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Scientific articles

Contabilidad ambiental como experiencia educativa del licenciado en Contaduría. Caso Universidad Veracruzana

Environmental Accounting as educational experience for the Bachelor of Accountancy. Case study: Veracruzana University.

A contabilidade ambiental como experiência educacional para o graduado em contabilidade. Caso da Universidade Veracruzana

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Resumen

La presente investigación tiene como objetivo analizar la percepción de los estudiantes del octavo semestre de la licenciatura en Contaduría de la Universidad Veracruzana sobre la experiencia educativa de contabilidad ambiental cursada durante el semestre febrero-julio de 2023. Para ello, se diseñó un estudio de tipo cuantitativo de corte transversal, y se aplicó un cuestionario a 237 estudiantes en el que se indagaba sobre el contenido teórico de la asignatura de Contabilidad Ambiental. Los resultados obtenidos muestran que la mayoría de los estudiantes consideran que cursar la referida asignatura es importante tanto para su formación profesional como para su desempeño laboral. La originalidad de este estudio radica en la identificación de datos sobre la aplicación de la contabilidad ambiental en el entorno educativo como parte integral de la formación de un licenciado en Contaduría. Como futuras investigaciones se propone aplicar el mismo instrumento después de un año de que los estudiantes hayan egresado con el fin de identificar el impacto de la formación en contabilidad ambiental en su desempeño laboral. Se concluye, por



tanto, que un futuro licenciado en Contaduría formado con una visión ambiental demuestra la madurez de la contabilidad ambiental, la cual constituye un aporte fundamental para el desarrollo sustentable de la sociedad.

Palabras claves: contabilidad ambiental, educación, licenciado en contaduría, instituciones de educación superior.

Abstract

This research aims to analyze the perception of the eighth semester students in the Bachelor of Accountancy program at Veracruzana University regarding their educational experience in environmental accounting during the February-July 2023 semester. A quantitative cross-sectional study was designed, employing a questionnaire administered to 237 students, probing into the theoretical content of the Environmental Accounting course. Results indicate that the majority of students consider undertaking this course is crucial for both their professional development and future work performance. This study's uniqueness lies in uncovering data on the application of environmental accounting within the educational environment as an integral part of an Accountancy graduate's training. As a future research suggestion, applying the same instrument a year after students graduate is proposed to identify the impact of environmental accounting education on their professional performance. In conclusion, a prospective Accountancy graduate with an environmental perspective demonstrates the maturity of environmental accounting, making a vital contribution to society's sustainable development.

Keywords: Environmental Accounting, Education, Bachelor of Accountancy, Higher Education Institutions.

Resumo

O objetivo desta pesquisa é analisar a percepção dos alunos do oitavo semestre da licenciatura em Ciências Contábeis da Universidade Veracruzana sobre a experiência educacional em contabilidade ambiental realizada durante o semestre de fevereiro a julho de 2023. Para tanto, foi realizado um estudo do tipo desenho transversal quantitativo, e foi aplicado um questionário a 237 alunos no qual foi investigado o conteúdo teórico da disciplina Contabilidade Ambiental. Os resultados obtidos mostram que a maioria dos estudantes considera que a frequência da referida disciplina é importante tanto para a sua formação profissional como para o seu desempenho profissional. A originalidade deste estudo reside na identificação de dados sobre a aplicação da contabilidade ambiental no ambiente educacional como parte integrante da formação do graduado



em Ciências Contábeis. Como pesquisa futura, propõe-se a aplicação do mesmo instrumento um ano após a graduação dos alunos, a fim de identificar o impacto da formação em contabilidade ambiental no seu desempenho profissional. Conclui-se, portanto, que um futuro graduado em contabilidade formado com visão ambiental demonstra a maturidade da contabilidade ambiental, que constitui uma contribuição fundamental para o desenvolvimento sustentável da sociedade.

Palavras-chave: contabilidade ambiental, educação, pós-graduação em contabilidade, instituições de ensino superior.

