

# Retrospective Analysis of the Performance of Students from a Public University in Pre-COVID Time due to the Use of Information and Communication Technologies

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**Abstract**—The present research was carried out in order to determine the influence that the use of information and communication technologies has on the academic performance of students in the subject Image Theory of the Professional Academic School of Communication Sciences of the UNICA School of Communication Sciences, Tourism and Archeology during 2019. The research is of an applied or technological type of explanatory level and a non-equivalent control group design that established the causal relationship between the study variables, in a sample of 54 students. To collect the information, the verification test was applied, which consisted of the pre-test and post-test tests, the control card and the research card were also used. Between the variables use of tics and academic performance, it was determined that there is a highly significant dependency relationship according to the statistical test applied in the contrasting of the hypotheses between the experimental group.

**Keywords**—*ICT, academic performance, multimedia resources, educational videos, students, influence.*

## I. INTRODUCTION

In the present investigation it is intended determine the influence of the use of Information and Communication Technologies on performance and explain the influence that the application of multimedia resources has on academic performance and the use of educational videos on the academic performance of students in the subject Theory of the Image of the Professional Academic School of Communication Sciences of the Faculty of Communication Sciences, Tourism and Archeology of UNICA during 2019.

Faced with such a digital revolution, whose unidirectional past no one remembers, now we are all 2.0 beings capable of interacting in real time: we chat, we talk with our loved ones by

videoconference, we read articles of our interest, we write and we learn. That is why in this new era training is also digital, which means that it is much more enriching [1]

The use of Information and Communication Technologies (ICT) in the education system is increasingly widespread. There is a false belief that ICTs by themselves improve educational quality, without planning or pedagogical reorganization of the teaching-learning process. [2] Currently, the information society is immersed in a new conception of the citizen that, in digital terms, requires a series of capacities for the management of technological environments that are part of the daily educational task. That is why this research focuses on Information Technologies (ICTs), applied during class sessions as essential tools for teachers since it allows improving the academic performance of their students.

The emergence of the Internet brought with it a multiplicity of applications and tools available on mobile devices that help us solve various tasks, from the simplest to the most complex, even for academic purposes.

The insertion of its use in the educational field is carried out through an environment called mobile device learning (m-learning), which leads teachers to constantly update and prepare in teaching in new learning areas that, say of several authors, they have attractive and functional characteristics such as: size, discretion, ubiquity, affordability and autonomy [3]

The use of information and communication technologies is a key factor to achieve the integral development of the student in the teaching-learning process evidenced in optimal academic performance, therefore the application of tics in the educational environment promotes dynamic processes and innovative.

The study of trends regarding the integration of ICT in academic offerings shows us that there are considerable and

meritorious efforts on the part of universities that have managed to provide significant responses in this direction. There is a recent increase in the offer of virtual academic courses and programs.

The study shows a clear tendency to favor virtual academic programs at the postgraduate level and continuous training, in various disciplinary areas. The pedagogical and technological models adopted by these institutions, in the case of virtual courses, are varied. As already mentioned, the use of the Moodle platform as a virtual learning environment predominates. Likewise, a large number of hybrid educational programs (with face-to-face and virtual moments) were identified [4]

Information and communication technologies (ICT) are the main lever for unprecedented transformations in the contemporary world. Indeed, no other technology caused such great mutations in society, culture and the economy. Humanity has been significantly altering the ways of communicating, entertaining, working, negotiating, governing and socializing, on the basis of the spread and use of ICTs on a global scale. It is also universally recognized that ICTs are responsible for previously unimaginable increases in productivity in the most varied sectors of business activity, and notably in the economies of knowledge and innovation.

Regarding personal behaviors, new technologies have also revolutionized perceptions of time and space; in turn, the Internet reveals itself to be intensely social, unleashing shock waves in the way people interact with each other on a planetary scale. [5].

Gamification is a methodology that integrates tools of the game in the educational community to ensure that students learn in a fun and motivating way. [6] The Flipped Classroom (hereinafter FC) is based on inverted learning, with the premise that work outside the classroom is done before work within it on certain contents [6]

The case derived from the booktubers is somewhat different. Most booktubers are young people who share their personal appreciations about the readings they do: they tell which books they like, which they don't, make short reviews about the authors, expose the relationships they find between the book's plots and recommend readings to others young people, readers too. The expansion of this phenomenon was understood very quickly by publishing groups that on many occasions began to hire the booktubers with the most followers to promote their editions. [7] Social networks and transmedia narratives in the classroom The previous development opens up a whole kaleidoscope of opportunities that deserve to be considered. We are thinking, for example, of the possibility for students to create an Instagram profile, in which a literary work is reproduced by means of images and small texts [7]

Technologies as tools to deterritorialize the school allow us to understand that classrooms have limits. Some are square, others rectangular. At one time the National Ministry of Education under the management of Daniel Filmus awarded a project that proposed to build circular classrooms; however, it was never carried out. Some time ago, not long ago, the teacher's desk was on a platform, which, while allowing him to have a

vision of the group of students as a control strategy, also reproduced hierarchies and a system of order.

