Abstract: The objective of the research is to identify and evaluate the learning process of international financial reporting standards "IFRS" supported by interactive learning objects "OIA"

Background: The implementation of IFRS in Colombia requires new dynamics in accounting education in the classroom with dynamic learning tools.

Methodology: The methodology proposes a mixed qualitative and quantitative analysis of information, using the questionnaire as an instrument for data collection as a test before and after the use of the OIA. The sample is represented by students from two Colombian universities in the Public Accounting program in the subject of liabilities.

Contribution: This review allows to deepen in the learning process the need to link more and more frequently the interactivity as a tool to improve the understanding of concepts.

Findings: The results obtained indicate that the IROs are a tool that allows a better understanding of theoretical concepts such as IFRS, argued by the improvement in the results of students by linking tools such as video tutorials and guides supported by cybernetics.

Recommendations for Practitioners: It is recommended to professionals and researchers to advance new evaluations with longer periods of time to identify if it is a true learning or just a momentary memory due to the virtual supports.

Recommendations for Researchers: The application of research in new virtual environments.

Impact on Society: In the social sphere, the research helps to reflect on the teaching exercise, the master class, the role of the teacher, the teaching process and the need to rethink the instruments used in university teaching.

Future Research: The article becomes a base document for future research to deepen aspects such as virtual learning, learning supported by e-media, learning and the need for teacher presence, student engagement in virtuality.

Keywords: Interactive learning objects "ILO"; International Financial Reporting Standards IFRS; learning, e-media; virtuality.

INTRODUCTION

The teaching-learning process in accounting, specifically in the IFRS subject, involves carrying out a theoretical review based on traditional and critical educational models, examining the theories formulated by Freire, Carreño, (1984) Ausubel, Piaget and Vygotsky, Casimiro & Casimiro, (2013) and the influence generated by the various teaching methods in the classroom. From this point of view, the impact that Information and Communication Technologies "ICT" have had in the classroom is shown. It is identified how currently accounting teaching has to be permeated by technological developments; taking up concepts such as e-learning, the Interactive Learning Objects «OIA»; education standards and different accounting teaching methodologies.

This analysis allows clarifying and identifying the relationship between teaching methods, innovation strategies, learning, ICT, OIA, and how all these influence the proper understanding of IFRS by students.
When reviewing the application of OIAs in education, it is necessary to address the concept of information and communication technologies (ICT). At present they are found as a necessity originated by technological developments in which the teaching-learning process must generate a renewal in the educational methodology.

The didactics of virtual education pose new challenges for the teaching-learning process, going from a change in the tools traditionally used such as the board and chalk to new mechanisms that are supported by current technology. In virtual learning environments, pedagogical performance is supported by multimedia elements, technological elements that help the student in the learning process and become a guide for the development of teaching and evaluation by the teacher Duart and Sangrá, (2000). When the student is in a virtual environment, the adequate structure of the platform becomes his main tool to achieve learning; Nevertheless,

«Teaching is learning. Learn before, learn during, learn after and learn with the other» Litwin, (2010). ICT-based teaching allows virtual interactions in the so-called «interactive field», a concept that refers to the communication space that allows the student the adequate apprehension of knowledge. The interactive field allows the construction of the power and knowledge of the student as a process of responsibility and capacity in decision-making, it is a space that, in addition to connecting the student in the learning process, links the emotional and affective, where the tutorial spaces become essential elements to achieve adequate teacher-student interaction FUCN, (2005). This space becomes an important element for the achievement of academic objectives, where the communication can be asynchronous, but with effective answers to solve doubts in the student; however, synchronous advisory spaces are recommended, structuring the emotional and allowing to articulate the complete cycle of teaching-learning in virtuality.

E-learning education «electronic learning» can be interpreted as another form of teaching; which is associated with virtual education, but which focuses on the use of web pages, messages, forums, and communication networks. As Arboleda (2013, 76) expresses: «The e-Learning student ceases to be the old and self-taught hermit to insert himself into a set of academic, pedagogical and social networks; becoming an essentially interactive subject.»