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Introduction

The Accounting graduate is a professional who contributes to the attainment of organizational objectives by generating pertinent information for decision making. This profession encompasses various domains, including administrative areas such as taxation, auditing, accounting, costs analysis, budgeting and finance. Associetal focus on achieving sustainable development objectives continues to grow, accounts are increasingly engaged in matters crucial to humanity, particularly in the realm of caring for and conserving natural resources.

In other words, given the relevance of the environmental impact of companies and the actions they carry out for the benefit of the planet, there is a need to have accounting professionals who have knowledge about the environment and can integrate this perspective into financial information. of economic entities. In this sense, Piza *et al* . (2018) affirm that the transversal incorporation of environmental topics in higher education, such as in the degree in Accounting, is essential to train professionals who are aligned with current needs and demands, especially with regard to sustainability.

For this reason, Reinosa (2014) states that accounting must address not only the positive aspects of companies, but also the negative impacts, such as damage caused to the environment, which must be adequately represented in financial information to facilitate making decisions aimed at mitigating said damage (Londoño and Martínez, 2020), hence the importance of the participation of higher education institutions in the training of these professionals.

However, research such as that of Murrieta *et al* . (2020) indicate that in the 2011 curriculum of the accounting degree program offered by the Universidad Veracruzana, it was not possible to provide students with sufficient knowledge in the area of environmental accounting. This justifies the importance of future accountants taking some educational experience related to environmental issues.

In accordance with this, during the period between February and July 2023, the subject of Environmental Accounting was offered in the faculties of the Universidad Veracruzana where the degree in Accounting is taught, an initiative that is part of the 2019 study plan and was taken by students of the eighth semester.

This experience has given rise to the present work, which aims to analyze the students' perception of the aforementioned educational experience. To this end, the hypothesis is supported that one of the ways to contribute to the sustainable development of companies and the fulfillment of the objectives of sustainable development from the accounting perspective is through the training of accounting graduates with transversal knowledge, such as environment.

Environmental Accounting in the Academic Training of the Accounting Graduates

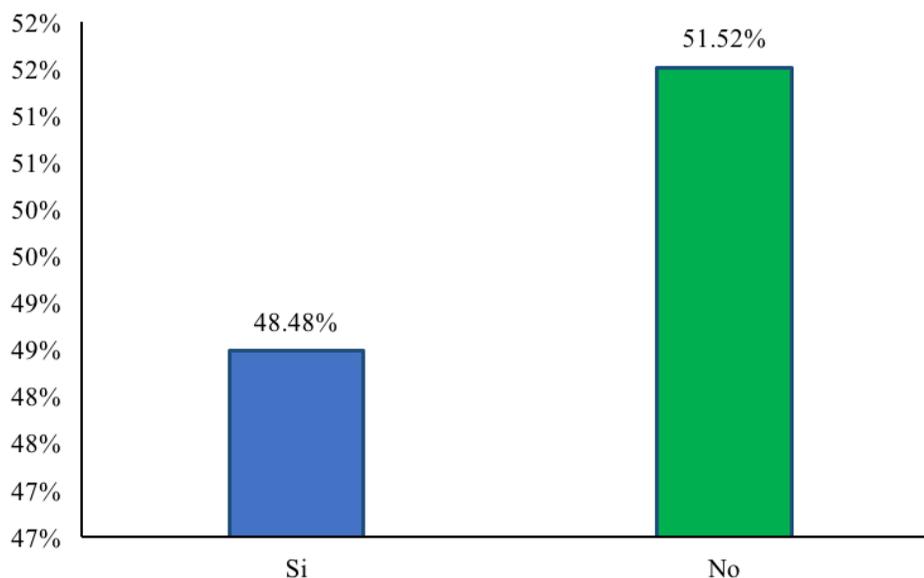
The subject of Environmental Accounting, which concentrates on the measurement and allocation of costs associated with the environment for inclusion in decision-making information (Azizul, 2017), emerges “from the need to understand the impact of an organization on the environment through its activities” (Zhingri and Zapata, 2023, p. 2). The primary objective of this accounting area is “to measure the impact that an organization's activities generate on the environment” (Aguilar *et al.* , 2023, p.1), providing competitive advantages to the company (La Soa , 2019).

