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Scientific articles

La creatividad y pensamiento crítico en la formación del contador público: el caso de la BUAP

Creativity and critical thinking in the training of public accountants: the case of the BUAP

Criatividade e pensamento crítico na formação de contadores públicos: o caso da BUAP

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Resumen

Se ha llegado a un consenso sobre el hecho de que la educación está experimentando un punto de inflexión debido a la pandemia del covid-19, lo cual implica un cambio de paradigma. Sin embargo, la transición de la enseñanza presencial a la virtual ha exacerbado las desigualdades tanto entre instituciones como dentro de estas, de las cuales una de las más significativas se refiere al proceso de aprendizaje, fundamental para la formación de los estudiantes. Por eso, en esta nueva era de la educación superior, hay un consenso especial sobre la necesidad de reevaluar el papel del profesor y el proceso de aprendizaje en su totalidad. Esto lleva a una crítica y análisis centrados en el estudiante como agente principal en la construcción de su propia formación y adquisición de conocimiento para su mejora sustancial. No obstante, la idea de que el estudiante sea el arquitecto de su propio aprendizaje requiere fomentar la creatividad y el pensamiento crítico. Señalado lo anterior, esta investigación se centra en el caso de los estudiantes de la Facultad de Contaduría Pública de la Benemérita Universidad Autónoma de Puebla (BUAP) y en las habilidades de creatividad y pensamiento crítico que han desarrollado durante su formación.

Palabras claves: habilidades, creatividad, pensamiento crítico y formación del estudiante.

Abstract

There is a consensus that as a result of the Covid-19 pandemic, education is at a turning point, which implies a change of era, higher education is no exception, given that the change from face-to-face to Non-attendance triggered and exacerbated inequalities between institutions and within them. One of these inequalities is related to learning, the backbone of student training. A special consensus of the new era of higher education is to reassess the role of the teacher and learning, in terms of what happens in the training process, which puts in the crosshairs of criticism and therefore of analysis the one that the student as a builder of his training and knowledge for his substantial improvement. For the student to be the builder of his training requires generating creativity and critical thinking. The research addresses, in the case of the public accounting student, their creativity and critical thinking skills.

Key words: skills, creativity, critical thinking and student training.

Resumo

Chegou-se ao consenso de que a educação vive um ponto de viragem devido à pandemia de covid-19, o que implica uma mudança de paradigma. No entanto, a transição do ensino presencial para o virtual agravou as desigualdades entre e dentro das instituições, das quais uma das mais significativas refere-se ao processo de aprendizagem, fundamental para a formação dos alunos. Portanto, nesta nova era do ensino superior, existe um consenso especial sobre a necessidade de reavaliar o papel do professor e o processo de aprendizagem como um todo. Isto leva a uma crítica e análise focada no aluno como principal agente na construção da sua própria formação e aquisição de conhecimentos para o seu aprimoramento substancial. No entanto, a ideia de que o aluno é o arquitecto da sua própria aprendizagem exige o incentivo à criatividade e ao pensamento crítico. Posto isto, esta investigação centra-se no caso dos alunos da Faculdade de Contabilidade Pública da Universidade Benemérita Autónoma de Puebla (BUAP) e na criatividade e capacidade de pensamento crítico que desenvolveram durante a sua formação.

Palavras-chave: competências, criatividade, pensamento crítico e formação estudantil.

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Problem Statement

The Benemérita Universidad Autónoma de Puebla (BUAP) is an institution that aspires to adapt to the most outstanding educational and pedagogical innovations. To do this, however, we must first be aware that innovation is closely linked to the advancement of science, which is based on both consensus and conflict, and advances on four independent and interdependent pillars: rationality, empiricism, imagination and verification. In fact, there is an ongoing debate between rationalism and empiricism, as the latter challenges rational constructions that are reconstructed from new empirical discoveries. Furthermore, there is a conflicting complementarity between verification and imagination.

The relationship between verification and imagination is complex because, in its own sociology, there is a struggle, a complementary antagonism between its principle of rivalry, of conflict between ideas or theories, and its principle of unanimity, of acceptance of the rule of verification. and argumentation. Therefore, it can be said that modern science, despite simplifying theories, is an extremely complex enterprise.

In addition to innovation, the second point that must be paid attention to is creativity, which is essential for the public university to fulfill its social function, that is, the training of critical, creative individuals committed to solving problems. main problems of the ecoregion, as well as with the construction of more just and balanced societies. Furthermore, integration with society through the opening and sharing of spaces that promote learning, creativity, reflection and debate on major ecoregional, national and international issues, all in an environment of freedom and respect that encourages individual development. and collective.

Now, to promote critical thinking in teaching and learning, it must be considered that the human person is conceived as a historical-social being who, from his own worldview, gives meaning to his existence, influences his environment and transforms itself in a free, supportive and responsible way. In this vision of the world, in addition to principles and values that guide social coexistence, the generation, appropriation, application and criticism of knowledge, both natural and social, takes on great importance.

The human person is recognized as a defender of dignity, with a critical attitude towards the limitations imposed by the predominant rationalities of modernity, and it is understood that they need to participate in the recognition of practices and knowledge with a view to emancipation.

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Therefore, critical humanism stands as the guiding principle of our university work. This seeks to promote the self-realization of the individual in all its dimensions, capacities and potentials, but in a socioeconomic and political context that facilitates said development.

Regarding teaching-learning, the development of complex thinking skills is considered essential. This approach is based on the application of the skills acquired in the didactic unit of development of complex thinking skills, using alternative methodologies that guide the student towards the continuous improvement of these skills.

In summary, cooperative learning, critical thinking, interdisciplinarity, the reconstruction and generation of knowledge, as well as the creation of environments and the design of scenarios for human development in all dimensions, both inside and outside the university.

Justification

The justification for this research arises from the lessons left by the covid-19 health crisis, especially in view of the new normal, hence quality training that incorporates both inclusion and excellence must be ensured. In other words, it is no longer enough to teach, since it is necessary for students to learn how to learn and to do so throughout their lives. This initiative has been promoted from the motto of the third World Conference on Higher Education, scheduled for 2022 (Reinventing Higher Education for a Sustainable Future), specifically in its thematic axis "The New Landscape of Learning in Higher Education", where underlines the importance of adapting to changes in the way we learn and teach.