Technology becomes an essential element in the teaching-learning process, allowing new possibilities for the student who finds in communication networks, solutions to their doubts and new connectivity mechanisms that allow quick and clear answers, mediated by interactive learning objects such as tool to facilitate the acquisition of new knowledge.

THE TEACHING LEARNING PROCESS

The apprehension and application of class concepts constitute the initial element to review to understand the positive effects that the inclusion of OIAs can generate in the teaching-learning process; This process has been approached from different perspectives, starting from a position of the teacher as the owner of knowledge to a teacher who only becomes a facilitator, a guide in learning in the classroom.

<table>
<thead>
<tr>
<th>Pedagogical models</th>
<th>Critical Pedagogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>traditional pedagogy</td>
<td>Opposed to traditional pedagogy; shows a participatory attitude of the student as a subject who can analyze, investigate, and maintain a reflective attitude. Gonzalez, (2007), Perez, (2004)</td>
</tr>
</tbody>
</table>

The student is perceived as a subject who receives knowledge and where everything that the teacher expresses, the student memorizes without making any reflection or criticism. Freire cited by González (2007)
Traditional pedagogy poses an emphasis based on results, without analysis or critical reflections Pérez, (2004). In this teaching process, the student then becomes a passive subject where he is limited to listening to the teacher and following the guidelines proposed without further analysis or reflections on realities.

Critical pedagogy leads us to see the student as an active subject in learning; reflective, analytical and in search of new world realities, a world in which the theory raised in the classroom can be refuted and allows the search for new theories.

The review of some teaching models allows us to reflect on the learning process, understood as the acquisition of new knowledge, the ability to develop processes or the formation of competencies, this process leads to deliberate on the implication that the OIA may have in the appropriate Student learning of IFRS International Financial Reporting Standards. The learning process has been approached from different teaching positions that are shown below:

Table 1 Learning models.

<table>
<thead>
<tr>
<th>Learning Models</th>
<th>behaviorism</th>
<th>Cognitivism</th>
<th>constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>It is formulated as a process of encouraging the student to achieve certain behaviors. Learning under this structure does not think about the way in which the student performs his learning logic and the student is seen as a passive subject. A standardized learning in which all students are expected to learn at the same time and without thinking about their differentiating characteristics. Curone, (2008)</td>
<td>The basic principle of cognitivism is to banish memory and promote rational learning. Thus, he opposes «rote learning» to «meaningful learning». Bonavente, (2001). Opposed to traditional pedagogy; shows a participatory attitude of the student as a subject who can analyze, investigate, and maintain a reflective attitude; This concept is raised by Paulo Freire when referring to education as a problematizing, liberating activity; where the contents of the subjects must become open curricula; scenarios that allow debate and a critical analysis of the teacher's discourse.</td>
<td>Learning from constructivism takes another perception originated by the change in the structure of the subject; that impregnates the theory with a concept of personal reality that allows not only to memorize but also to confront and build new concepts Dongo, (2008).</td>
</tr>
<tr>
<td>Main authors</td>
<td>Ivan Petrovich Pavlov John Broadus Watson Edward Lee Thordike Frederick Skinner</td>
<td>Piaget Ausubel Bruner Vygotsky</td>
<td>Piaget Ausubel Vygotsky Noam Chomsky</td>
</tr>
</tbody>
</table>

Font: Own elaboration.

