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ARTIFICIAL INTELLIGENCE AS A TOOL TO STRENGTHEN GRADUATION, GRADUATION AND MEASUREMENT OF THE QUALITY OF GRADUATES OF THE ACCOUNTING AND FINANCE DEGREE OF THE INSTITUTE OF HIGHER STUDIES OF MEXICO CITY ROSARIO CASTELLANOS

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Abstract: Higher Education Institutions (IES) have the function of contributing to the improvement of personal growth through the granting of university degrees, confirming a highly specialized education and training (Morales & Echeverría, Ivonne, 2022); To effectively and efficiently achieve the objective of universities, which is to improve their quality, this has become a priority (ANUIES, 2023) since universities have presented difficulties for graduation, according to the Integrated Information System of Higher Education (SIIES) in Mexico in the year 2020 of an enrollment of 5,069,111 students, 892,912 graduated and a total of 569,128 students graduated, in addition to this, in the educational context the application of Information Technologies and Communication (ICT) with the greatest evolution during the pandemic caused by COVID-19, experienced an unprecedented technological revolution, innovating with ICT must be constant since it allows promoting compliance with the fourth Sustainable Development Goal (SDG) "Guarantee a inclusive, equitable and quality education and promote lifelong learning opportunities for all (United Nations, 2015), therefore, this research focuses on the analysis of the benefits of the implementation of AI and the importance of the study lies in the need to optimize the graduation and graduation processes in the Accounting and Finance Degree (LCFI) of the Rosario Castellanos Institute of Higher Studies of Mexico City (IRC), as well as to evaluate the quality of the teaching-learning process of its graduates through the generation of an AI tool proposal, which will allow the institution to remain at the forefront of innovation in the use of this tool and join efforts to measure and improve the quality of the institution. The methodology applied is quantitative, the information collection was carried out through a survey applied for convenience to the LCFI community, based on the results obtained and the analysis of the program's curriculum, the structure of the evaluation tool is proposed. AI.

Keywords: Artificial Intelligence, ICT, Quality, graduation, Degree, IRC

PROBLEM STATEMENT

The technological evolution for teaching classes for decades has been transformed with the use of ICT, but since the pandemic its implementation for remote work became essential given the closure of schools, however, hybrid education has become characterized by combining the best practices of face-to-face education and distance education, so the technologies applied to this educational model have evolved significantly in recent decades, undergoing an unprecedented technological revolution where applying and innovating them is constant to promote the compliance with the fourth SDG (United Nations, 2015).

The application of AI is a topic of relevance in the contemporary world, since through the use of decision trees, student learning can be personalized, measured and promoted in an objective and precise way, this makes it a valuable tool, especially to try to promote the graduation, qualification and measurement of the quality of students in emerging environments in which it is necessary to analyze the possible risks and challenges that may arise in the implementation of AI.

In this sense, the relevance of this research focuses on newly created Higher Education Institutions, such as the Rosario Castellanos Institute of Higher Education of Mexico City (IRC) founded in 2019, with a hybrid educational model. -dual and that implements the training of its students in a prototypical problem-solving approach and in which its II objective is to "Train competent professionals, apt for the application and generation of knowledge that provide them with the skills

to solve problems." problems, with critical thinking, ethical sense, entrepreneurial attitudes, innovation and creative capacity, which incorporate scientific and technological advances for the development of Mexico City" (IRC, 2023) in order to prevent the prevailing problems in universities of Mexico City in which in 2021-2022 an enrollment of 727,898 students of University and Technological Degree was reported and only a total of 93,941 graduates were achieved (ANUIES, 2023) and in which currently they are mainly evaluated by the inputs and not by the results obtained from the teaching-learning process since the evaluations consider the profile and productivity of its academics, management, infrastructure, equipment, etc. (ANUIES, 2023).

Therefore, this research focuses on understanding and explaining the use of AI and as a tool to strengthen the graduation, graduation and measurement of the quality of the students of the LCFI of the IRC, having as a question:

Through the generation of an AI tool, it is possible to strengthen the graduation, the degree and the measurement of the quality of the graduates of the LCFI of the IRC?