In this new landscape of learning in higher education, creativity and critical thinking will take center stage, as highlighted in the first concept note of the world conference, titled "Reinventing the Role and Place of Learning in Higher Education for a better future." Sustainable Future". In the specific case of the public accountant training process, emphasis is placed on the development of creativity and critical thinking of both the student and the teacher.

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Goals

General objective

This research is based on the premise that there is a lack of understanding about how creativity and critical thinking are taught, encouraged and developed, which makes it necessary to evaluate these skills. Therefore, the general objective of this study is to analyze the skills that influence creativity and critical thinking in the training of students of the degree in Public Accounting at the Benemérita Universidad Autónoma de Puebla (BUAP).

Specific objectives

- Assess the level of students' creativity and critical thinking skills.
- Evaluate the strategies that influence students' creativity and critical thinking.
- Recommend guidelines to improve students' creativity and critical thinking.

Since there is no previous work that serves as a background, a detailed diagnosis cannot be made in this regard. This research, therefore, would be the first to address the analysis of the skills that influence creativity and critical thinking in the training of students of the degree in Public Accounting at the BUAP.

Methodology

This was an exploratory, descriptive, explanatory and propositional research. It relied on the method of maieutic, used by the philosopher Socrates, which consists of reaching the truth through questions and answers. Furthermore, considering the nature of the information, a quantitative approach was adopted to try to respond to the hypotheses and objectives set.

Regarding the study methods, a qualitative approach was used to analyze the state of the evaluation of creativity and critical thinking in student training. Likewise, a quantitative approach was used in the review and construction of the research instruments.

The research techniques included documentary analysis to explore, substantiate and analyze the object of study, as well as field research to determine a representative non-probabilistic sample. The analysis and interpretation of the results obtained allowed pertinent recommendations to be proposed.

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Literature Review

The topic of this work focused on the student training process in the face-to-face or hybrid classroom, with special emphasis on the development of skills that encourage creativity and critical thinking.

According to Pinto Bolívar (2023), recontextualizing the training of the future public accountant implies integrating research in educational technologies in the knowledge area of "Society and Knowledge Management", which seeks to respond to an innovative society, where various tools are implemented. technological, especially in the field of public accounting, since with the constant advancement in the business world, professionals capable of improving performance effectively and efficiently are needed.

In this context, when considering the training of the future public accountant, the importance of innovation is highlighted. Furthermore, today's society demands accounting professionals with interdisciplinary knowledge, who can interact effectively with other related professionals. Educators, therefore, must strive to create better opportunities for the future of their students, developing skills and competencies related to innovation, regardless of the profession to which they dedicate themselves.

However, as Tovar-Gálvez and García Contreras (2012) point out, teaching practices still persist in which traditional educational methods that emphasized memorization of content and individual learning predominate. In fact, in some cases there is a lack of educational policies and guidelines that guide teaching towards training consistent with reality, that is, where priority is given to the production of learning and the evaluation of the tasks performed by students.

Therefore, according to Hurtado *et al*. (2015), it is essential to incorporate an updated educational approach that adjusts to new technological paradigms in the training of the future public accountant. This will allow future professionals to position themselves competitively in a labor market that demands interdisciplinary and transdisciplinary knowledge. Likewise, it is crucial to prepare them to face a business reality that is constantly evolving and increasingly based on computerized systems.

Regarding the strategies that could be used for this purpose, Ortega Mallqui *et al.* (2017) highlight that comprehension performances, as their name indicates, are processes that require special attention due to their influence on complex thinking, creativity, critical capacity, decision making and problem solving. These performances encourage the development of innovation, exploration and research in general, with the aim of achieving

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effectiveness in professional success. In this regard, it is important to highlight that they refer to understanding in its broad sense, and not only to reading texts.

Furthermore, it has been observed that the pedagogy of understanding is a perspective that seeks to promote the development of understanding through the art of learning, focusing on achieving a deep understanding of the topics, and not only on the transmission of curriculum content.

In this regard, Lizarro Guzmán (2022) explains that currently it is essential that educational actors in the university recognize the importance of technology and undertake a process of pedagogical, methodological and technological innovation. Likewise, according to Dussel (2020), it is imperative to promote creativity to stimulate new ideas and apply innovative practices that demonstrate that learning in teaching is a continuous and inexhaustible process. This includes developing educational materials, designing activities, and creating interaction spaces that capture students' attention, surprise them, keep them engaged, and motivate them to participate.

The diversity of approaches in the application of technologies in education offers a wide range of possibilities to create innovative training environments adapted to the needs of students. In accordance with this, the importance is emphasized for students, in their role as critical thinkers, to constantly develop specific skills that can be strengthened until they become a true skill (Benavides and Ruiz, 2022). Therefore, currently teaching has evolved through a pedagogical practice that seeks meaningful learning, which represents an educational challenge in the 21st century.

In the Latin American context, according to Tabares *et al*. (2019), the development of critical thinking is presented as a means to achieve this objective, since it allows comprehensive training and the implementation of educational practices that cultivate participatory citizens. It is expected, therefore, that students can propose solutions to various facts or problems that need to be solved, using strategies that allow them to make deductions or conjectures based on reason.

In this sense, the pedagogy of understanding seeks to develop understanding based on the art of learning and not only on the transmission of content, where understanding performances are fundamental processes for complex thinking, creativity, decision making and troubleshooting. The trend towards competency-based educational models is evident, and the Organization for Economic Co-operation and Development (OECD) has highlighted three types

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of competencies that are strongly interrelated with each other, as noted in its work "The OECD/CERI project on the teaching and evaluation of creativity and critical thinking" in 2017:

1. Technical skills, which refer to the contents and how to apply them.
2. Creative and critical competencies, which involve skills such as observation, curiosity, connecting ideas, imagination and considering multiple perspectives.
3. Socio-emotional competencies, which encompass skills such as confidence, perseverance, collaboration and communication.

However, some questions arise regarding these competencies, such as the following: are they materialized in practice? Is their teaching evaluated? Is there evidence of their learning? Are they promoted during the student's training process and are they used as reference for your evaluation?