From the accounting perspective, the environment has been a subject of analysis and discussion in the academic field. Notable authors such as Larrinaga (1997), Llull (2001) and Salas (2015), among others, emphasize the importance of companies' accounting reports integrating environmental aspects. In Mexico, these propositions have materialized in sustainable companies (Sinforoso, 2023), which, through financial reports and sustainability reports, communicate actions and commitments in favor of the environment to stakeholders. However, higher education institutions (HEIs), eager to meet the needs of the business and social environment, demand that future professionals possess knowledge in areas contributing to the care and conservation of natural resources. Hence, it is imperative that study programs include subjects related to the environment in their catalog of educational experiences.

In this context, one of the pivotal professions in the business environment is that of a graduate in Accounting, an academic profile that assumes special significance in the realm of environmental accounting. These professionals specialize in recording, analyzing, presenting and interpreting financial information. However, considering the importance of environmental issues and their connection with the accounting profession, it is essential for these graduates to receive training in environmental and sustainability matters.

As of now, some higher education institutions have incorporated the topic of the environment into their curricular structures as a subject (either an educational experience or subject) providing knowledge of environmental matters to future accountants. Figure 1 presents the results of an analysis carried out on the curricular map of 33 state public universities in Mexico where the degree in Accounting or a related field is taught. In August 2023, it was identified that 48.58% of the programs integrate an educational experience aimed at mainstreaming knowledge of the environment and sustainable development.

Figure 1 . State public universities in Mexico where an educational experience on the environment and sustainable development is taught in the study program for a degree in Accounting or a related field.



Source: self made

In an analysis carried out on the study programs of the degree in Accounting or related careers, Table 1 shows the educational experiences where topics related to environmental accounting are taught, as well as the semesters in which they are taken, according to data collected from the website of the educational institutions consulted in the month of August 2023. Specifically, subjects such as Sustainable Development, Environmental Accounting, Social Responsibility, Society and Culture, among others, are identified.

Table 1. Educational experiences on the Environment in the Study Program of the Degree in Accounting, Public Accountant, Public Accountant and Auditor, or any other related designation in State Public Universities in Mexico

State public universities	Educational experiences	Semester in which it is taught
Autonomous University of Nuevo León	Social responsibility and sustainable development	6
University of Sonora	Social responsibility accounting and sustainable development	4
Autonomous University of Carmen	Sustainable development	2
Juárez Autonomous University of Tabasco	Environmental culture Accounting for social sustainability	---
Veracruz University	Environmental accounting	8
Autonomous University of Coahuila	Sustainable development	---
Autonomous University of Chiapas	Training for life and sustainability	2
Autonomous University of Chihuahua	Society and culture	--
Juárez University of the State of Durango	*Environmental education *Optional I: Sustainability and social responsibility of organizations	1 and 7

Autonomous University of the State of Hidalgo	Sustainable development and environment	2
Autonomous Mexico State University	Corporate social responsibility and sustainability	1
Autonomous University of Sinaloa	Sustainable development	10
Sonora Technological Institute	Sustainable development and social responsibility I	2
Autonomous University of Tlaxcala	*Sustainable development *Humanism and sustainable development	2
Autonomous University of Baja California	Social responsibility	1
Autonomous University of Baja California Sur	Sustainable	3

Source: Own elaboration with information consulted in August 2023 on the virtual page of each institution

In relation to the semesters in which educational experiences are taught, this varies depending on the institution (see table 1), as some offer them in the first semesters, others in the middle of the professional career, while some HEIs teach them in advanced semesters. For example, the Sustainable Development educational experience at the Autonomous University of Carmen is offered to students in the second semester, while at the Autonomous University of Nuevo León, Social Responsibility and Sustainable Development is taught in the seventh semester.

