements that constitute the study was known (León, Maguiña, & León, 2023). Thus, the population was composed of 60 students with an exit profile from the professional career in accounting. Structured surveys were applied, with the design of the questionnaire of questions and the use of other tools to obtain quantitative data. To apply non-probabilistic convenience sampling, where participants are selected based on their availability and relevance to the topic of study. [44] when access to the population is limited.

With these references, the population of students enrolled in the academic unit of study was obtained, according to [45] and the list of students in the accounting specialty, therefore, the subject population of the study was 60 university students in the classroom mode of the Accounting and Auditing Career (CCA), Technical University of the North (UTN) who studied the last level of the accounting specialty. As shown in Figure 02.

Figure 02
Population of university students



Note: Taken from (UTN en Cifras, 2024).

Techniques

For this study, common research techniques (survey) were used to collect the information independently. [46]. The survey technique was established for the purpose of collecting data on the knowledge and perceptions of students of university accounting education, with the study of internal control and cybersecurity. The diagnosis was applied to students with an exit profile, in the classroom mode (CCA), who were examined according to their perceptions of the level of knowledge for their future professional contribution in the economic and financial field of work in public and private entities.

Instruments

The research had the collaboration of professional experts in the area of accounting and auditing, with practical experience in internal control and cybersecurity, who validated the instruments for the field application. The (Questionnaire 1) was designed, through the Likert scale, for statistical analysis, with an overview of the students' knowledge and competences. Because the use of Likert scales allows to measure the attitudes or perceptions of the respondents in a numerical way, facilitating the subsequent statistical analysis. [47].

This questionnaire as a tool [48] which consisted of 12 items, which facilitated the collection of data from the students (CCA); to understand their educational experiences at the end of their university studies. This data collection instrument (Questionnaire 1) reflected their views on accounting education and control, analysing from the practical business experience to the academic approach to higher education, according to the quantitative analysis obtained from Martínez (2012), cited inr [49].

4. Discussion

Globally, the basic function of Higher Education Institutions (HEIs) through the advancement of university education is to promote the effective contribution to economic and social transformation in all areas of economic, social and environmental development. In this sense, social, family, community, business, institutional and state assistance needs arise, according to the new discoveries and evolution of scientific knowledge in different areas.

Also the technological development, financial sustainability and existing inventions in all fields of knowledge, have encouraged to carry out this study, which was based on the analysis of scientific theory related to issues of internal control and cybersecurity of information, because in the current era there is a boom in innovative education, sustainability and preservation of digital data to prevent risks in the management of business information.

Procedures reflected in the study

The authors considered it fundamental to base the study, from the field of knowledge, with the direct examination applied to the students, to evaluate their level of knowledge, with the guidelines of technical specialisation in accounting and auditing, according to the student strengths developed at the end of their university career, according to the supports of the theory of specialisation.

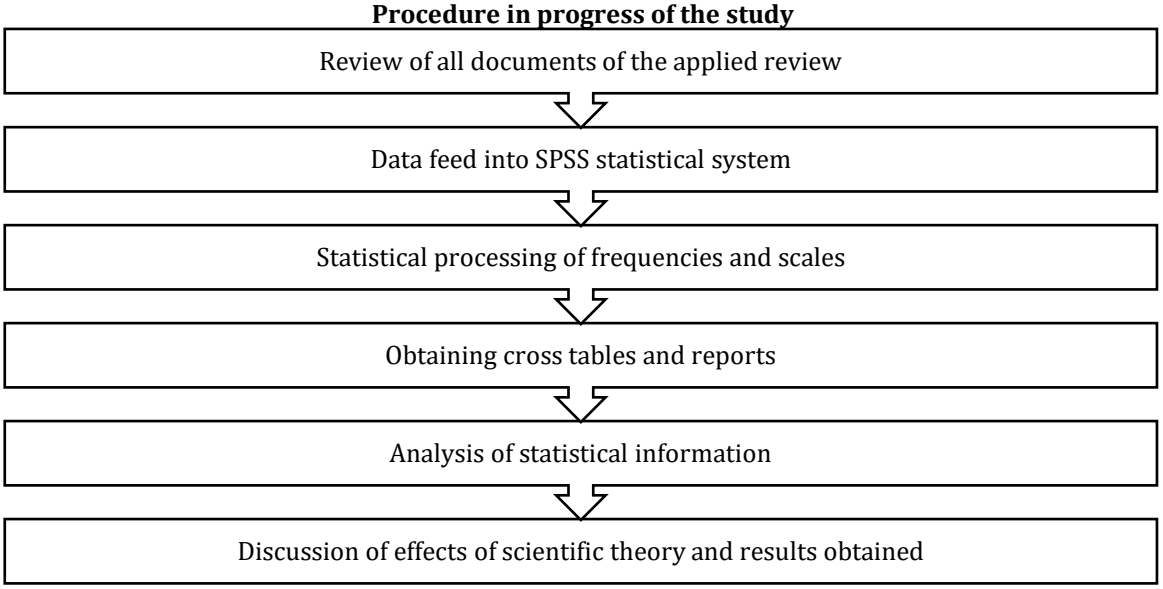
Because accounting students are the professionals of the future business, which need to have the elementary support of skills and abilities in accounting, operational control, cybersecurity, and other related areas, to reflect their professional capacity in the organisational environment, therefore, the focus of internal control and supervision of accounting and financial systems, is elementary, according to the observance of legal standards and data security of financial economic information.