A first approach to these questions is found in the *on-site evaluations* of the Program for Strengthening Educational Excellence (PROFEXCE). By contrasting a positive evaluation in the area of teacher training to train their students with a negative evaluation of its impact on the training of students, we can obtain information about the effectiveness of teaching these competencies.

The three types of competencies, focused on the creativity and critical thinking of students during their *on-site training*, demand an evaluation aimed at their improvement at two levels: teaching by teachers and appropriation by students.

Below, Table 1 shows a consistency matrix of the research carried out on complex thinking, creative thinking and critical thinking:

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Table 1. Consistency matrix of the research that has been done on complex thinking, creative thinking and critical thinking

No.	Author(s)	Year	Study	Thematic dimension	Key concepts
1	Víctor del Carmen Avendaño Porras, Claudia Inés Bohórquez Olaya, Paola Andrea Lara Buitagro	2022	Scale to measure the significance of complex thinking in virtual learning environments of higher education institutions.	Complex thinking	Complex thinking: The importance of complex thinking is highlighted as a necessary approach to address the problems of current reality.
2	Alejandra Mercedes Colina Vargas	2020	Higher education from the vision of complex thinking.	Complex thinking	Relationship between complex thinking and education: A theoretical review of the theoretical foundations proposed by Edgar Morín on complex thinking and its connection with education is carried out.
3	Arnulfo Ortega Mallqui, Jani Monago Malpartida, Olinda Cárdenas Crisóstomo	2017	Understanding performances in the development of complex capabilities in university higher education.	Complex thinking	Complex thinking: It is highlighted that this type of thinking promotes understanding beyond the routine and encourages problem solving and decision making.
4	Guillermo César Vázquez-González, Iván Ulianov Jiménez-Macías, Luis Gibrán Juárez Hernández	2022	Classification of knowledge management strategies to promote educational innovation in higher education institutions.	Complex thinking	Educational innovation: It is the implementation of changes and improvements in educational processes, the curriculum and educational practices. Aspects such as the creative and innovative condition of education, the centrality in pedagogy, teamwork, complex thinking, the use of ICT and openness to flexible and collaborative learning stand out.
5	Myriam Estela Ávata Varas, Floresmila Cecibel Ponce Tomalá, Flor María Cordero Orellana, Flor Magaly Palacios Marín	2022	Innovative educational management allows the construction of inclusive, quality and creative teaching processes.	Creative thinking	Creative and innovative educational management: Holistic learning is promoted in all dimensions: cognitive, emotional, social and physical. In addition, it involves the ability to generate new and original ideas, encouraging students to think critically, solve problems and adapt to changing situations.

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6	Cecilia Bojórquez Díaz, Alicia Sotelo Castillo, Víctor Quintana López, Laura Fernanda Barrera Hernández	2022	Well-being and life satisfaction in education: reasons to promote motivation in higher education.	Creative thinking	Creative thinking: Ability to generate original and valuable ideas, solutions or products. It involves thinking outside the box, making novel connections, thinking outside the box, and producing something new and useful.
7	Nora Lizarro Guzmán	2022	University teaching: creativity and innovation with digital tools.	Creative thinking	Creativity and innovation: In university teaching, it is necessary to appeal to creativity and innovation in the virtual classroom to generate added value in the students' knowledge. This involves using digital tools and creative and innovative strategies.
8	María Alejandra Marín, Daiana Rojo Lucero	2022	Competencies of the public accountant in technology: international training standards.	Creative thinking	Challenges of the accounting profession: They are related to the rapid evolution of business, globalization and the spread of new technologies. It is recognized that technology also creates new job opportunities. Accountants must acquire technological skills and be willing to adapt and learn continuously.
9	Claudio Antonio Ruótolo, Luis Alberto Cavagnola, Roberto Ariel Pérsico	2022	Some prospective ideas for the training of accountants in the 21st century.	Creative thinking	Disruptive times and changes: It is mentioned that we are living in a time of strong changes and disruption, which poses new problems to be solved in the practice of the accounting profession and in the training of accountants.
10	Cleyssen Benavides, Aurelio Ruíz	2022	Critical thinking in the educational field: a systematic review	Critical thinking	Critical thinking: Skill that allows a person to analyze, evaluate and form informed judgments about situations or problems, using logical reasoning and reflection.

Source: Self made

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Analysis unit

First, the conceptual framework of the unit of analysis for this research will be established, which will be the Faculty of Public Accounting of the Benemérita Universidad Autónoma de Puebla (BUAP), which has a notable historical trajectory. From 1937 to 1956, the year in which the university was granted autonomy, graduates of the Faculty of Economic-Administrative Sciences bore the acronym CPT, which corresponds to a certified public accountant. This name, perhaps a fashion of the time, was also used in Mexico City and in some states of the country, to distinguish those who obtained their degree from official schools recognized by the federal and state governments from those who studied a career in Public Accountant or Tax Technician in academies of the time.

For this reason, an evaluation was carried out of the various study plans that had been implemented both at UNAM and in the faculties of the Tecnológico de Monterrey and the University of Guadalajara. Roberto Castrejón Porras and Félix Cortés Campos were responsible for this meticulous work. During this period, the university had as rectors Dr. Manuel S. Santillana, Mr. Armando Guerra Fernández, Dr. Manuel Lara y Parra, and Dr. José F. Garibay Dávalos. Currently, the Faculty of Public Accounting offers the following degrees, see table 2:

Table 2. Academic offerings of the Faculty of Public Accounting

Degree	Modality
Public accounting	In-person / semi-schooled / Distance
Administration and management of SMEs	In-person / Distance
Financial management	In person
Accounting and Public Finance	Distance

Source: Self made

Field research

Creativity and critical thinking: tools for students

The following survey was applied to the students of the BUAP Faculty of Public Accounting with the objective of evaluating the level of their skills in critical thinking, creativity, complex thinking and communication. The results were the following:

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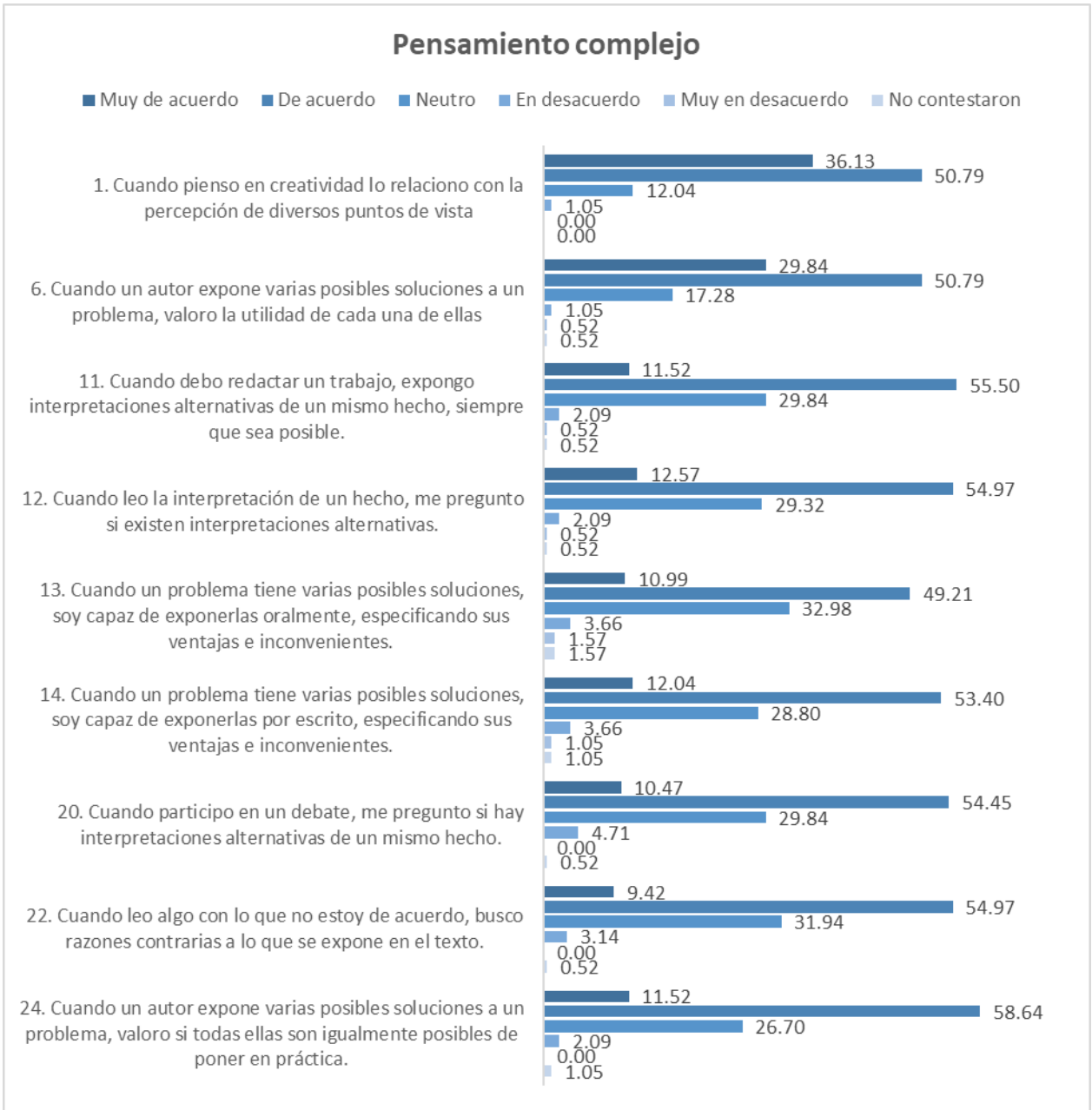
Complex thinking: interpretation

The results of items 1, 6, 11, 12, 13, 14, 20, 22 and 24 of complex thinking, see figure 1, indicate that the majority of students are capable of thinking in terms of multiple perspectives, relationships and interdependencies.

Figure 1. Complex thinking



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Detailed analysis of the results

Items 1 and 6: The majority of students (50.79%) demonstrate a deep understanding that creativity involves the ability to see the world from different perspectives. Furthermore, they are able to critically evaluate the various options and select the best one.

Items 11, 12 and 22: The majority of students (55.50%) present alternative interpretations of the same fact, think innovatively and consider various possibilities. Additionally, 54.97% demonstrate critical thinkers by questioning the information received and seeking additional data to support their opinions. Likewise, they look for arguments contrary to those presented in a text with which they do not agree, as well as additional information to support their opinions.

Items 13 and 14: The majority of students (49.21%) orally present different possible solutions to a problem, detailing their advantages and disadvantages, which demonstrates the ability to communicate their ideas in a clear, concise and persuasive manner. Furthermore, 53.40% explain in writing the different possible solutions to a problem, specifying their advantages and disadvantages and communicating their ideas in an effective way that is easy to understand and remember.

Items 20 and 24: The majority of students (54.45%) demonstrate critical thinkers by seeking additional information to support their opinions and considering alternative interpretations during a debate. Furthermore, 58.64% evaluate all possible solutions to a problem, critically evaluating the different options and selecting the best one.

Creativity: interpretation

The results of items 2, 3, 4, 5, 10, 15, 16, 17 and 18, see figure 2, reveal that the majority of students self-identify as creative people and perceive that the teaching conditions at their university promote the creativity. Likewise, it indicates that the university not only focuses on the transmission of knowledge, but also recognizes the importance of fostering creativity in its students.