METHODOLOGY

The present study is a formative investigation that focused on a case study regarding the analysis of the relevance of the application of the AI applicable to processes of strengthening at graduation, titling and measurement of the quality of the students of the LCFI of the ICR. In order to answer the research question, under a transversal approach, the following variables are evaluated: 1. Artificial Intelligence Applicable to Education, 2. Graduation and Degree in the LCF, 3. Curricular Learning Units of the LCFI and 4. LCFI students. Therefore, an exploratory and descriptive research methodology was used to present the generalities of the context of the study area, with the purpose of identifying and diagnosing the current situation of its educational offer, carrying out a documentary investigation, which implied the search, compilation and analysis of writings on AI applicable to education, graduation and degree, LCFI Learning Curricular Units and LCFI students.

Subsequently, convenience surveys were used from February 27 to March 10, 2023 to LCFI students to obtain information regarding their graduation and graduation process; The analysis of the information allowed the generation of a proposal for an AI tool that can strengthen the graduation, the degree and the measurement of the quality of the graduates.

ARTIFICIAL INTELLIGENCE IN EDUCATION

The constructivist theory of Piaget and Vygotsky indicates that learning is not obtained passively but actively and allows the student to be placed at the center of their training, the development of skills, competencies and knowledge, promoting autonomous learning in the student body, which which can be achieved through the use of facilitating tools such as the IA case of which UNESCO (2021) ensures that they allow innovation in teaching-learning practices and accelerate the progress of achieving the fourth SDG "Guarantee an inclusive, equitable and inclusive education". quality and promote lifelong learning opportunities for all (United Nations, 2015) allows to protect the well-being and guarantee access to continuous learning and that aspires to the mobilization of resources to provide solutions appropriate to the context to provide distance education that take advantage of high, low and no technology approaches (UNESCO, 2020).

Currently there are applications and pages

that implement AI for educational purposes such as: Chat GPT, Perflexity, Parafrasear.org, SlidesAI, Redactame, Quillbot, Tome.app, Grammarly, Quizlet, among many others; some of them allow the writing of essays, documents, presentations, summaries, acquisition of knowledge, etc.; putting into question the functionality and ethical use of these, generating debate among the actors of education in this regard, since although it is true there are some that limit the generation of competencies and abilities in students, as well as some others that adhere to the recommendations corresponding to five cross-cutting issues generated in the UNESCO Beijing Consensus held from March 16 to 18, 2019, which are: promoting an equitable and inclusive use of AI in education; an AI that respects gender equity and favors gender equality; ensure ethical, transparent and verifiable use of education data and algorithms; monitoring, evaluation and research (UNESCO, 2021).

INSTITUTE OF HIGHER STUDIES OF MEXICO CITY ROSARIO CASTELLANOS

The IRC has 8 Academic Units: Azcapotzalco, Coyoacán, GAM, Justo Sierra, Magdalena Contreras, Milpa Alta, Academic Linkage and Interculturality (IRC, 2022), in table 1 you can see the programs that make up its integrated educational offer of as follows 24 undergraduate programs 16 hybrid face-to-face modality and 8 distance learning; 5 master's degrees; 2 specialties; and 2 doctorates (IRC, 2023).

The Educational Model is dual hybrid and its approach is based on solving prototype problems. For the first quarter of 2022, it had a total enrollment of 31,325 students, 30,964 undergraduates (19,445 women and 11,519 men), 361 Postgraduate students (182 women and 179 men) and a total of 160 graduate students.

BACHELOR OF ACCOUNTING AND FINANCE

The IRC Accounting and Finance Degree is a face-to-face-hybrid modality program with the objective: "to train professionals with a multidisciplinary and moral approach with solid knowledge in accounting, costs, tax auditing and finance, to control, generate, analyze, validate, interpret and evaluate financial information necessary for decision-making in the commercial, production, services, teaching and research sectors, which contribute to solving the needs of the different sectors of the population. The foregoing will be achieved through the use of information technologies, as well as the various techniques, methods and systems" (IRC, 2018) at the Headquarters: Gustavo A. Madero, Coyoacán, Azcapotzalco, Milpa Alta.

2018 program subjects

The 2018 IRC LCFI program consists of 50 subjects or Learning Units divided into 8 semesters with two modules each (module I and module II), the first 6 semesters are made up of 6 subjects (3 in each module) and the last 2 of 7 subjects (3 and 4 subjects each module respectively); It is a Face-to-Face-Hybrid educational model (table 2), the subjects of this degree are divided into 5 areas: accounting, finance, law, administration and economics (graph 1).