CURRENT ACCOUNTING TEACHING PROCESS
Higher education institutions have prioritized teaching processes focused on the preparation of accounting tasks such as taxes, reports, software management and various tools that focus on doing things well, and not on knowing how and where to go. Manage accounting tasks. “The teaching-learning process of accounting is carried out by transmitting knowledge about its procedure or about the accounting standard and one is more interested in the accounting process than in its conceptual foundation, focusing more on doing than knowing. Reyes & Chaparro, (2013, p. 1151). In many cases, the entrepreneur considers accounting as a mechanism of oppression and they see accounting only as an instrument for paying taxes and not as a tool for decision-making Salazar, (2013). It is necessary then that the accounting teaching based on the master class allows a rethinking that leads to the use in the classroom of the various current technological tools and that allows the student a true learning. The OIAs are presented as mediators in the classroom, they support the academic process and seek to become valid didactic tools for teaching theoretical concepts such as the international financial reporting standards «IFRS». In the words of Bruner, (1991) «The main objective of the cognitive revolution is «Recovering the mind» after the behavioral glaciation era».

In Colombia, the teaching has been thought of, not only IFRS, but accounting in general, in this regard the Ministry of National Education, (2003) expresses: The teaching of accounting must allow the student the «know the languages, techniques and practices of the professional practice of Accounting». In this sense, the university professor must be a great pedagogue and be able to develop didactic strategies.

Globalization demands new challenges in teaching methodologies and tools that strengthen the accounting profession; This is how IFAC (2008) expresses it. «IFAC» International Federation of Accountants, as a global organization for the accounting profession, an institution dedicated to serving the public interest by strengthening the profession and contributing to the development of strong international economies. This body has developed, through its Education Committee, the "IAESB" Publisher New Standards on Content of the Professional Accounting Education Program, guides and informative documents with the application of high standards providing perspectives for the development of study guidelines at a level accountant.

The United Nations conference held in November 2017 ISAR, puse highlights the differences in the way in which professionals from different countries calculated accounting operations and fair value in accounting, a situation that shows the difficulties in accounting education at a global level with IFRS.

The IAESB has published three International Education Standards (IES):

Technical skills in the NIE 2; professional skills in NIE 33 and skills, values, ethics and attitudes in NIE 4.

IAESB focuses on accounting teaching by competencies, the capacities in education seek to generate three elements in the student: development of being, knowing and knowing how to do. Knowledge by competencies goes from a theoretical concept only to a concept applied in practice. Teachers have to be trained and motivated to include various forms of teaching focused on future accountants, among which one could think of adapting teaching methods and material to the ever-changing environment in which the accountant works, and linking of technological tools for learning IFAC, (2008).

IFAC reinforces the need, in accounting education, to involve ICT and OIA as new teaching methods to achieve an adequate process in a world marked by technological tools and visual learning. «Investigating the emergence of skills that escape formal learning, implies transcending to a certain degree the categories that articulate our a priori knowledge of learning» Díez & Díaz, (2018). It is necessary to rethink the way in which it is taught to potentiate the current tools in technology and development in the forms of communication.

The concept of education by competences mediated by technological tools is reinforced by the approach issued by the CTCPC (2015) when it states: «The learning objectives are focused on the definition of the necessary competences for the development of the function and the establishment of the expected results”. The regulatory body emphasizes education not only thinking about the traditional evaluation but also thinking about what are the skills that the public accountant needs to properly practice the accounting profession and the mediation of the learning process by technological tools; He shows it, for example, when he states: It is necessary to think about teaching with an "open-book" approach, This type of teaching leads students to a simulation of what happens in their lives.
and changes the concept of memorizing a regulation that changes permanently due to simple social logic. With this approach it can be achieved that the student can handle the IFRS at all times CTCP, (2015)

The "open book" teaching is a sample of the possibility that the OIA have in the classroom as a tool that allows the student, not only the understanding of a classroom space but also to have the possibility of entering from any space to deepen again to class concepts and seek with this a higher level of learning of IFRS concepts. The teaching of IFRS regulations, both for SMEs and complete ones, must be carried out on the basis of the concepts, since these become the instrument of technical legitimacy for the CTCP accounting process, (2015 p. 66). These concepts must be taught supported by new learning mechanisms within which the OIA can be an interesting bet for the teaching of IFRS.