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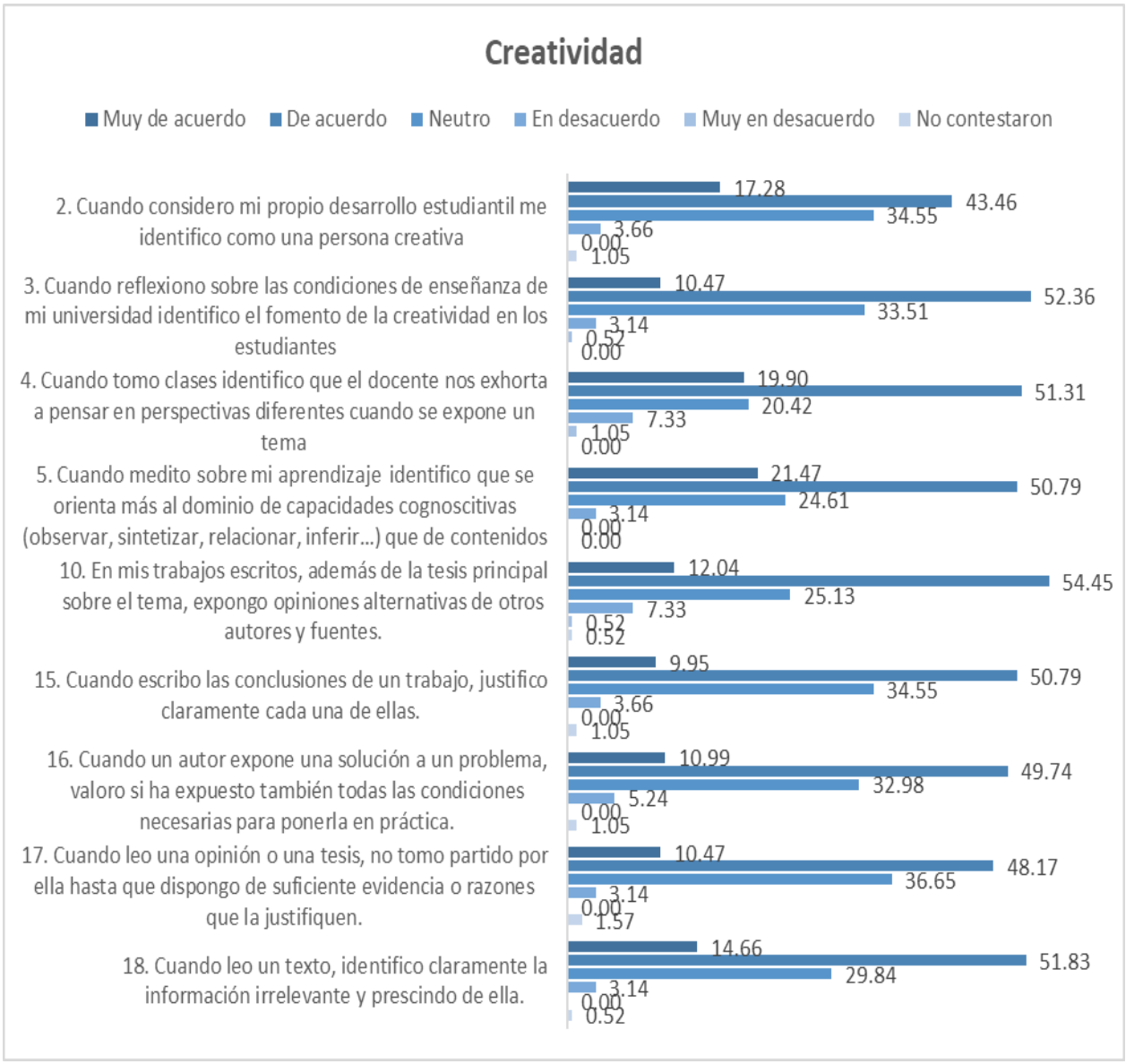
Figure 2. Creativity



Source: Self made

Detailed analysis of the results

Items 2 and 3: The majority of students (43.46%) self-identify as creative people, since they have developed creative skills and competencies during their student career. Furthermore, 52.36% identify the promotion of creativity in the teaching conditions of their university, since critical thinking and problem solving are promoted.

Items 4 and 8: The majority of students (51.31%) recognize that teachers encourage them to consider different perspectives when addressing a topic, as they expose them to

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various points of view and approaches. Likewise, 51.83% clearly identify irrelevant information in a text and discard it, reflecting critical thinking skills.

Items 5 and 15: The majority of students (50.79%) perceive that their learning focuses more on the mastery of cognitive skills than on the memorization of content, which stimulates critical thinking skills such as observation, synthesis, relationship and inference. In addition, they adequately justify each of the conclusions of their written works, which teaches their ability to think critically and support their opinions with evidence.

Items 10, 16 and 17: The majority of students (54.45%) present alternative opinions from other authors and sources in their written works, which shows openness to diverse perspectives and willingness to question established opinions. Additionally, 49.74% evaluate whether an author has considered all the conditions necessary to implement a solution to a problem, which demonstrates critical thinking skills by identifying the limitations of the proposed solutions. Finally, 48.17% do not adopt an opinion or thesis until they have sufficient evidence or reasons to justify it, which demonstrates an ability to think critically and evaluate the evidence objectively.

Critical thinking: interpretation

The results of items 7, 8, 9, 19, 21, 23, 25, 26 and 27, see figure 3, indicate that the majority of public accounting students at the BUAP understand the concepts of critical thinking well and can apply them in various situations. That is, they are able to decompose problems or situations into their component parts to understand them better, they have the ability to evaluate information, arguments and proposals in a critical and well-founded manner, as well as the ability to think logically, systematically and coherently to reach conclusions. solid conclusions, in addition to being able to identify problems, generate creative solutions and choose the most appropriate one in each case.

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Figure 3. Critical thinking

Source: Self made

Detailed analysis of the results

Item 7: It is observed that 37.70% of students do not take a position without considering other perspectives, which demonstrates their ability to think objectively and critically.

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Items 8 and 9: 38.74% of students mention the sources of their ideas and can evaluate the reliability of the information; that is, they recognize the work of others and avoid plagiarism. Likewise, they judge whether the sources they use are reliable since they are capable of evaluating the information critically.

Item 19: 46.7% of students are able to justify their opinions in a logical and coherent manner, which indicates a solid capacity for critical reasoning.

Item 21: 45.55% of students can clearly identify the arguments that support or refute a thesis, demonstrating their ability to critically analyze information.

Item 23: 56.02% of students verify the internal logic of the texts they read, which demonstrates impartial and reflective thinking when evaluating the coherence and validity of the arguments presented.

Item 25: 52.36% of students show a tendency to look for alternative ideas during debates, suggesting creative and open thinking. They are willing to consider new possibilities, which teaches an innovative and flexible mindset.

Items 26 and 27: The majority of students (47.12%) demonstrate a reflective attitude by recognizing the possibility of being wrong and accepting that the author of a text may be right, even if they disagree. This indicates an ability to evaluate information objectively and draw critical conclusions fairly and accurately when reading texts.