The student desks were positioned in a unique way that directed their gaze towards the focal point from which the class was coming. However, whatever their shape, classrooms constitute a territory and in many ways a field where different struggles come into tension. That the educational systems of the world have chosen the classroom unit as the organizing principle of the space for development.

The classroom functions within a framework of relationships that make up the school structure. Taking a sincere and truly critical position leads us to question the conceptual and theoretical edifice that sustained the operation of the school from its origins to the present day. Rethinking the classroom is rethinking the school. And in many ways To rethink the school is to rethink the society that shaped it. Whatever the assessment we make, what is increasingly clear is that that society has changed, and the classroom of the 19th and 20th centuries has become anachronistic. We are convinced that the classroom should continue to have a privileged place in the construction of knowledge because this process is achieved in dialogue with others. [7]

We live in a society that, due to its current dynamics, requires that educational systems around the world rethink the vision of future professionals who wish to be trained according to global economic development and the demands of the increasingly changing labor market; putting aside the traditional teaching model based on the transmission and memorization of knowledge, in favor of other methodologies that allow students to acquire a set of knowledge, skills and attitudes to apply them in a close and realistic work setting [8]

In the same way, the socio-educational functions of current education should be oriented towards preparing future citizens to understand and interpret political, economic and cultural complexity, navigate in uncertainty, develop jobs unknown until now, participate in life. collective of a global and local world in dizzying and permanent changes [9].

In today's liquid digital society, emerging technologies are presented, on the one hand, as those key computing tools that, in addition to being used today, also promise significant growth in the coming years (Sharples et al., 2014; Johnson et al., 2015); and on the other, as a new technological framework that blur and present new scenographies and provide other ways of communicating, shared and openly, both synchronously and asynchronously, generating new rich learning environments and giving way to different places [10].

Today, technology allows links to transcend geographic restrictions and also enables multilateral interaction among network members. However, the matter goes beyond the technological factor. According to the Mexican specialist Sinuhé Jaime Valencia, unlike the classic social networks, the modern ones stand out particularly because the members tend to generate and share content. For example, the greeting is no longer limited to an exchange of words, but frequently incorporates (at least) a photo of breakfast, or a story about the nightmare of the previous night, having (at least) a response with a humorous image. [11]

Confinement measures mean, for a large part of the population, living in overcrowded conditions for a prolonged period, which has serious implications for the mental health of the population and in increasing exposure to situations of violence towards boys, girls and adolescents. According to ECLAC / UNICEF (2020), 51.2% of girls, boys and adolescents living in urban areas in Latin America reside in homes with some type of housing precariousness. Two out of ten live in conditions of moderate housing precariousness and three out of ten face situations of serious housing insecurity. [12]

## II. METHODOLOGY

During the development of the research, we proceeded to identify the research problem and choose the Experimental and control group for the application of the data collection instrument, in this sense, the experimental group underwent a series of trainings in reason to the problem raised to later evaluate them.

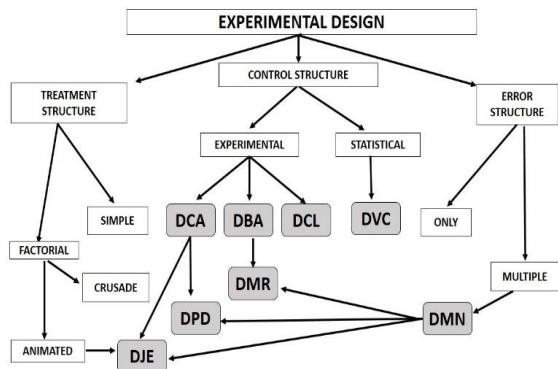


Fig. 1. Experimental design [13].

The type of research is applied or technological because it demonstrated the validity of information and communication technologies, under which scientific principles are applied that demonstrate their effectiveness in the modification or transformation of a fact or phenomenon, evidenced in the academic performance of students. students in the Image Theory subject, which contributed to the solution of a latent problem in the university educational environment promoting a quality education.

Due to its temporality, it is transversal or synchronous because during a period of 3 months it was gradually observed how the students who were taught the knowledge using ICTs improved their academic performance.