Table 1 identifies that the Universidad Veracruzana offers an educational experience on the environment from an accounting perspective, called Environmental Accounting; At the University of Sonora, Accounting for Social Responsibility and Sustainable Development stands out, and at the Juárez Autonomous University of Tabasco, Accounting for Social Sustainability is offered. On the other hand, some universities train their future accountants with educational experiences such as “Society and Culture”, “Training for Life and Sustainability”, “Corporate Social Responsibility and Sustainability”, “Environmental Culture”, “Humanism and Sustainable Development”.

Regarding the Environmental Accounting educational experience taught at the Universidad Veracruzana, the educational institution under study in this research, its unit of competence is as follows:

The student analyzes the cost/benefit of environmental performance with an economic, sustainable and ethical approach, through the use of techniques, methods and instruments, as well as the application of valuation, presentation and disclosure rules, the recognition of assets and liabilities and disclosure. of contingencies in the financial statements, in order to promote socially responsible decision-making.

[This experience] belongs to the area of disciplinary training, is made up of 2 theoretical hours and 2 practical hours, totaling a value of 6 credits, under the course-workshop modality and is taught in groups. The educational experience corresponds to the field of study of Financial Accounting; Its objective is to provide the student with basic knowledge that emphasizes the good use and care of natural resources, as well as providing the tools to identify the environmental impact of the entities' operations, with a sense of economic benefit to the entity through the implementation of strategies that allow the sustainability of the organization over time, as well as adequate recognition in the financial statements of the entities (para. 5).

Environmental Accounting Seen as an Educational Experience

Numerous studies have investigated environmental accounting as part of the curricular structure of study programs. Notably Gutiérrez *et al.* stand out . (2020), emphasize that the students at the University of Guadalajara ntially lacked awareness of the concept of *environmental accounting* . However, they express willingness to integrate this knowledge into their academic training and professional life. These findings underscore the importance of analyzing the results following the implementation of an educational experience on environmental accounting among the students pursuing an Accounting degree at the Universidad Veracruzana.

Building on this research background, Murrieta *et al.* (2020), investigated the perception of 206 students from the Universidad Veracruzana who completed an Accounting degree regarding sustainable development and its connection with their professional profile. They identified that the 2011 curriculum of the educational program had failed to provide sufficient knowledge in areas like environmental accounting. In the February-July 2023 semester, accounting degree students participated in the environmental accounting educational experience as part of the 2019 plan, and this article Will present the results regarding their perception.



Other contributions on environmental accounting as a subject for training professionals in the accounting field come from Martínez *et al.* (2017), who state that this approach contributes to the dissemination of environmental culture and encourages environmental preservation among students. García (2019) suggests that including social and environmental accounting in the university teaching of public accountants “ reinforces the idea of recognizing that it is a segment of accounting that exists and is 'mature' to deserve a specific course ” (p. 21).

Likewise, Marín (2022), by integrating environmental accounting as a subject for the training accountants, identifies the lack of a curricular structure on environmental accounting training in the Faculty of Accounting, Administrative and Economic Sciences of the National University of Pilar in Paraguay. However, this study also demonstrates that several subjects include specific competence topics such as environmental auditing and preparation of financial statements related to social and environmental responsibility actions conducted by organizations. This justifies the impact of environmental issues from an accounting perspective in higher education.

Another rationale for the importance of integrating an Environmental Accounting subject into the accounting graduate's curriculum comes from Maldonado *et al.* (2013). They argue that accounting “is an indisputable ally for the achievement of sustainable development” (p. 20), emphasizing that universities should enhance the knowledge of accounting graduates in environmental issues, since this is an area of opportunity. in public or private companies where the accountant can professionally contribute. In the words of Rodríguez and Ramírez (2021), studying the subject of environmental accounting contributes to environmental education and economic culture among students and teachers.