Creativity and critical thinking: instrument for teachers

The following survey was applied to the teachers of the Faculty of Public Accounting of the BUAP with the objective of evaluating the level of skills to promote critical thinking, creativity, complex thinking and creative teaching. The results are the following:

Critical thinking: interpretation

The results of items 4, 5, 13, 14, 16, 14, 22, 23, 26 and 27 of critical thinking, see figure 4, indicate that teachers have a good level of understanding of the concepts of critical thinking and are able to apply them in their teaching practice.

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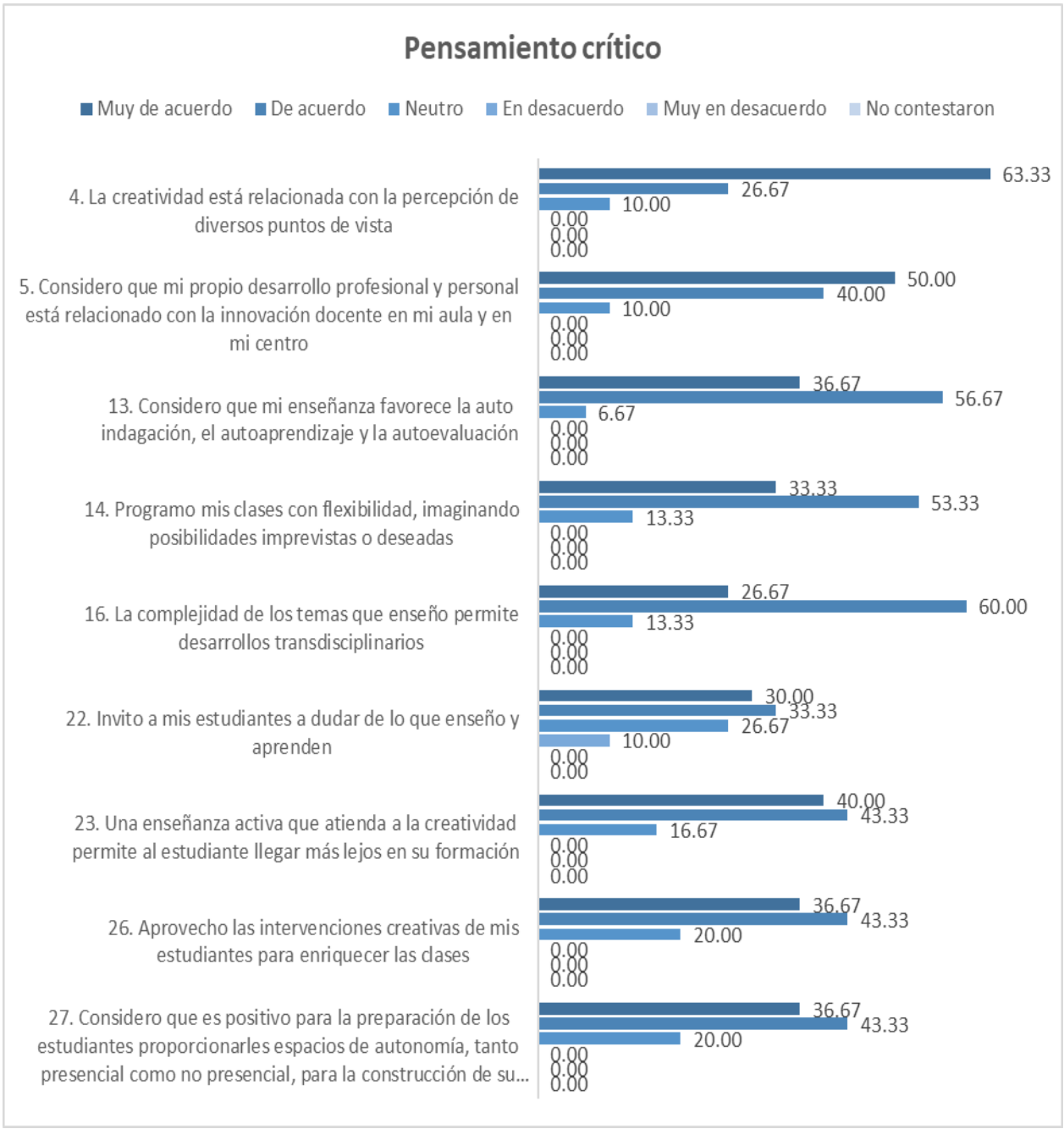
Figure 4. Critical thinking



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Detailed analysis of the results

Items 4 and 5: The majority of teachers (63.33%) affirm that creativity is closely related to the perception of diverse points of view and critical thinking. Furthermore, 50% consider that their own professional and personal development is linked to teaching innovation in the classroom, demonstrating their commitment to developing skills and improving their teaching practice.

Items 13 and 14: The majority of teachers (56.67%) believe that their teaching encourages self-inquiry, self-learning, and self-assessment, reflecting their commitment to developing their students' critical thinking. Furthermore, 53.33% schedule their classes flexibly, allowing for unforeseen or desired possibilities, and are open to innovation and experimentation in their teaching practice.

Items 16 and 22: The majority of teachers (60%) consider that the complexity of the topics they teach allows for transdisciplinary developments, which is a sign of their commitment to comprehensive teaching that transcends the limits of a specific discipline. Additionally, 33.33% invite their students to question what they teach and learn, demonstrating their commitment to developing critical thinking.

Items 23, 26 and 27: The majority of teachers (43.33%) believe that active teaching that encourages creativity allows students to advance further in their training. Furthermore, they take advantage of students' creative interventions to enrich classes, showing openness to new ideas and contributions, and they consider it positive to provide spaces for students' autonomy to build their knowledge.

Creativity: interpretation

The results of items 1, 2, 3, 6, 10, 11, 12, 28 and 31, see figure 5, reveal that the teachers involved in the training of public accountants at the BUAP have a positive perception of creativity and recognize its importance as a fundamental skill for students. Teachers appreciate students' ability to think outside the box, propose innovative solutions, and approach problems from new perspectives. He emphasizes that creativity is not an extra or an add-on, but is considered an essential skill for today's public accountants. This is because the professional accounting environment is constantly changing and requires professionals capable of adapting to new situations and challenges, thinking critically and proactively, communicating ideas effectively and collaborating with multidisciplinary teams.