Research level belongs to the explanatory level; This type of research is aimed at establishing causal relationships between the study variables, a fact that was evidenced when it was shown that Information and Communication Technologies positively influenced the academic performance of students in the School Image Theory subject Professional Academic of Communication Sciences of the Faculty of Communication Sciences, Tourism and Archeology of UNICA.

Research design. This is defined as the graphical structure that is selected in order to represent the basic aspects of the research process and in particular to control the variables. The

design selected according to "Hernández Sampieri, Roberto" () is the Non- Equivalent Control Group Design, which consisted of initially evaluating the experimental group and the control group. The experimental group received the experimental treatment with the application of information and communication technologies and the control group continued with their daily activities. This design was used by the researcher to test the research hypotheses.

**Graphically they are represented as follows: Graph 1**

$$\frac{GE}{GC} = \frac{O_1}{O'_1} \quad X \quad \frac{O_2}{O'_2}$$

where:

GE = Experimental group

GC= Control group

O1= Pre-test evaluation of the Experimental Group

O2= Post-test evaluation of the Experimental Group

O'1= Control Group Pre-Test Evaluation

O'2= Post-test evaluation of the Control Group

X= Represents the independent variable

## III. RESULTS

The field work refers to the process of applying the different data collection instruments elaborated in the office with their respective validation and then applying it to the students of the Image Theory subject of the Professional Academic School of the Faculty of Sciences of the Communication, Tourism and Archeology of the UNICA, students who constitute the sample for our research. For the process of applying the instruments and therefore the collection of data to the undersigned, I demand several weeks, since there was a pre-test and post-test instrument.

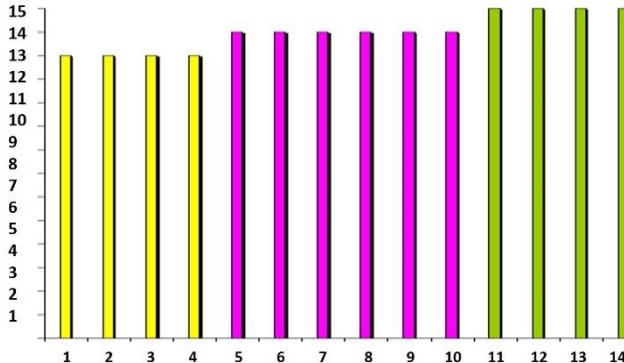
Once the data collection was finished, the respective statistical tables were processed and elaborated for their analysis and interpretation that we present below.

Application of the independent variable to the experimental group in the image theory subject.

Table I shows how the New Information and Communication Technologies were used, such as multimedia resources and educational videos during class sessions in the Image Theory subject. For this, 5 valuation indices identified with the letters a, b, c, d, and e were taken into account. Likewise, a rating scale of 1 to 3 points was used as evaluation criteria to indicate the achievements achieved in each of the learning sessions with the students of the V cycle "A" of the Professional Academic School of Communication Sciences. The table shows an average between 13, 14 and 15 points in all learning sessions, which means that multimedia resources and educational videos were frequently applied during class sessions in the Image Theory subject, a fact that evidences the correct use of the resources of Communication and Information Technologies. Likewise, it is shown that the general average is 14 points out of

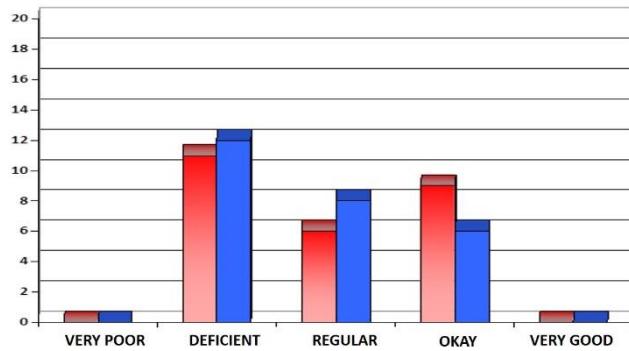
a total of 15, which indicates that the independent variable X has been applied efficiently.

TABLE I. NUMBER OF CLASS SESSIONS



In table II we observe the results of the entry test applied to the experimental group and the control group, made up of 26 students respectively, as detailed below: The experimental group has an arithmetic mean of 9.07, a variance of 10.22 with a standard deviation of 3.19, which indicates that the students of the V cycle "A" of the Professional Academic School in Communication Sciences, have difficulties to consolidate the contents of the Image Theory subject, existing the necessary conditions for the application of the New Information and Communication Technologies, making use of multimedia that offers great advantages in the learning of students, since The use of this resource allows dynamic classes that arouse interest and permanent attention during class sessions. The control group has an arithmetic mean of 9.69, a variance of 12.22 with a standard deviation of 3.49, which indicates that the students in cycle V "B" also have difficulties, but are in better conditions in relation to the experimental group, since there is a significant difference of 0.62 in relation to the arithmetic mean.