Regarding teaching, the Technical Council of Public Accounting "CTCP" is clear in expressing the activities it considers relevant to achieve learning when it states: The teacher must provide knowledge, perform practical demonstrations (of knowledge and skills) must, in addition, motivate students. In addition, the teacher within the class planning must include: session objectives, content to be developed, support resources (presentations, support readings, videos), CTCP dynamization, (2015, p 56).

The invitation of the CTCP is to look for learning tools that motivate the student, that allow them to leave the master classes to spaces with practical, didactic elements, with elements such as videos and other learning instruments within which the OIA can be differentiators for achieve a change in the conceptual perception of IFRS and with this change improve the proper learning of these.

The IASB (International Accounting Standards Board) shows an IFRS teaching approach based on the conceptual framework seeking to develop a deductive logic, addressing three levels according to the CTCP, (2015) each level is illustrated through the "Bloom's Taxonomy".

Bloom's taxonomy was designed by Benjamin Bloom in 1956 at the University of Chicago and is widely used by a large part of the academic community to develop teaching-learning processes, where cognitive abilities (ability to process and use information) are developed; affective (feeling, emotions and attitudes in the teaching-learning process); and psychomotor (ability to use physical abilities) Churches, (2009).

The new regulations under International Financial Reporting Standards "IFRS" force students to rethink the perception of learning. «Future changes and new norms require that students learn both to identify the need for judgments and the appropriate measures to form judgments, instead of simply memorizing how judgments have been formed in the past» Hodgdon & Hughes, (2011). It is necessary to change the memorization in the classroom for the incorporation of sufficient criteria in the student that allow him not only to record financial information but also to reflect on the implications of said financial statements in the organizational reality.

**INTERACTIVE LEARNING OBJECTS**

The OIAs currently become an intermediary tool between the teacher's knowledge, the way of bringing these concepts to the classroom and the existing theory. Arboleda, (2013) states: «Pedagogical e-mediations are essential principles of e-Learning scenarios, they maximize teaching methodologies and allow teaching to be correlated with learning. The e-Learning environment of learning is not possible if it is not built with the e-learning tools. (p.78)

These e-mediations from the OIA apply not only for virtual education or e-learning, they also become a valid tool for face-to-face education with support in interactivity. Dialogic learning and communication that must be presented in the class spontaneously both with ICT and with other advanced e-mediation Segovia, (2000).

Education presents changes that not only address distance or virtual education, this situation implies reviewing the way in which education is taught in person that links computer platforms and applications, and that links classrooms with the web, interaction and digital work, Grove, (2013).

**INTERACTIVE LEARNING OBJECTS IN ACCOUNTING TEACHING**
Accounting teaching cannot remain anchored to the traditional use of the master class as a learning mechanism, it is necessary to take advantage of technological tools to generate motivation and integration of realities framed by interactivity in the classroom. Active learning methodologies become a challenge for teachers who must think about including information technologies as an integrating element in the classroom, becoming a knowledge creation network (Reyes & Chaparro, 2013).

The inclusion of OIA in the accounting teaching process allows the teacher to integrate the theoretical concepts in a didactic way that can be consulted by the student at any time, not only limited to the memory of what was discussed in the classroom, but, from their personal technological tools, as a reinforcement to improve learning.

In the traditional method, although problem-based learning can also be guided, the interactive part is not tangible and becomes a static moment without graphics and movements. With the OIA, the student can observe, analyze and conclude; re-simulating with the OIA tool to provide feedback on the process. According to the analysis that has been made, it can be synthesized through a comparison between the models taken to the classroom: traditional (chalk and board) and the OIA model.

The need for the teaching of IFRS with new methods such as the OIA is a reality that the academy must accept and include in their curricula, as Holtzblatt & Tschakert (2011) say: "The accounting profession has gigantic changes that the academia review to be at the same time with these new developments. These innovative technological teaching tools can help energize the classroom and can make the accounting learning process more exciting."