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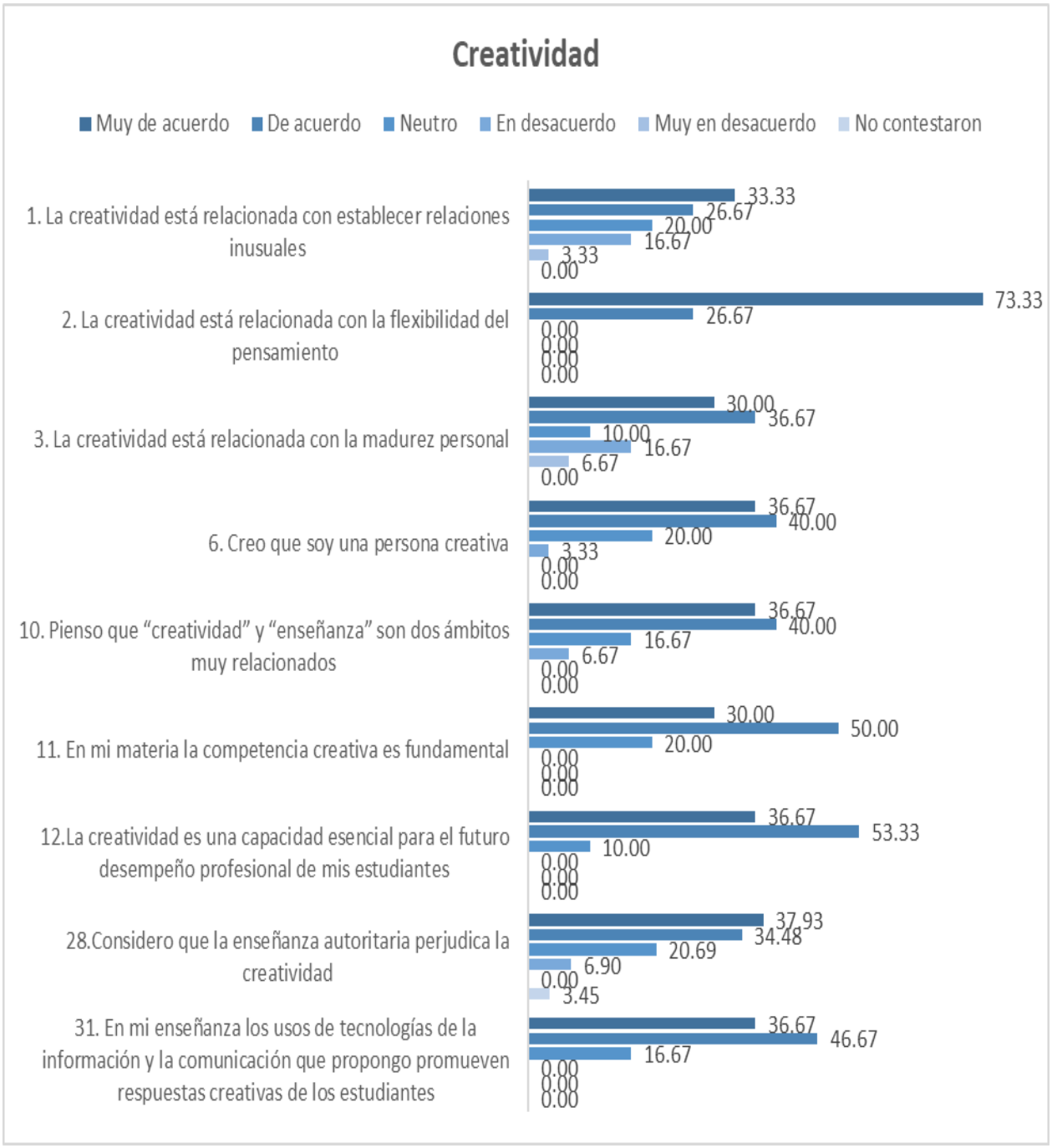
Figure 5. Creativity



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Detailed analysis of the results

Items 1, 2 and 3. 33.33% of teachers identify creativity as the ability to establish unusual relationships, which implies a new and different way of seeing the world. Furthermore, a high percentage (73.33%) relates it to the flexibility of thinking, which implies the ability to think in an open and adaptable way. Likewise, 36.67% of teachers believe that personal maturity is linked to creativity, since this ability is developed with experience and maturity.

Items 6 and 10: 40% perceive themselves as creative people, which gives them confidence in their abilities to generate new and original ideas, and in turn inspires students to learn more effectively. Furthermore, they believe that creativity and teaching are closely related. A positive perception of creativity among students, together with a pedagogical approach that encourages it, contributes to more effective and meaningful learning.

Items 11 and 12: 50% believe that creative competence is essential in their subject, since it allows them to solve problems from different perspectives and generate diverse ideas. Also, 53.33% affirm that creativity is essential for the future professional performance of their students, since it allows them to approach problems in an innovative way and make better decisions.

Items 28 and 31: 37.93% believe that authoritarian teaching, based on the imposition of knowledge and the suppression of student autonomy, can harm creativity by restricting their ability to explore new ideas, by limiting students' freedom to make decisions and think independently. On the other hand, 46.67% affirm that the use of ICT in their teaching promotes creative responses on the part of students, since they contribute to create more dynamic, interactive and participatory learning environments, where students feel motivated to explore, experiment and develop their creativity.

Complex thinking: interpretation

The results of items 17, 18, 19, 20, 21, 32, 33, 34 and 35, see figure 6, reflect that the teachers involved in the training of public accountants at the BUAP recognize the importance of complex thinking and are committed with its promotion among its students. Teachers have the confidence and motivation necessary to guide their students in the process of developing complex thinking, which is essential for their professional success.

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Figure 6. Complex thinking

Source: Self made

Detailed analysis of the results

Items 17 and 35: Most teachers (46.67%) guide their students to reflect on themselves and understand the environment around them. However, they also maintain a neutral stance when requesting arguments against the ideas presented, which suggests that the importance of considering diverse perspectives and the ability to argue against an idea has not yet been fully internalized.