TABLE II. APPLICATION OF THE PRE-TEST EVALUATION: THE OPTIMAL APPLICATION OF MULTIMEDIA RESOURCES INFLUENCES SIGNIFICANTLY INCREASING ACADEMIC PERFORMANCE IN THE SUBJECT OF IMAGE THEORY



In Table III we observe the results of the exit test applied to the experimental group and the control group, noting a significant difference in favor of the classroom where the multimedia resource was applied as detailed below: The experimental group has an arithmetic mean of 14.31, which places it in the category of good, students are located from the

category of fair, that is, there are no very poor or deficient grades; presents a variance of 8.52 with a standard deviation of 2.91, which indicates that the students of the V cycle "A" of the Professional Academic School in Communication Sciences have notably improved their academic performance in the subject Theory of the Image, from the use of multimedia as a resource for Information and Communication Technologies, favoring the achievement of optimal learning. The control group has an arithmetic mean of 11.08 that places them on the regular scale, however a percentage of students with poor grades still persists, it presents a variance of 8.03 with a standard deviation of 2.83 which gives us indicates that the students of the V cycle "B", although they have improved, they have not managed to reach the category of good, although they started in better conditions in relation to the experimental group, because in this section the traditional teaching method was continued.

TABLE III. APPLICATION OF THE POST-TEST EVALUATION: THE OPTIMAL APPLICATION OF MULTIMEDIA RESOURCES INFLUENCES SIGNIFICANTLY INCREASING ACADEMIC PERFORMANCE IN THE IMAGE THEORY SUBJECT

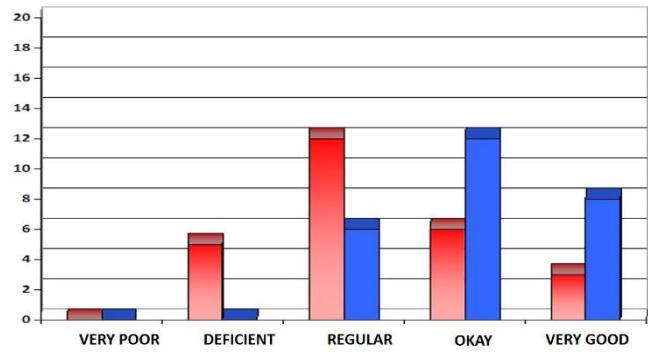
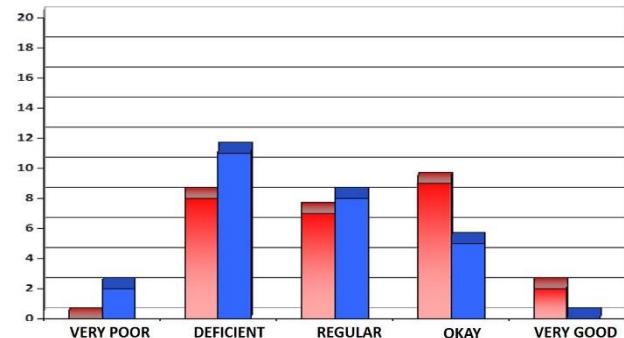


TABLE IV. APPLICATION OF THE PRE-TEST EVALUATION THE EFFICIENT USE OF EDUCATIONAL VIDEOS INFLUENCES SIGNIFICANTLY INCREASING THE ACADEMIC PERFORMANCE OF STUDENTS IN THE IMAGE THEORY SUBJECT

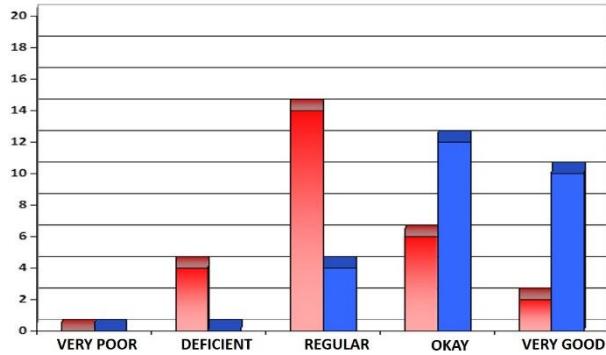


In Table IV we observe the results of the entrance test applied to the experimental group and the control group, made up of 26 students respectively, as detailed below: The experimental group has an arithmetic mean of 8.46, a variance of 12.37 with a standard deviation of 3.51, which indicates that the students of the V cycle "A" of the Professional Academic School in Communication Sciences, have difficulties to consolidate the contents of the Image Theory subject, existing the necessary conditions for the application of New Technologies of Information and communication, making use of educational videos that promote dynamic meaningful

learning as it has been shown that when the student comes into contact with an audiovisual medium and learns more easily because all the senses work on it.