It is an invitation to innovation in teaching, with tools such as OIAs and access to technological tools that reinforce an education that is often static in a world that evolves every day and needs the teaching process to be linked to global changes.

METHODOLOGY

The collection of information by the researcher in qualitative research forces the reader to look for mechanisms that remove the degree of subjectivity of this type of research. As Kawulich (2006) says, «The reader would not see the findings as credible, if the researcher simply spends a week in the culture; however, he would be more certain that the findings are accurate if the researcher lived in the culture for an extended period of time or visited the culture repeatedly over time." This search forces to structure qualitative mechanisms that allow a holistic vision that allows to increase the degree of impartiality in the investigation.

The research used the qualitative, quantitative technique, through the use of the "GEOGEBRA" program, which becomes a tool that not only serves for the student to observe the class at a time, but also allows him to return to what he has seen and for through didactic tools to achieve the learning and reinforcement of GEOGEBRA concepts, (2017).

The project intended to implement the construction of teaching alternatives through Information and Communication Technologies ICT with the use of OIA Interactive Learning Objects supported by video tutorials and problem situations.

OIAs were carried out supported by video tutorials on basic financial instruments in the Liabilities subject with IFRS content; which were modeled in the classroom seeking to implement this type of learning strategies that allow reviewing the teaching processes and achieve in the students a development of their academic autonomy.

Then the construction of an instrument consisting of a diagnostic test of "before" and "after" was elaborated. Said instrument was validated before Magister teachers in the accounting area and in education; seeking that the questions that make up the instrument effectively represent the reality of the fact investigated. In the same way, other criteria were taken into account, such as: the wording of the questions asked, the clarity of the ideas, the understanding factor or comprehension of the questions, and the competences directed to the fundamental concepts about the basic financial instruments that the students they had to acquire in the subject of "Liability Accounting" in traditional classes.
After the validation of the instrument, a sample was taken from two university institutions located in the city of Medellín - Colombia with similar characteristics such as: the curriculum, thematic content, hourly intensity, hours of independent work, competences, evaluations, bibliography and the level of student training. The sample consisted of 80 students who had already taken the subject of liabilities under IFRS.

The instrument was designed with the following scale:

<table>
<thead>
<tr>
<th>PUNCTUATION</th>
<th>EVALUATION CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td>The question does not apply, so it should be deleted</td>
</tr>
<tr>
<td>2</td>
<td>The question is valid, but needs to be modified</td>
</tr>
<tr>
<td>3</td>
<td>The question if it applies</td>
</tr>
</tbody>
</table>

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As a result, questions with a score of 3 were selected.

For the construction of the "before" and "after" diagnostic test, the questions are focused on what is shown in the OIA supported by video tutorials and, obviously, on the master classes, which were designed taking into account levels 1 and 2 of "Bloom's Taxonomy", in the development of the skills that include knowing, understanding, applying, and analyzing. These questions are rated from zero (0) to one (1).

For the evaluation of the effectiveness of the OIA supported by video tutorials, the dependent variables are the OIA and the video tutorials, and the independent variables are: facilitators for learning, participation and stimulation for contribution in class, relationship between theory and the application in the solution of problems, the autonomy in the learning, the comprehension of the contents, the interaction between classmates and teachers, the use in the independent work of the subject and a more significant learning.

RESULTS

Both tests (pre and post), are validated in the XLSTAT software, (2017), which allows analyzing the data and determining aspects such as mode, mean and variance in each of the variables evaluated. For the investigation, a population of 80 students was taken, 40 from each university institution, for this type of sample it is identified that n>30, which is identified as a large sample and is evaluated with a confidence level of 95% for determining trends in test scores before and after teaching with OIA. The results show confidence intervals before and after teaching with OIA that show the influence of this teaching methodology.