Methodology

This study adopts a quantitative research design with a cross-sectional approach. Data collection took place between June 6 and August 8, 2023. The questionnaire was designed through the Google Forms platform, and its link was shared with the teachers who facilitated the accounting educational experience, as well as with some directors of the faculties offering the Accounting degree. Subsequently, the data collected were processed with the assistance of tools provided by Microsoft Office Excel.

Data collection technique and instrument

The data collection technique involved interviews, and a questionnaire was designed as the instrument for data collection, supported by the topics of the environmental accounting program in the study program. The questionnaire comprised 11 questions formulated on a Likert-type response scale with five options: totally agree, agree, neither agree nor disagree, disagree and totally disagree. The questionnaire questions addressed the following environmental accounting program topics:

- 1) Context of environmental accounting.
- 2) Legal (non-accounting) framework of environmental accounting.
- 3) Accounting regulations applicable in the environmental field.
- 4) Environmental impacts on financial information.
- 5) Trends in environmental accounting.

Limitations of the study

There was not a response from 100% of the students who participated in the Environmental Accounting educational experience during the February-July 2023 semester.

Study Sample

The questionnaire was shared with eighth semester students of the Accounting degree at the Universidad Veracruzana who took the environmental accounting experience during the semester from February to July 2023. Respondents to the questionnaire came from the five regions where the University of Veracruz operates. The sample consisted of 237 participants. Table 2 shows the number of students categorized by region.

Table 2. Study sample

Regions of the Veracruzana University	Absolute frequency	Relative frequency
Poza Rica-Tuxpan	60	25.3%
Xalapa	27	11.4%
Veracruz-Boca del Rio	89	37.6%
Orizaba-Córdoba	29	12.2%
Coatzacoalcos-Minatitlán	32	13.5%
Total	237	100%

Source: self made

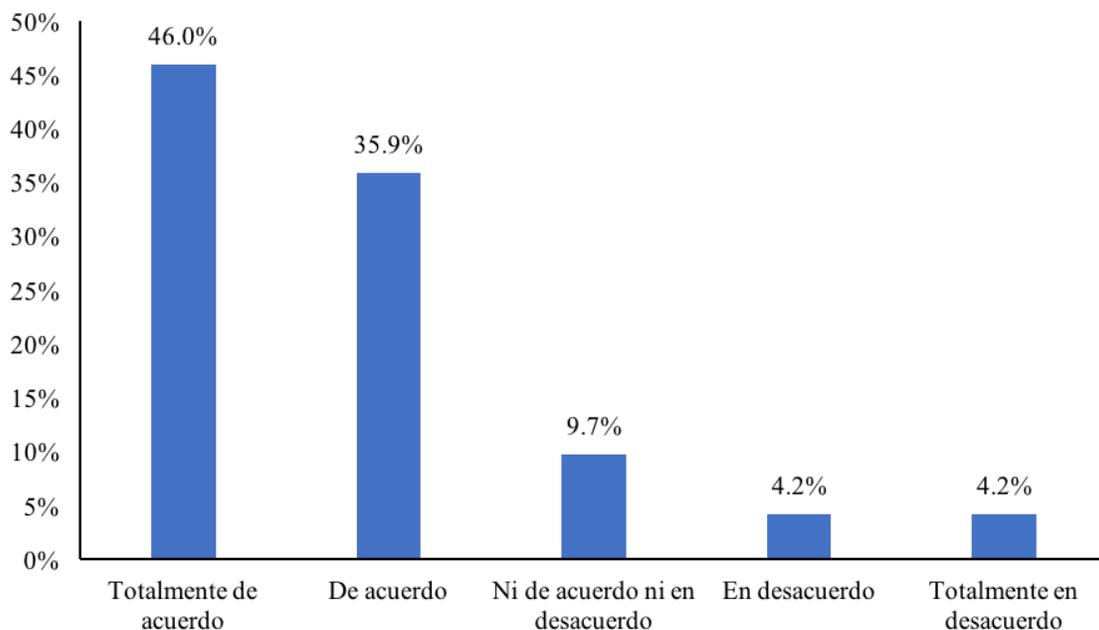
Table 2 shows that the majority of students who responded to the questionnaire were from the Veracruz-Boca del Río region (37.6%), followed by the Poza Rica-Tuxpan region (25.3%), while students from Xalapa represented the lowest proportion of participants (11.4%).