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Items 18, 19, 20 and 34: The overwhelming majority of teachers (53.33%) seek to develop in their students a preparation that transcends mastery of the contents. They recognize that complex thinking is essential for personal and social growth, encouraging reflection on how to apply the knowledge acquired in life and in their future professions. In addition, they promote the consideration of different perspectives when presenting a topic, which is crucial for the development of critical thinking, as it allows one to understand nuances and make informed decisions.

Item 21 and 33: 40% of teachers indicate that their educational approach prioritizes the development of cognitive skills, such as observation, synthesis and inference, over simple memorization of content. They also highlight that when addressing problems posed by students they explore all possible alternative solutions, which underlines the importance of considering different perspectives and solutions in the teaching-learning process.

Item 32: 36.67% of teachers indicate that, when students present an idea, they ask them to justify it and evaluate the solidity of their arguments.

Discussion of the results on creativity and critical thinking: student instrument

The results of the complex thinking items indicate that the majority of students at the BUAP School of Public Accounting have a solid understanding of this concept. That is, they demonstrate abilities to think critically and creatively, and examine the world from multiple perspectives, which makes it easier for them to better understand problems and generate more effective solutions.

In addition, they are able to identify the interrelationships between different elements, which allows them to understand the functioning of economic, financial and accounting systems. They also critically evaluate various available options, which helps them select the best approach to achieve a viable goal.

Regarding the results of the creativity items, they indicate that the majority of students show high self-esteem and confidence in their ability to generate new and original ideas as part of their training at the BUAP Faculty of Public Accounting. In addition, some subjects, such as Entrepreneurship, encourage creativity, which suggests that students will be able to stand out in their professional practice not only for their knowledge, but also for their creative capacity and critical thinking.

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Finally, the results of the critical thinking items reveal that the majority of students have acquired analytical, synthetic, analogical, comparative and contrast methods, which have been fundamental in their training as public accountants. An example of this is that, when faced with problems in their professional practice, they rely on facts and evidence, and are willing to consider different perspectives, even changing their minds in the face of new evidence.

In addition, they show a willingness to abandon preconceived beliefs and explore new ideas to address challenges, and they demonstrate an understanding of the relevance of global problems and their impact in Latin America and Mexico, which enables them to generate innovative solutions. However, a small percentage of students may need to strengthen their critical thinking skills.

Discussion of the results on creativity and critical thinking: teacher instrument

The results of the items related to complex thinking reveal that the majority of teachers in charge of training public accountants at the BUAP have a solid understanding of the concepts associated with complex thinking and are capable of applying them effectively in their teaching work. Furthermore, they are fully aware of the value of complex thinking and are motivated to cultivate this skill in their students.

In fact, they recognize that critical thinking is a transferable skill that can be used in various situations and problems. They agree on the importance of students being able to think from multiple perspectives, identify relationships and interdependencies, and critically evaluate different options. This reflects their understanding of the interconnection and interdependence of economic, financial and accounting systems and phenomena.

On the other hand, the findings of the items related to creativity indicate that teachers in the training of public accountants at the BUAP positively value creativity and recognize its importance as a fundamental skill for students, since they understand that promoting creativity among students increases their chances of success in the professional field. In a world characterized by rapid change, companies demand employees who can think innovatively and solve problems effectively. However, there is a small percentage of teachers who could benefit from developing their creative skills.

Regarding the results related to critical thinking, it is observed that teachers distinguish themselves by incorporating processes, methods and strategies that contribute to

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the construction of complex thinking in their students. In addition, they are committed to strengthening their teaching practice to promote solid training in this area.

It should be noted that the research carried out at the faculty has focused on exploring the profile of the Public Accounting graduate based on their knowledge, skills and abilities. Therefore, it can be assured that the contribution of this research lay in examining the capacity for complex, critical and creative thinking that teachers, through their teaching, have managed to instill in students. In this regard, the role of complex thinking in the interpretation of economic, financial and accounting systems is especially highlighted.

Conclusions

Complex thinking is distinguished by its ability to address the intricate nature of the world's phenomena and problems, going beyond the simplicity that characterizes simplistic thinking. While the latter seeks simple and linear solutions, complex thinking is based on the ability to order, systematize and face challenges from a multidimensional perspective. In addition, it seeks to recognize the interrelationships, connections and dynamics between various elements and systems. Its objective is to understand the systemic nature of phenomena and how they interact with each other, which involves considering multiple disciplines and forms of knowledge to obtain a more complete and accurate vision of reality.

Therefore, it can be said that complex thinking stimulates creativity and critical thinking by challenging simplistic assumptions and exploring new ideas, approaches and solutions. In fact, it recognizes that complex problems demand innovative and flexible responses that can be adapted to different contexts and circumstances.

The complex thinking approach challenges us to examine causal relationships and cascading effects, as well as to consider the possible long-term consequences of our actions. Simply put, it urges us to approach problems from multiple angles, anticipating interactions and potential ramifications.

However, to adopt this approach it is crucial to develop an open and flexible mindset, capable of dealing with uncertainty and ambiguity. This involves seeking integrated and holistic solutions, considering the complexity and diversity of the systems in which we operate. By doing so, we can better understand the challenges we face and find more effective and sustainable responses.

Now, in the teaching field of higher education, pedagogical, methodological and technological innovation is essential to achieve meaningful and quality learning. In this area,

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creativity and innovation must be pillars of teaching practice, reflected in the production of educational materials, interactive activities and in new ways of teaching and learning. To achieve this, it is imperative to put aside rote teaching and promote meaningful learning that promotes critical thinking. Instead, the pedagogy of understanding stands as a valuable approach, as it seeks to develop understanding based on the art of learning, prioritizing understanding processes that are fundamental for complex thinking, creativity, decision making and Problem resolution.

Future lines of research

The new research project will focus on exploring and determining the innovation capacity of both teachers and students in the accounting, financial and economic field of the BUAP Faculty of Public Accounting. Therefore, the starting point will be the analysis of the students, who have taken their first steps in research during their bachelor's degree and have consolidated this process at the master's level in our postgraduate degree, where proposals related to new accounting systems, models innovative finance and the integration of emerging technologies in the field.

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