ANALYSIS AND RESULTS

GRADUATION AND DEGREE FROM HIGHER EDUCATION INSTITUTIONS

For the SIIES in Mexico there are 10,766 schools in Institutions, with a total enrollment of 5,069,111 students (2,714,329 women and 2,354,788 men), in relation to graduation in 2020 a total of 892,912 (496,779 women and

Education level	Program
Hybrid face-to-face degrees	Degree in Environmental Sciences for Urban Areas
	Bachelor of Data Science
	Bachelor of Data Science for Business
	Bachelor of Accounting and Finance
	Degree in Law and Criminology
	Degree in Urbanism and Metropolitan Development
	Degree in Law and Citizen Security
	Bachelor's Degree in Humanities and Multimedia Narratives
	Bachelor's Degree in Economics and Sustainable Development
	Bachelor of Tourism
	Degree in psychology
	Degree in international relations
	Degree in Communication Sciences
	Enviromental science degree
	Bachelor of Engineering in Control and Automation
	Bachelor's Degree in Community Development for Metropolitan Areas
Distance bachelor's degrees hybrid	Bachelor of Administration and Commerce
	Bachelor's Degree in Information and Communication Technologies
	Bachelor of Marketing and Sales
	Degree in international relations
	Degree in psychology
	Degree in Law and Criminology
	Bachelor's Degree in Humanities and Multimedia Narratives
	Bachelor of Accounting and Finance
Masteries	Master in Environments, Systems and Management in Multimodal Education
	Master in Climate Change and Biodiversity
	Master's Degree in Indigenous Law
	Master in Public Policy and Interculturality
	Master in Territory and Historical Memory
Specialties	Specialty in Pedagogical Strategies for Intercultural Education
	Specialty in Innovative Teacher Intervention in Emerging Situations
Doctorates	PhD in Multimodal Educational Environments and Systems
	PhD in Sustainability Sciences

Table 1 IRC educational offer

Source: IRC (2023)

| Semester	Module	LIST OF SUBJECTS OR LEARNING UNITS	CLUE	SERIATION	HOURS WITH TEACHER	HOURS INDEPENDENT	CREDITS	INSTALLATIONS
1st SEMESTER	Module I	Basic accounting	CFM01		96	120	12	A/O
		Professional ethics	CFM02		64	80	8	A/O
		Financial mathematics	CFM03		64	80	8	A/O
	Module II	Applications with Excel	CFM201		64	80	8	A/O
		Civil law	CFM202		64	80	8	A/O
		Fundamentals of Economics	CFM203		64	80	8	A/O
2nd SEMESTER	Module I	Intermediate Accounting	CFI201	CFM01	96	120	12	A/O
		Fundamentals of Administration	CFI202		64	80	8	A/O
		Generation of Financial Information Systems	CFI203		64	80	8	A/O
	Module II	Civic Culture and Social Responsibility	CFI2201		64	80	8	A/O
		Commercial Law	CFI2202		64	80	8	A/O
		Statistics I	CFI2203	CFM203	64	80	8	A/O
3rd SEMESTER	Module I	Advanced accountancy	CFI301	CFI201	96	120	12	A/O
		Internal control	CFI302		24	70	5	A/O
		Information technology	CFI303		24	70	5	A/O
	Module II	Fiscal Law	CFI3201		24	70	5	A/O
		Organizational system	CFI3202		24	70	5	A/O
		Statistics II	CFI3203	CFI2203	24	70	5	A/O
4th SEMESTER	Module I	Costs	CFM401		24	70	5	A/O
		Fundamentals of Audit	CFM402	CFI302	24	70	5	A/O
		Economic Problems in Mexico	CFM403		24	70	5	A/O
	Module II	Indirect Taxes and Social Security	CFM4201	CFI3201	24	70	5	A/O
		Labor law	CFM4202		24	70	5	A/O
		Operations investigation	CFM4203	CFI3203	24	70	5	A/O
5th SEMESTER	Module I	Budgets	CFI501		24	70	5	A/O
		Basic Finance	CFI502		48	80	5	A/O
		Social Law	CFI503		24	70	5	A/O
	Module II	Physical persons	CFI5201	CFM4201	24	70	5	A/O
		Market study	CFI5202		24	70	5	A/O
		Sustainability and Transparency	CFI5203		24	70	5	A/O
6th SEMESTER	Module I	Selected Topics Based on NIF	CFI601		64	100	9	A/O
		Corporate finance	CFI602	CFI502	32	80	8	A/O
		Audit practices	CFI603		64	120	10	A/O
	Module II	Moral people	CFI6201	CFI5201	24	70	5	A/O
		Investigation Methodology	CFI6202		24	70	5	A/O
		Direction	CFI6203		24	70	5	A/O
7TH SEMESTER	Module I	National and International NF Consulting	CFI701		64	100	9	A/O
		Investment projects	CFI702	CFI602	48	80	7	A/O
		Cost practices	CFI703		64	120	10	A/O
	Module II	Tax practices	CFI7201		48	80	7	A/O
		Financial models with Excel	CFI7202		24	70	5	A/O
		Electronic accounting and its link with the SAT platform	CFI7203		64	100	9	A/O
		Marketing	CFI7204		24	70	5	A/O
8th SEMESTER	Module I	Stock Market Simulators	CFI801		64	100	9	A/O
		Stock Finance	CFI802		64	100	9	A/O
		Investment Portfolios	CFI803		64	100	9	A/O
	Module II	Econometrics	CFI8201		64	100	9	A/O
		Advanced Finance Simulators	CFI8202		64	100	9	A/O
		Technical and Fundamental Analysis Simulator	CFI8203		64	100	9	A/O
		Strategic planning	CFI8204		64	100	9	A/O
ADDITION			2,378		4,190	358		