University accounting education has undergone a significant transformation over the last decades. Scholars indicate that it traditionally focused on technical aspects of accounting and auditing, but today accounting education has evolved to include a more holistic approach, integrating core competencies in the context of internal control, risk management, professional ethics and cybersecurity. Knowing that, internal control is a central topic in the training of future accountants, as it ensures that business operations are conducted efficiently and in compliance with laws and regulations. Therefore, accounting education should provide students not only with the theoretical knowledge of internal control, but also with the practical skills for implementation and supervision in a real environment.

This research summarised the fundamental aspects of university accounting education according to the landscape of business, internal control and cybersecurity for the analysis of the learning of students who are pursuing a university degree in the field of accounting and auditing.

Therefore, in the analysis of results, a review of all the respondents' documents, SPSS data entry, statistical processing of frequencies, obtaining reports and review of cross tables, for the analysis of statistical information and discussion of results, according to the theoretical aspects and the results obtained, were carried out. According to Figure 02.

Figure 03
Procedure in progress of the study



Note: Steps taken in the research, according to the statistical data obtained.

Reliability of the study

For the execution of results, the questions of the Questionnaire (1) were processed in the SPSS Programme, according to the scaled analysis, to determine the reliability of the study. These data that were tested, allowed to find the reliability of the information, with Cronbach's Alpha, which reached the indicator of 0.8, with a total of 12 questions processed, according to the data report of the learners with exit profile of the university career (CCA), (UTN). The reliability results of the study are shown in Table 04.

Table 04
Reliability of the research

Reliability statistics of the study

Reliability statistics	
Alfa de Cronbach	**N of elements**
0,800	12

Note: Statistical processing (SPSS, 2024)

Summary of case processing			
	Detail	**N**	**%**
Cases	Valid	60	100,0
	Excluded[a]	0	0,0
	Total	60	100,0

Note: Deletion by list is based on all variable in the procedure.

5. Synopsis of the Main Research Outcomes

Analysis of the first statistical processing of data

According to the statistical processing, in the first instance the results obtained from 60 accounting students were analysed, according to the existing relationship according to the frequency tables, where it was verified, the result of the university accounting education variable that reached 38.3% of total student satisfaction; In the same sense, 35% of students were moderately satisfied with their accounting education process, and 26.7% of students were satisfied with their level of studies during the normal course of their professional career, with expressions of security to take on new challenges in the labour field.

On the other hand, the level of knowledge in internal control of the investigated university students, represented 48.30% of very satisfactory domain; 38.30% also had a moderately satisfactory domain and 13.30% of the students who reflected their satisfactory participation according to the evolution of learning in the different topics related to internal control, for future business intervention. According to the average ratio of variables, the very satisfactory opinion prevailed, because the trend variations according to the level of satisfied knowledge had a higher priority for the internal control variable, according to the statements of the university accounting students, as shown in Table 05.

Tabla 05

Relationship of Variables: University Accounting Education and Internal Control with Cybersecurity

University Accounting Education					Internal Control				Relationship and Variation			Note
	Scale of Likert	F	%	% valid		Scale of Likert	F.	%	% valid	Relac X̄	Edu_C	C_I	
Válido	Satisfactory	16	26,7	26,7	Válido	Satisfactory	8	13,3	13,3	20,00	13 * <		*** Satisfaction with internal control prevails
	Moderately satisfactory	21	35,0	35,0		Moderately satisfactory	23	38,3	38,3				
	Very satisfactory	23	38,3	38,3		Very satisfactory	29	48,3	48,3	36,67		>*** 3	
										43,33		>*** 10	
	Total	60	100	100,0		Total	60	100,0	100,0	100,0	0,00	0,00	

Note: Derived from statistical data from (IFRS-2023 Sustainability Project using SPSS Processing, 2024).