Results

In Figure 2, it is evident that a substantial majority of students (81.9%) perceive the educational experience in environmental accounting as significant within the subjects comprising the bachelor's degree program in accounting. This observation underscores the cross-disciplinary nature of the environmental issue within the field of public accounting, emphasizing the crucial need for teacher training in these areas.

Figure 2. Perception of the Educational Experience in Environmental Accounting.

The graph visually represents the recognition by students of the educational experience in Environmental Accounting as an integral component of the curricular map for the degree in Accounting.

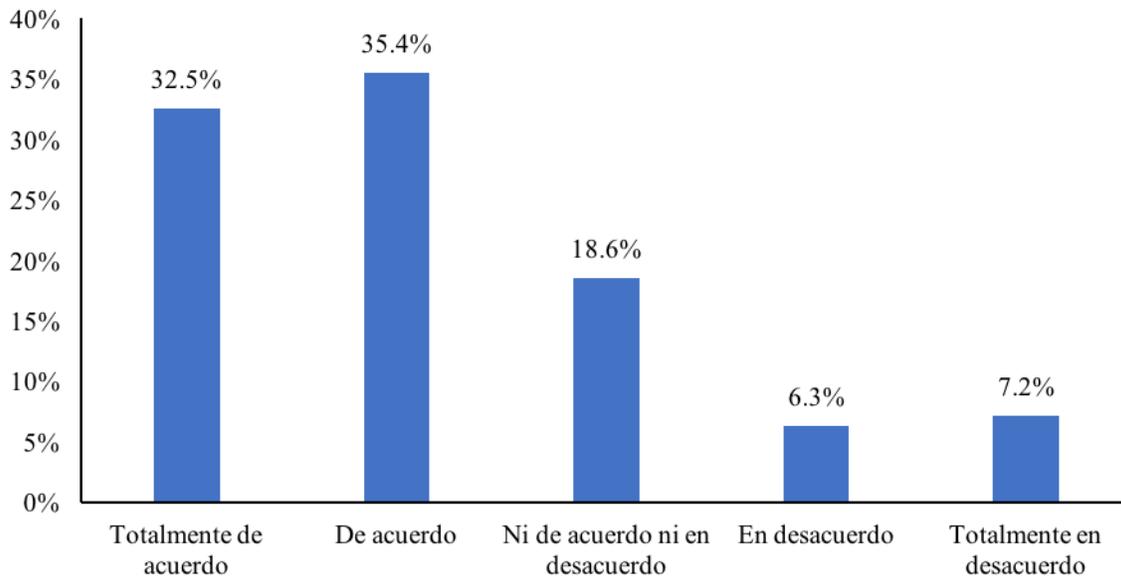


Source: self made

Upon graduation, the professional competence of a student significantly relies on their education in areas of professional interest. In this context, Figure 3 reflects that 67.9% of the students express agreement, at various levels, with the idea of pursuing a diploma in environmental accounting. Notably, the increasing presence of environmentally conscious companies in the

Mexican economy underscores the demand for accounting graduates to be equipped to address challenges associated with the preservation and conservation of natural resources.

Figure 3. Interest in pursuing a diploma in environmental accounting



Source: self made

The questionnaire was meticulously crafted based on the data collected and theoretical insights into the subject of environmental accounting, which was derived from students pursuing bachelor's degree in Accounting, specifically those in the eighth semester during the period from February to July 2023. Table 3 encapsulates the outcomes, illustrating the students' perceptions of the theoretical knowledge acquired and its impact on their professional development.