Table 2 IRC LCFI Program 2018

Source: IRC (2018)

Graph 1 IRC LCFI Curriculum

Source: IRC

Institutions and schools 2020	Tuition 2021	Graduation 2020	Degree 2020	Professional cells 2019
Growth 2019-2020	Growth 2020-2021	Growth 2019-2020	Growth 2019-2020	
Institutions 4,134 5,14%	Total 5,069,111 1.24%	Total 892,912 4.34%	Total 569,128 8.19%	Total 378,134
Schools 6,632 4,65%	Men 2,354,782 -0,96%	Men 396,133 0.96%	Men 249,912 4.18%	
	Women 2,714,329 3,23%	Women 496,779 7.21%	Women 319,216 11.55%	
	With disability 59,749 22.83%	With disability 6,960 -2.93%	With disability 3,717 22.79%	
	Indigenous language 61,182 4.82% speaker			

Table 3 Statistics on Higher Education in Mexico (Undergraduate and Postgraduate)

Source: Ministry of Public Education (s.f.)
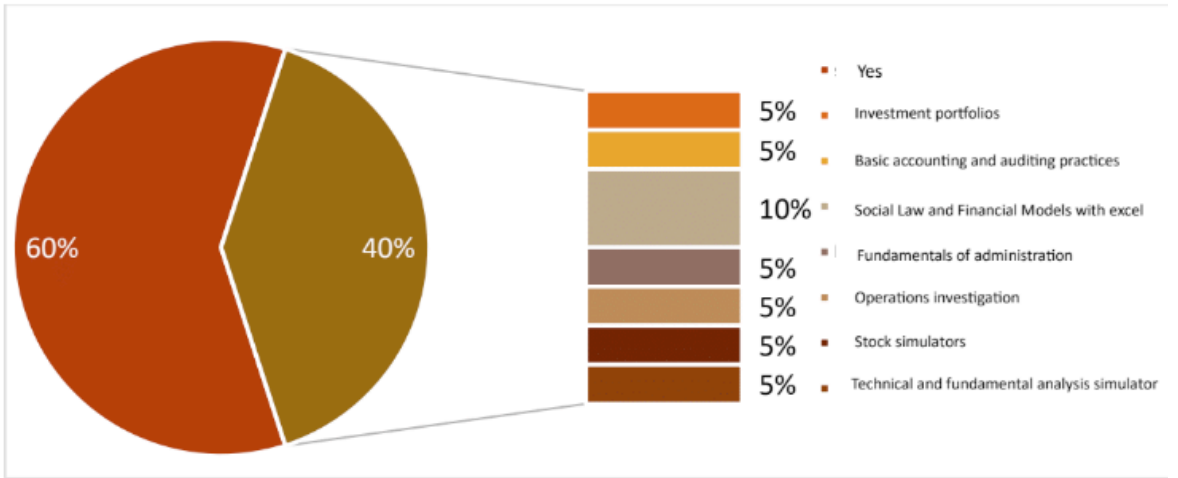
Graph 3 Debt of subjects