Analysis of the main variables of the study in relation to other variables in the second data processing

Once the results of the main variables had been verified, it was important to relate university accounting education and internal control to other variables such as financial sustainability, international accounting standards and accounting specialisation, for which the processing of descriptive statistics allowed the procedure and analysis to be carried out in this scenario, according to the percentages obtained in terms of knowledge of financial sustainability and accounting management, as shown in Table 06.

For the variable university accounting education, the results showed that 38% of the respondents considered that their knowledge of the university accounting education they received was very satisfactory, representing a positive indicator of the effectiveness of the training they received. 35% of participants gave a moderately satisfactory rating and 27% of the student body considered it satisfactory, because there are still areas where students need to improve. The absence of responses in the unsatisfactory category indicated that all participants have some level of satisfaction with their accounting training.

According to the variable, notions of financial sustainability, 20% of the students considered that their knowledge was very satisfactory; because 33% of the respondents reflected a satisfactory understanding, while 23% reported having a moderately satisfactory knowledge, even 23% of the opinion was

unsatisfactory. This suggests a significant gap in student understanding of this key sustainability issue for financial management in companies, and points to an urgent need to strengthen education in this area.

According to the variable sustainability standards (IFRS), 25% of respondents claimed to have a very satisfactory knowledge of these standards, while 38% of respondents classified it as moderately satisfactory, in the same sense, 22% of students claimed to have satisfactory knowledge; while 15% considered it unsatisfactory. These results reflected by the respondents, where it was noted that more than half of the students, if they have notions about the sustainability standards of (IFRS), adding the moderately satisfactory and satisfactory levels, also these indicators show that there are pending areas for improvement.
The level of accounting specialisation was perceived as very satisfactory by 25% of respondents, 40% rated it as moderately satisfactory, with a more moderate perception of their skills; 23% of respondents rated it as satisfactory, and only 12% considered it unsatisfactory. These results affirm that the majority of respondents feel confident, because their knowledge is solid, although not necessarily advanced, which points to the need to improve training in more specialised aspects of accounting and mastery of related areas.

The analysis of the internal control variable reaffirmed the first result, with 48% of respondents claiming to have a very satisfactory knowledge of internal control, with a highly positive perception of the students' preparation in this subject; 38% indicated a moderately satisfactory level; 13% rated their opinion as satisfactory, while there were 0 responses in the unsatisfactory category. In this scenario, finally, it was concluded that all respondents have at least a solid foundation in their internal control training, with a focus on a crucial topic for business management and cybersecurity. Therefore, the present research affirms the importance of strengthening in the areas related to higher accounting education, strengthening learning in internal control and information security. According to Table 06.

Table 06
Analysis of knowledge in accounting education, financial sustainability, accounting standards, accounting specialisation and internal control

Scale of Likert	University accounting education received	Financial sustainability	IFRS sustainability standards	Level of accounting expertise	Internal control
Very satisfactory	38%	20%	25%	25%	48%
Moderately satisfactory	35%	23%	38%	40%	38%
Satisfactory	27%	33%	22%	23%	13%
Not satisfactory	0%	23%	15%	12%	0%

Note: Derived from statistical data from (IFRS-2023 Sustainability Project using SPSS Processing, 2024).

Analysis of other variables that contribute to the main variables of the study.
In continuity with the data analysis, the analysis of the business strategies, the proposals considering the regulations and international standards that contribute to the advancement of the profession of future public accountants was reflected. Table 07 shows that 43% of the respondents considered that their participation in the implementation of business strategies was very good, while 33% rated it as good and 13% considered it excellent; regular and insufficient participation were in the minority, with 7% and 3% respectively.

This analysis determined that the majority of the students surveyed have had a positive and relevant experience in the implementation of entrepreneurial strategies, but the application of new teaching-learning mechanisms is needed to improve in terms of excellence. The application of (IFRS) and (IAS) references from the students'point of view is very good, with 47% of the respondents' opinion, while 27% rated it as excellent; 18% rated it as good and a small part rated it as fair or insufficient. These results reflected that the majority of respondents have a solid understanding and experience in the application of these standards, which is crucial for international accounting and financial transparency.