After validating the tests carried out in the XLSTAT software, the following statistical results are presented: statistical summary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Obs. missing data</th>
<th>Obs. no data lost</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Half</th>
<th>Dev. typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.289</td>
<td>0.399</td>
</tr>
<tr>
<td>Question 2</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.300</td>
<td>0.324</td>
</tr>
<tr>
<td>Question 3</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.237</td>
<td>0.362</td>
</tr>
<tr>
<td>Question 4</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.286</td>
<td>0.363</td>
</tr>
<tr>
<td>Question 5</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.322</td>
<td>0.408</td>
</tr>
<tr>
<td>Final note</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>4,900</td>
<td>1,433</td>
<td>1,381</td>
</tr>
</tbody>
</table>

Font: Own elaboration.
Table 4 shows that the averages in each of the questions are low, even in the final grade. In Table 5, for the column of means, there is a noticeable growth in each of the means of the questions in comparison with the results of the first test. The deviations in each test per question are very similar, but if the means are different, a better test result is noticeable.

Table 6 shows the results for the final grade in each test (before and after), the change in the average value of each test is noted, the result being better in the second evaluation.

Table 4 final test results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Obs. with missing data</th>
<th>Obs. no data lost</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Half</th>
<th>Dev. typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.689</td>
<td>0.334</td>
</tr>
<tr>
<td>Question 2</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.572</td>
<td>0.278</td>
</tr>
<tr>
<td>Question 3</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.663</td>
<td>0.414</td>
</tr>
<tr>
<td>Question 4</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.449</td>
<td>0.394</td>
</tr>
<tr>
<td>Question 5</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>1,000</td>
<td>0.580</td>
<td>0.416</td>
</tr>
<tr>
<td>Final note</td>
<td>79</td>
<td>0</td>
<td>79</td>
<td>0,000</td>
<td>5,000</td>
<td>2,953</td>
<td>1,124</td>
</tr>
</tbody>
</table>

Font: Own elaboration.

Histograms and normality tests

Figure 1

Histogram of frequencies Final note 1
Graph 1 shows high frequencies of very low notes and very few of very high notes. By graphic inspection, a normal behavior of the variable final grade 1 is not noticed, since this grade is the sum of the results for each question.

Figure 2

Histogram of frequencies Final note 2

The histogram of graph 2 shows the distribution of the results of test two, that is, of the test after having implemented the learning tools influenced by the OIA, and an improvement is achieved, the results seem to be normal, which shows better performance.

In graphs 3 and 4 the boxplot of the results of both tests is presented. This type of graph allows us to identify that in the first test the results are lower with greater dispersion compared to the second test the results are better and there is less dispersion (box size) (Vakieva, Gonzalez & Journet, 2017). When looking for normality in the data, the QQ Plot graph is used to observe normality, this occurs if the points fit the line with the least possible dispersion and that is what is achieved in the second test.

Graph 3: Boxplot Final score 1 Graph 4: Boxplot Final score 2

Graph 5: Graph of normality final grade 1 Graph 6: Graph of normality final grade 2
The Shapiro-Wilk statistical test is also used to test the normality hypothesis. Its statistical foundation is based on a probability graph in which the regression of the observations on the expected values of the hypothesized distribution is considered, where its W statistic represents the quotient of two estimates of the variance of a normal distribution. Pedrosa, Juarros, Robles, Basteiro, & Garcia, (2015).