Source: the own author
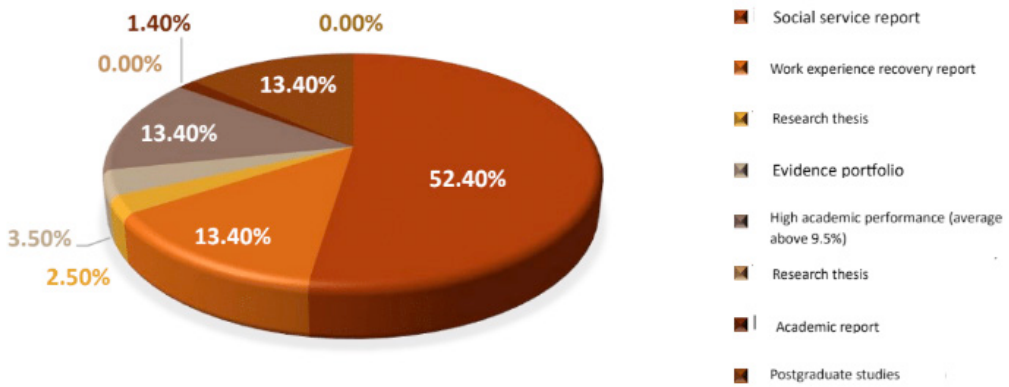
Graph 7 Preferred degree medium

Source: Own elaboration

Basic accounting	Professional ethics	Financial mathematics	Applications with Excel	Civil right	Fundamentals of the Economy
Intermediate Accounting	Fundamentals of Administration	Generation of Financial Information Systems	Civic culture and	Social responsability	Commercial Law
Statistics I	Advanced accountancy	Internal control	Information technology	Fiscal right	Organizational systems
Statistics II	costs	Audit Fundamentals	Economic Problems in Mexico	Indirect Taxes and Social Security	Labor law
Operations Investigation	Budgets	Basic Finance	Social Law	Physical persons	Market study
Sustainability and Transparency	Selected NF-Based Topics	Corporate finance	Audit practices	Moral people	Investigation Methodology
Direction	National and International NIF Consulting	Investment projects	Cost practices	Tax practices	Financial Models with Excel
Electronic accounting and its	Link with the SAT platform	Marketing	Stock Market Simulators	Stock Finance	Investment Portfolios
	Econometrics	Advanced Finance Simulators	Technical and Fundamental Analysis Simulator	Strategic Planning	

Graph 8 Reinforcement by subject

Fuente: Elaboración propia

Accountant

Financial

Right

Administration

Economy
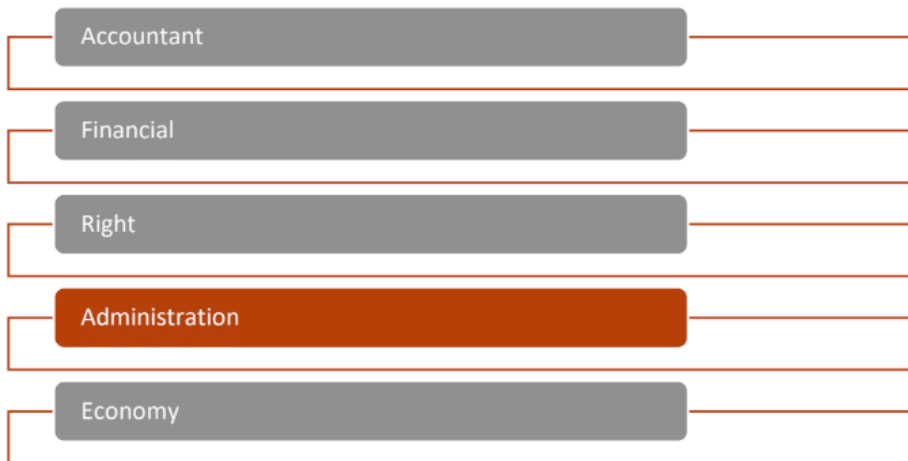
Gráfico 9 Reforzamiento por área del conocimiento