Similarly, in the function of quality practices, an excellent opinion was found with 10% of acceptance; 38% of very good opinion, being a significant portion of respondents who applied these standards with high competence; while 22% of students considered it good and reflected their opinion in an acceptable manner; however, 13% of opinion was regular and 17% with insufficient in application of these standards, constituting a significant portion of opinion, which needs to cement the competence in this area.

In the same sense, in the handling of (SDGs) an excellent opinion was obtained with 13% of contribution, 42% of very good participation reflecting a significant contribution, which demonstrated the deep knowledge of the Sustainable Development Goals (SDGs); 20% of good opinion of the students who were familiar with the subject, although some limitations were noted with a regular option of 10% of participation and 15% of low contribution, which revealed the urgent need for training in this area.

Regarding the preparation of reports, the final results prevailed in the indicators of excellence and very good, because it was found that 51% of participation between the two variables indicated that the students surveyed do have a good capacity and competences to prepare reports according to the standards investigated. While 25% of opinion was good, with acceptable skills; followed by 5% of fair opinion and 18% of insufficient action. Because it reflected the requirement for greater strengths in their accounting education training process, for the issuance of financial reports. In terms of the next variable of the level of knowledge in other international standards related to accounting, the excellent opinion was found with 12% participation, followed by 38% very good, to show that students have a deep knowledge in other standards that support their profession; with 25% acceptable contribution from the group that has an admissible level of understanding. While the options indicative of fair and insufficient opinions marked 25% of participation, who need further training in topics related to this area of knowledge. The results of the analysis are reflected in Table 07.

Table 07
Analysis of strategies, sustainability proposals, quality standards, sustainability standards and other standards related to accounting.

Qualification	Implementation of business strategies and security	Proposals for corporate sustainability	International Financial Reporting Standards (IFRS) and IASs	Practice of quality standards International standards - (ODS)	Estándares internacionales - (ODS)	Reporting based on IFRS sustainability standards	Knowledge of other accounting-related standards
Excellent	13%	8%	27%	10%	13%	13%	12%
Very Good	43%	48%	47%	38%	42%	38%	38%
Good	33%	28%	18%	22%	20%	25%	25%
Fair	7%	7%	5%	13%	10%	5%	7%
Insufficient	3%	8%	3%	17%	15%	18%	18%

Note: Obtained from statistical data from the IFRS-2023 Sustainability Project using SPSS Processing (SPSS, 2024).

It is important to highlight that the university accounting education received by the respondents in general was perceived as very satisfactory, with observance in some areas with room for improvement, especially in topics related to financial sustainability and sustainability standards of (IFRS).

Because in the analysis of internal control, this area is best mastered by the respondents, while there is a good level of knowledge in the application of international standards such as IFRS and IAS. Similarly, business strategies also have a significant share. In this sense, the results reflected that, although there are strengths in the training programme in these variables of study, there is room for improvement in certain key aspects to ensure a deeper mastery in the critical areas.

Cross-tabulation results

Based on the established results, a cross-tabulation was developed to determine the weight per question and compare it with the information obtained, as detailed in Table 08.

Table 08
Classification of variables by cross-tabulation

Classification of variables				
Detail	**Weak**	**Intermedia**	**Solid**	**Total**
Students	13	35	12	60
%	21,67	58,33	20,00	100

Note: Obtained from statistical data from the (IFRS-2023 Sustainability Project through Processing (SPSS, 2024).

It is important to mention that the cross tables reflect the dispersion of the responses in three categories: "Weak", "Intermediate" and "Strong". The intermediate category is the most predominant, suggesting that most respondents have an adequate foundation, but need to improve in areas such as financial sustainability and internal control. The areas of strength focus on the application of business strategies and the management of internal control, while the weaknesses are more related to knowledge in sustainable finance and the application of IFRS and IAS. Table 08 describes the categories according to their main analysis.

Weak Category, where 13 respondents were self-assessed with weakness in the answers to the questions posed. The questions that predominated in this classification are related to areas in which respondents perceive a lack of knowledge or experience. These questions involve concepts of financial sustainability and international standards (IFRS) and IAS, since these were the areas where the greatest difficulty was observed in the previous interpretations. Some of the questions that could have influenced this ranking are: knowledge of financial sustainability, only 20% reported a very satisfactory knowledge, while a significant percentage considered it to be moderately satisfactory or even unsatisfactory. In this sense, the application of (IFRS) and (IAS) corresponds to only 47% who had a solid experience, leaving 53% with a lower rating, which may have contributed to this category. These areas suggest that the notions of sustainable finance and the practical application of international standards are weak points that require reinforcement in the training of the respondents.