Table 3. Theoretical Knowledge of the Educational Experience in Environmental Accounting and its Contribution to the Professional Training of the Accounting Graduate.

Theoretical knowledge / answers*	Totally agree	OK	Neither agree nor disagree	In disagreement	Totally disagree
Context of environmental accounting	47.7	32.9	11.8	2.1	5.5
Legal framework of environmental (non-accounting legal) accounting	46	36.3	12.2	0.8	4.6
Accounting regulations applicable to the environmental field	46	39.7	9.7	0.4	4.2
Environmental impacts on financial information	49.8	37.6	7.6	1.7	3.4
Environmental accounting trends	43.5	39.7	10.1	2.5	4.2
Average	46.6	37.24	10.28	1.5	4.38

*Answers expressed in percentages

Source: self made

As can be seen in table 3, the majority of students (83.84%) express agreement, at various levels, regarding the contribution of the theoretical knowledge acquired during the environmental accounting educational experience, (conducted from February to July 2023), to their professional training as accounting graduates. These findings signify a positive perception of how the theoretical knowledge about environmental accounting, imparted in academic settings has impacted students' training as future public accountants with an environmental perspective.

In Table 4, regarding their perception of the knowledge acquired and its contribution to the work environment, a significant 80.67% of the students affirm that the theoretical knowledge from the environmental accounting educational experience plays a role in their work training. It is noteworthy that, in line with international trends, an increasing number of companies established in Mexico are adopting a sustainable focus. An example of this is the automotive sector, which stands out as one that has invested in clean technologies in recent years.

Table 4. Theoretical knowledge of the educational experience of environmental accounting and its contribution to work functions as a graduate in Accounting

Theoretical knowledge / answers*	Totally agree	OK	Neither agree nor disagree	In disagreement	Totally disagree
Context of environmental accounting	40.5	40.5	12.2	2.5	4.2
Legal framework of environmental (non-accounting legal) accounting	39.2	41.4	13.1	2.5	3.8
Accounting regulations applicable to the environmental field	42.6	36.7	14.8	2.1	3.8
Environmental impacts on financial information	43	39.7	10.5	2.1	4.6
Environmental accounting trends	38	42.2	11.8	3.4	4.6
Average	40.66	40.1	12.48	2.52	4.2

*Answers expressed in percentages

Source: self made

The results obtained reveal the perception of the first generation of Accounting degree students at the Universidad Veracruzana, who underwent an educational experience integrating environmental issues into their professional training. The majority emphasized the importance of the theoretical knowledge acquired on environmental accounting, seeing it as valuable for both their training as accountants, as well as its contribution to their work functions. Importantly, they considered this educational experience as an integral part of their disciplinary training as accountants. Additionally, students expressed interest in pursuing future courses or diplomas related to environmental issues from an accounting perspective.

Discussion

The results of this study reflect insight into the successful application of environmental accounting into higher education, underscoring the importance of approaching environmental issues from an accounting perspective through dedicated courses. This aligns with the practices of several institutions, including the Universidad Veracruzana, the University of Sonora and the Juárez Autonomous University of Tabasco. The findings validate Garcia's assertion in 2019 that environmental accounting "is a distinct segment within accounting, mature enough to warrant a specific course" (p. 21).

However, the findings of this study present a contrasting perspective to the information gleaned by Murrieta *et al.* (2020), who conducted an análisis of the 2011 curriculum of the accounting degree program taught at the Universidad Veracruzana. Their study revealed a challenge in providing students with adequate knowledge in the field of environmental accounting. On the other hand, in the current study, which focuses the same program, but under the updated 2019 Plan, a different scenario unfolds. In the updated curriculum, a noteworthy shift is observed with the majority of students acquiring theoretical knowledge about the environment from an accounting standpoint through their participation environmental accounting educational experience. This shift in perspective indicates a positive evolution in the curriculum, reflecting a more effective integration of environmental accounting content. Furthermore, the acquired knowledge is not merely perceived as a theoretical exercise; instead, students recognize its practical utility for their training as accounting graduates. The acknowledgment of the significance of this knowledge extends beyond academia, with students attributing value to its application in their future professional roles.