Fuente: Elaboración propia

Applications in excel

Civil culture and social responsibility

Tax law

Indirect taxes and social security

Physical persons

moral persons

Tax practices

Econometrics

Gráfico 10 Reforzamiento por área del conocimiento

Source: Own elaboration

First semester

Basic accounting

Professional ethics

Financial mathematics

Applications with Excel

Civil law

Fundamentals of Economics
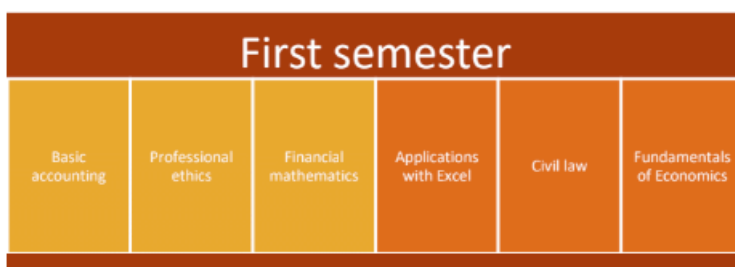
Graph 11 Subjects of the First Semester

Source: Own elaboration

Graph 12 Subjects of the Second Semester

Source: Own elaboration

Graph 13 Subjects of the Third Semester

Source: Own elaboration

Graph 14 Subjects of the Fourth Semester

Source: Own elaboration

Graph 15 Fifth semester subjects

Source: Own elaboration

Gráfico 16 Asignaturas del Sexto Semestre

Source: Own elaboration

Graph 17 Subjects of the Seventh Semester

Source: Own elaboration

Graph 18 Subjects of the Eighth Semester

Source: Own elaboration

Gráfico 19 asignaturas para medición de la calidad y titulación

Source: the own author

Graph 20 Reagent bank worksheet

Source: Own elaboration
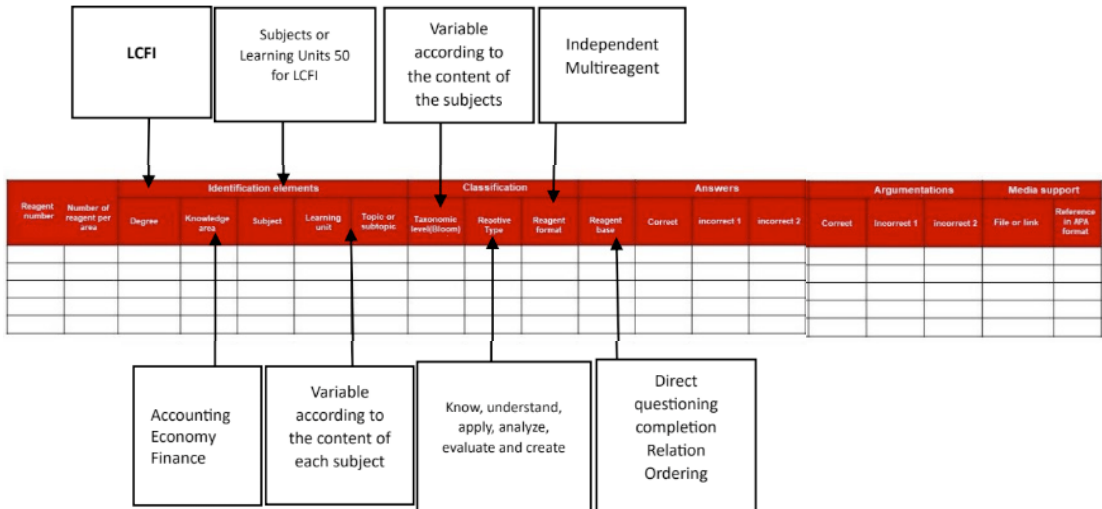
Graph 21 Reagent bank worksheet with specifications

Source: the own author

396,133 men) were achieved, the degree of 2020 was 569,128, of which there are 319,216 women and 249,912 men (table 3), therefore, considering the above information, it can be inferred that 17.6% of the enrollment (9.8% women and 7.8% men) manage to graduate and graduate as only 11.2% (6.3% women and 4.9% men).