The Intermediate Category was the largest, with 35 responses. Respondents probably have an acceptable level of knowledge, but feel that they still do not fully master the areas evaluated. This classification may have been influenced by questions related to university accounting education and internal control, where the majority of respondents showed a moderately satisfactory level; thus, university accounting education resulted with 35%, indicating that their knowledge was rated as moderately satisfactory, that although they have a knowledge base, they still feel the need to improve; while, in internal control, although 48% have a very satisfactory knowledge, 38% rated it as moderately satisfactory, because a good part of respondents still need some room for improvement in their knowledge in this area. In this sense, the intermediate category reflected areas where university training has been adequate, but has not yet reached a level of excellence or complete solidity. Here it is important to strengthen education in internal control and in the practical application of IFRS.

Solid category, with 12 responses obtained, which represented the surveyed students who considered themselves to have complete mastery in the areas evaluated, because the questions that were most related to this category are those linked to the areas where the students showed a high level of confidence and competence, thus, internal control with almost half of the respondents rated it as very satisfactory, while the application of business strategies with 43% of participation, rated it as very good and 13% as excellent.

In relation to the knowledge of IFRS and IAS, which reached 27% of the accounting respondents who have an excellent command of these standards. Therefore, the Solid Category reflected the areas of greatest strength, particularly in internal control, the application of international standards and the implementation

of business strategies. These results suggest that the respondents who belong to this classification have a strong command in key aspects of their accounting and business training, for professional performance.

Contributions of results

University accounting education framed in globalization, digitalization and changes in accounting regulations, requires the commitment and responsibility of universities to continuously adapt and update their study programs. Because the adoption of interdisciplinary approaches, which integrate accounting and its related areas such as internal control and information technology, are extremely essential for the strengthening of accounting students, in the course of their university career for future professional intervention.

Digital skills and security in risk management and business supervision, is a transcendental role for the safeguarding of business resources, to prevent risks and cyber attacks.It is essential to strengthen education in these areas related to the profession, with the implementation of educational strategies that allow increasing skills in the training of future public accountants.

Educational and social challenges reflect opportunities to innovate and improve the quality of accounting education. The main challenge for university accounting education is to keep up to date with market demands and emerging technologies. For practical cases and simulations, cyber attack simulations and real case studies can be used, so that students can apply their knowledge in inspected environments, which strengthens their response capacity to various incidents. Likewise, interdisciplinary collaboration encourages collaboration between accounting, IT and law departments, to prevent cybersecurity risks. As noted by the Spanish Data Protection Agency, [50], that interdisciplinary education in cybersecurity allows professionals to expand a more complete understanding of cyber threats, in order to know how to mitigate them effectively.

Students need to learn about data protection mechanisms, such as encryption, access control, and modern policies, to secure financial information. Since protecting financial data is a shared responsibility in the company, accountants must understand how to implement and monitor the necessary security measures [51]. Likewise, regulatory compliance is a key aspect of cybersecurity in companies.

Regulations, such as the Personal Data Protection Act in several countries, require organizations to implement adequate measures to protect personal and financial information. For accounting training, the study of regulatory frameworks is important, since non-compliance can result in significant penalties and damage to reputation. Because the regulatory framework in cybersecurity not only protects consumers, but also sets standards for companies to follow and protect their digital assets. [52].

In addition, it is necessary for educators to be well trained in cybersecurity to effectively impart this knowledge. Because the rapid evolution of cyber threats requires accounting programs to be flexible and constantly reviewed to ensure that students receive relevant and up-to-date training. [53]. Because in the digital age, cybersecurity has become a crucial issue, not only for companies, but also for the training of professionals in key areas such as accounting.

Thus, the integration of cybersecurity in accounting education responds to the need to prepare students to face and mitigate cyber risks that can affect the integrity and security of financial information. A main reason for integrating cybersecurity in accounting education lies in the growing dependence on information technologies in financial and accounting management. Because currently, cybercrimes and digital threats alert accountants to be equipped not only with traditional accounting knowledge, but also with cybersecurity skills.

Because in the business context, due to the growing use of digital technologies for information and operations management, organizations are increasingly vulnerable to cyber threats that can compromise the integrity, confidentiality and availability of data. That is why cybersecurity and internal control are key in risk management in organizations. Also, substantial attention is paid to educational sustainability for technical areas.