The engagement of Bachelor's degree students in Accounting at the Universidad Veracruzana with the environmental accounting educational experience, part of the 2019 plan is pivotal. The results gleaned from this study emphasize that these students have effectively acquired knowledge about environmental accounting. This observation highlights a significant contribution of the educational experience, it equips future accountants with fundamental insights into environmental considerations from an accounting perspective. This departure from the findings of Gutiérrez *et al.* (2020), who indicated a lack of awareness among their study population regarding *environmental accounting concepts*, underscores the importance of a dedicated educational experience. The specific focus on environmental accounting in the curriculum has evidently addressed knowledge gaps and enhanced students' understanding of this specialized area within accounting.

Furthermore, this study recognizes that upcoming Accounting graduates from the Universidad Veracruzana receive a well-rounded education that encompasses contemporary issues like environmental sustainability. This aligns with the viewpoint expressed by Piza *et al.* (2018), asserting that the integration of environmental issues into higher education, specifically within the Accounting program, is pivotal. It not only reflects an adaptation to current needs and requirements, but also underscores a commitment to shaping future professionals with a keen focus on sustainability.

In essence, the educational experience examined in this study emerges as a catalyst for preparing future accountants, aligning their training with the dynamic landscape of contemporary challenges and emphasizing the imperative of sustainability in the field of Accounting.

Conclusions

The implementation of an educational experience on the environment from the accounting perspective materializes in the educational sector through theoretical contributions from various authors. These contributions justify the importance of integrating environmental impacts caused by companies' activities into accounting information, along with actions for the benefit of the environment. Therefore, it can be asserted that environmental care from an accounting perspective has gained relevance. Evidence supporting this claim is found in various investigations on the contribution of accounting towards the care and conservation of natural resources through information generation for decision – making. This demonstrates the application of sustainability aspects in the economic environment.

In accordance with this idea, and recognizing that numerous organizations, not only in the Mexican economy, focus their efforts on contributing to the care and conservation of natural resources, it is relevant that future accountants to receive training addressing environmental issues. This is crucial as companies engage in activities that benefit the planet.

However it is essential to note that there is an area of opportunity concerning the environment and accounting regulations. There are still theoretical gaps that limit the accounting record of environmental impacts, such as the economic valuation of environmental resources. From the accounting perspective, the issue of the environment continues to be an important challenge. Therefore, it is important to implement public policies that facilitate the accounting recognition of environmental impacts.

Future lines of research

For future research, a hypothesis is proposed: a graduate in Accounting with training in environmental issues contributes to the care and conservation of natural resources. Additionally, and with the purpose of analyzing how the environment has been mainstreamed in the accounting profession and its significance in accountants' professional practice, future studies suggest analyzing the same group of students one year post-graduation.

On the other hand, because this research focused solely on students, it is crucial for future investigations to assess the levels of knowledge on the topic of the environmental accounting among the accounting teachers. They play a pivotal role in shaping students' professional training. Furthermore, and given that the environment is a current issue and a challenge for the accounting profession, especially in the economic valuation of commonly used natural resources, it is essential to interview experts in the accounting area, as well as leaders of public accounting schools. This aims to understand their perspectives on the importance of accounting recognition of environmental impact and its incorporation into higher education.

Finally, it is worth noting that this research was not carried out before the students underwent the educational experience in environmental accounting. Therefore, in the future, there is a need for investigations both before and after future generations undertake this subject. This approach allows for a comparative analysis to comprehend the impact of the contents on the students' professional training. These results will allow us to detect areas of opportunity in the theoretical knowledge of the subject described above.

Gratitude

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