In the case of universities in Mexico City, the National Association of Universities and Institutions of Higher Education (ANUIES) reported in 2021-2022 an enrollment of 727,898 students of University and Technological Degree, 374,303 are women and 353,595 men; admissions were 140,565 (74,728 women and 65,837); In relation to discharges, it has a total of 93,941 of which 50,369 women and 43,572 men (ANUIES, 2023); It can be inferred that 21.98% per year enter (11.81% women and 10.16% men) and only 15.74% graduate (8.55% women and 7.20% men).

Given the national and Mexico City statistics, it is important to take pertinent actions to promote graduation and graduation from universitites, in order to meet its objective of contributing to the improvement of people's living conditions through granting of university degrees, which confirms the receipt of a highly specialized education and training (Morales & Echeverría, Ivonne, 2022).

GRADUATES AND DEGREE IN THE LCFI

The graduation profile is: "The graduate of the degree in Accounting and Finance will be able to control, generate, analyze, corroborate, interpret and evaluate financial information and economic and social indicators, as well as assist in decision-making that allows optimizing resources. minimize financial risks and thereby strengthen the growth and development of economic, social and cultural

entities, based on group and multidisciplinary performance of both research and sustainable development with strict ethical and moral values" (IRC, 2018).

The graduation and degree characteristics of the IRC LCFI students were shared in a personalized way with the target population, during the period from February 27 to March 10, 2023, achieving a convenience sample of 82 responses.

Of the graduated students, it is known that 89% have 100% credits, so they could already start their degree procedures, selecting one of the following modalities: social service report, work experience recovery report, thesis research, evidence portfolio, high academic performance, research thesis, academic report, intervention or innovation project or postgraduate studies, as long as they have accredited English language (see graph 2).
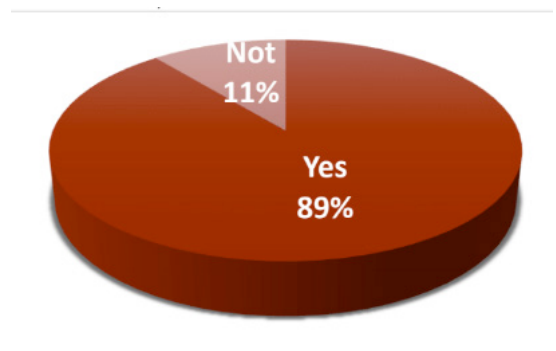

Graph 2 Graduates with 100% credits
Source: the own author

While in the accreditation of subjects, 60% mention having all the subjects of the LCFI program approved, and 40% infer the debt of one or more subjects among which are: social law and financial models with 10%, investment portfolios, basic accounting and auditing practices, management fundamentals, operations research, stock market simulators, and technical and fundamental analysis simulator (graph 3); It is necessary to carry out activities that promote and facilitate

graduation, using an artificial intelligence tool in which the knowledge, skills, attitudes and values acquired can be studied and measured, as well as being able to measure compliance with the general objective of the subject in order to be able to thus accredit said matter.

In the accreditation of the language required for their degree, 90.2% have a passing decision and 9.8% have not achieved it (graph 4) due to: lack of information, lack of time, they have not taken the exam, they have not been able to register for the course by joining timetables with subjects or working hours or simply has not taken it.
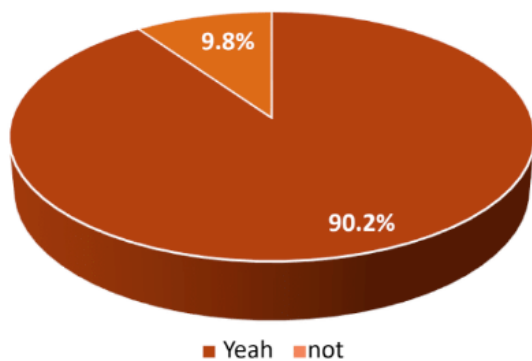
Graph 4 Status of accreditation of the English language