Thus, cyber risk management is a fundamental process in the profession of future accountants for the assessment of cyber risks and the integration into internal control systems. With the identification of

threats, assessment and mitigation of attacks, for the implementation of effective controls. Attention to the rules and regulations related to data protection and cybersecurity is an essential addition to the curriculum, because accountants need to be familiar with the laws, to ensure that accounting practices comply with current regulations. It is also important to consider the benefits of cybersecurity for future accountants in the process of university training. Table 09

Table 09
Benefits of Cybersecurity Training

Benefits	Reference
Improving Employability	Accountants with knowledge in cybersecurity are highly valued in the labor market, because they contribute to the protection of companies' digital assets.
Risk Management Capabilities	The ability to identify and mitigate cyber risks is a critical competency in business and accountants with these skills can enhance performance in key risk management roles.
Contribution to Business Sustainability	Accountants with training in cybersecurity contribute to the sustainability and resilience of companies by protecting the integrity of financial information.

Note: "Cybersecurity will continue to be a key issue in companies" [54]. Because the benefits of cybersecurity training improve the employability of accountants, creating a greater chance of being hired and having a decent salary aspiration. Because the labor market is more competitive, depending on professional specialization, in cybersecurity and control, with greater preparation to identify, evaluate and mitigate cyber risks, to exercise more comprehensive risk management in organizations. Because accountants contribute to business sustainability by playing a crucial role in protecting digital assets, company reputation and obtaining financial information with long-term sustainability.

6. Conclusions

University accounting education was analyzed, with the application of internal control and cybersecurity for companies, verifying the scientific supports and educational contributions of students and business accounting professionals, who with their skills and competencies are acting in the field of business and with their contingent plan financial actions to avoid the multiple risks and cyber threats that are latent in all areas of social, economic and environmental development.

The evaluation of accounting students (CCA) was carried out, with the data collected it was concluded that university education in accounting has strengths, but is not always safeguarding full effectiveness, according to professional needs related to internal control and cybersecurity. Because a disconnection between the theory taught in universities and the practical demands of the business environment, suggests the urgent need for strengthening and quality in technical accounting learning, with a rethinking of curricular programs, to align academic planning with the current challenges of sustainability, digitalization and globalization.

The analysis of the results on their level of knowledge in university accounting education for internal control and cybersecurity resulted in heterogeneous responses, which, according to cross-tabulations, showed that the majority of the students surveyed have an intermediate level of knowledge with 58.3%, a solid level of learning with 20% and a weak level of participation of 21.7%, because there are still areas of opportunity to strengthen accounting training. This reflected the need to update university educational programs to include more specific professional training in internal control, cybersecurity and sustainability, in line with the demands of the labor market.

The quantitative analysis highlighted that internal control is perceived as a fundamental tool for efficient business management, however, many of the respondents still need to increase solid accounting training supported by internal control during their university years. This finding coincides with previous studies that underline the need to integrate internal control as an integral part of university accounting programs. [55] [56].

Cybersecurity emerged as an emerging area of knowledge in the accounting and business field, and although 20% of participants reported having solid knowledge, the majority is at an intermediate level, indicating that there is still no full understanding of its importance. This reinforces the need to promote ongoing training in cybersecurity for accounting professionals, as suggested by [57] y [58] in studies related to training in digital skills.

It is recommended that universities include specific and updated software and modules on accounting, cybersecurity and internal control in their accounting and auditing programs. In addition, ongoing training is encouraged for accounting students and professionals in active practice, to keep up to date with the latest regulations and technologies applicable to internal control and the protection of business information.

University accounting students need to be familiar with current technology, in forensic accounting, forensic auditing and anti-fraud control, with the use of digital platforms, mastery of legal and accounting regulations, sustainability, management of security systems, internal control and other contributions, to counteract the threats and frauds that are currently being committed physically and cybernetically. New professionals who choose the Accounting and Auditing Career need to develop special skills and abilities to take on the new challenges of a globalized world, with the incentive to learn and self-learn, with constant training in different areas related to their profession, to advance in their innovative learning process for future specialized professional practice.

7. Limitations, Implications, and Further Directions of Research

Limitations

The broader study could show more significant statistical data by examining the contribution of internal control to all students who are pursuing a technical university degree. In this case, the research was directed at students by exit profile of an academic unit, who were informed about the topic of study.

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Contributions
GA: Investigation, conceptualization and writing, methodology, data curation, writing original draft, formal analysis, supervision, validation, visualization, review, editing, administration. RS: Conceptualization, writing, methodology, data curation, formal analysis, supervision.

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