\( H_0: \text{La variable nota final se extrajo de una población normal} \)

\( H_1: \text{La variable nota final no se extrajo de una población normal} \)

Table 7 shows a p-value less than the significance level of 5%, which concludes that the null hypothesis is rejected, that is, that the data of the final mark of the first test do not follow a normal distribution. When performing the same procedure with the second test, it is not rejected because the p-value is greater than 5% significance, this can be seen in Table 8. Something interesting at this point is that due to the low performance in the first test, the data is not normal and by improving in the second test, the normality of the data set is also achieved, this means that the efforts in the second test improve the final result of the test. \( H_0 \)

\[
\begin{array}{l}
\text{Shapiro-Wilk test (final_1):} \\
W & 0.864 \\
p\text{-value (2-sided)} & <0.0001 \\
\text{alpha} & 0.05 \\
\end{array}
\]

\[
\begin{array}{l}
\text{Shapiro-Wilk test (final_2):} \\
W & 0.983 \\
p\text{-value (2-sided)} & 0.354 \\
\text{alpha} & 0.05 \\
\end{array}
\]

Table 7: Normality test Table 8: Normality test

of the final grade 1 of the final grade 2

Due to the above, the assumption of normality will be used for both final grades, considering that the data of final grade 1 can be normal through interventions such as monitoring and improvement plans. The variances of both tests are not considered equal and, through the sample estimators, a test of comparison of means of both tests (groups) is carried out.

Means comparison test

Be\( \mu_1 \) the average performance of the first test 1 and that for the second test, with the respective estimators and the following hypothesis will allow us to verify whether the second test actually has higher performance than the first. \( \mu_2 \)

\( H_0: \mu_1 = \mu_2 \)
The test statistic is:

$$t_0 = \frac{\bar{y}_1 - \bar{y}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

The null hypothesis is rejected if $t_0 < -t_{\alpha, v}$, with a value from the normal distribution, the confidence level, and the degrees of freedom. The result that replaces the values is:

$$Z_{\alpha} = 0.05$$

$$t_0 = \frac{1.433 - 2.953}{\sqrt{\left(\frac{1.381}{79}\right)^2 + \left(\frac{1.124}{79}\right)^2}} = -7.58$$

$$v = \frac{\left(\frac{1.381}{79}\right)^2 + \left(\frac{1.124}{79}\right)^2}{\frac{79 - 1}{\left(\frac{1.381}{79}\right)^2/79} + \frac{79 - 1}{\left(\frac{1.124}{79}\right)^2/79}} \approx 150$$

$$-t_{\alpha, v} = -2.2641$$

In this case $t_0 = -7.58 < -t_{\alpha, v} = -2.2641$ With 95% reliability, the null hypothesis is not accepted, that is, the mean of the second test is higher than the first.

**DISCUSSION**

Although the result found evidence improves the results of the evaluations, it could not be a guarantor of learning, this discussion is generated by referring to possible temporary memories of the video tutorials and the games but, with the passage of a longer period of time, they can be forgotten. In order to conclude if the management of the IFRS has really been internalized, it would be prudent to carry out an additional test outside the classroom setting, or a comparison between permanent teaching methods supported by the OIAs and those that do not use these tools and not a mixture of both in the same group.

I know evidence that the use of OIAs can become an important part of university learning, partly changing the paradigm of traditional teaching, getting the teacher to integrate virtual tools into the teaching-learning process implies that they accept these e-mediations as viable and at the same time requires that the teacher be willing to accept a technological training that allows him to apply the OIA tools in the classroom. «The challenge, as a country, to position virtuality in higher education, It is a challenge of a cultural nature, which happens because many of the academics are convinced of the benefits of these mediations» (FUCN, 2005).

**CONCLUSIONS**

The results obtained allow us to show that the technological tools used "OIA" influence the learning of financial instruments, this allows us to reflect on the need to provide spaces for students in interactivity, and how they can improve the training processes that are achieved in the traditional classroom.

Although it cannot be affirmed that learning increases with the use of OIA in the classroom, it is identified as a motivational, didactic tool that can support the understanding of theoretical concepts such as IFRS. This argument is supported by the instruments used by the OIAs such as: videos, games, dialogic tools supported by technology and automation that are valid in current teaching and that are a consultation instrument that the student can take at any time to clarify doubts and reinforce learning.

**REFERENCES**


BIography

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