Fountain: own elaboration

In graph 5, it shows that 55% have their letter of studies completed, while 45% have not, which is related to the lack of accreditation of any subject (graph 3), or of obtaining the letter of liberation of the English language (graph 4), this allows us to predict that in the IRC the same problem of graduation problems and degree of some universities can be presented where 17.6% of the enrollment (9.8% women and 7.8 % men) manage to graduate and graduate only 11.2% (6.3% women and 4.9% men), so an AI tool would allow an alternative to strengthen the skills, knowledge and values of the students, it would also allow measuring the degree of effectiveness of the scope of the objectives of each subject.
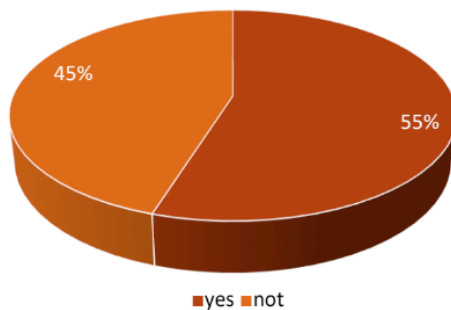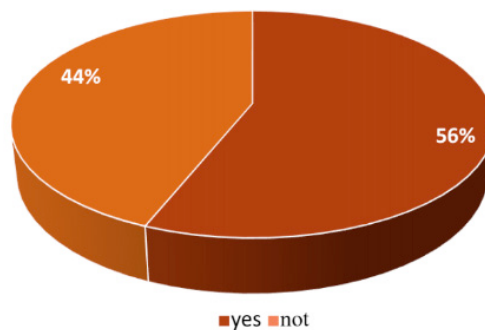

Gráfico 5 Estudiantes con carta global de estudios terminados

Source: Own elaboration

Regarding the Social Service, graph 6 shows that 56% of the population that was part of this study states that they have already completed this element, which is an essential requirement for the degree.

Graph 6 Social Service

Source: Own elaboration

Finally, the degree preferences were analyzed, where the main means is the social service report 52.40%, followed by work experience recovery report, high academic performance (average above 9.5) and postgraduate studies with 13.4% each. one, 7.4%, is represented by: research thesis, evidence portfolio and academic report and those that were not selected are: research thesis and intervention and innovation project (graph 7).

ARTIFICIAL INTELLIGENCE TOOL PROPOSAL

Considering the context of operation of the IRC, with the data obtained from the instrument applied to LCFI Students, as well as the needs detected by ANUIES and the opportunities identified by the United Nations and UNESCO for innovation and promotion of compliance with the fourth SDG, it is proposed to generate an AI tool to strengthen the graduation, qualification and measurement of the quality of the graduates of the LCFI of the IRC through the implementation of decision trees and supported by continuous and individualized adaptive microlearning, which through the application of CENEVAL-type questions for each of the 50 subjects of the educational program supported by Bloom's taxonomy, which will allow the tool to identify gaps and predict knowledge gaps, ensuring an efficient individualized and self-directed learning process through the support of multimedia resources, auto-generate personalized training sessions to repair those knowledge gaps; that encourages interaction with peers and instructors, incorporating Social Learning (SA), that I monitor, analyze and improve performance in real time.

The foregoing may be applicable for students who have subjects pending accreditation (graph 8), for those who require support by area of knowledge (graph 9) for example the area of administration (graph 10), as well as for those who require reinforcement of a complete semester (graphs 11 to 18), for those who already have the total number of credits taken to measure and evaluate the knowledge, skills, attitudes and values of the graduates and for those who wish to graduate through this proposal of discharge (graph 19).

In Excel, the reagents will be concentrated in a Ceneval-type format (graph 20), it will be completed considering the identification elements of the reagent: Degree, Knowledge Area, subject (table 2), learning unit, topic or subtopic; in addition to considering the classification in relation to the type of reagent that it contemplates: taxonomic level, type and format of reagent; Subsequently, the reagent base is integrated, followed by the 1 correct and 2 incorrect answers, as well as the arguments of the answers and finally a multimedia file is integrated (graph 21).

The proposed tool allows generating a platform where the student has 24/7 access and to optimize their learning, by being an active protagonist; marking a difference from traditional learning platforms. The AI generates algorithms that eliminates content dominated by the student and only leaves the subjects that require study; While the IRC obtains statistical information on its behavior, likewise, the tool can be implemented as an innovative form of qualification based on knowledge obtained, which could contribute to reducing the problem of graduation and qualification of universities, especially IRC.

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