The control group has an arithmetic mean of 10.76, a variance of 14.79 with a standard deviation of 3.84, which indicates that the students of the V cycle "B" also have difficulties, but are in better conditions in relation to the experimental group, since there are significant differences of 2.3 in relation to the arithmetic mean.

TABLE V. POST-TEST EVALUATION APPLICATION THE EFFICIENT USE OF EDUCATIONAL VIDEOS INFLUENCES SIGNIFICANTLY INCREASING THE ACADEMIC PERFORMANCE OF STUDENTS IN THE IMAGE THEORY SUBJECT



In Table V we observe the results of the exit test applied to the experimental group and the control group, noting a significant difference in favor of the classroom where the educational videos were applied as detailed below:

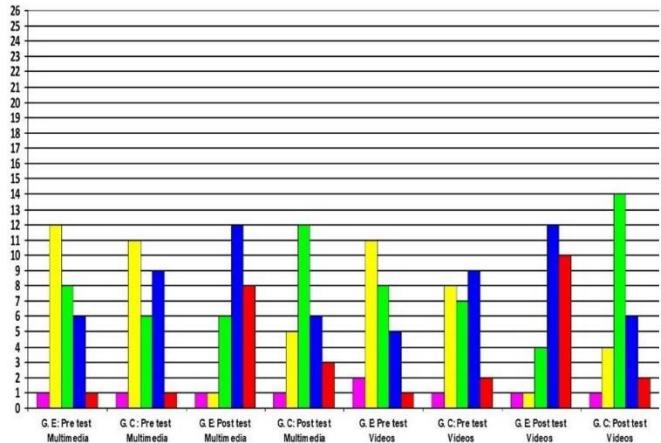
The experimental group has an arithmetic mean of 15.89, which places it in the category of good, the students are located from the category of fair, that is, there are no very poor or deficient grades; presents a variance of 8.34 with a standard deviation of 2.88 that indicates that the students of the V cycle "A" of the Professional Academic School in Communication Sciences, have notably improved their academic performance of the subject Theory of Communication. Image, based on the use of educational videos as resources for New Information and Communication Technologies, favoring the achievement of optimal learning, thus affecting academic performance.

The control group has an arithmetic mean of 10.92 that places them on the regular scale, however a percentage of students with poor grades still persists, it presents a variance of 6.49 with a standard deviation of 2.54 which gives us indicates that the students of the V cycle "B", although they have improved, they have not managed to reach the category of good, although they started in better conditions in relation to the experimental group, because in this section the resources of the Technology of the information and communication.

In this graph, the researcher shows the results of the evaluation and pre-test and post-test taken from the experimental group and control group, in order to establish comparison parameters, showing the following: In the experimental group where the independent variable Information and Communication Technologies was applied, there are significant improvements in the academic performance of students in the subject of Image Theory, observing important

improvements from the pre-test evaluation to the post-test evaluation such as detailed.

TABLE VI. RESULTS OF THE APPLICATION OF THE PRE-TEST AND POST-TEST: OF THE EXPERIMENTAL GROUP AND THE CONTROL GROUP



#### IV. DISCUSSION OF RESULTS

The results obtained in this research are important, since they show that as a result of the application of the independent variable, a statistically significant difference of arithmetic means has been achieved.

In the application of multimedia resources: the experimental group in the pre-test registers (9.07) and in the control group (9.69); showing a significant advantage of (0.62) in favor of the second group. In the post-test evaluation the experimental group registers (14.31) having improved 4.61, that is, almost 5 points; while the control group obtained (11.08) having minimally improved a 1.39. In this case, it is observed that the experimental group managed to improve their academic performance significantly.

If we contrast the experimental group (14.31) Vs control group (11.08) in the post-test evaluation; We will observe that where the multimedia resource was applied, it obtained a significant difference of 3.23 points.

In the application of educational videos: the experimental group in the pre-test records (8.46) and in the control group (10.76); showing a significant advantage of (2.3) in favor of the second group. In the post-test evaluation the experimental group records (15.69) having improved 7.23 points; while the control group obtains (10.92) having minimally improved 0.16. In this case, it is observed that the experimental group obtained statistically superior results when applying the independent variable. If we contrast the experimental group (15.69) Vs control group (10.92) in the post-test evaluation; We will observe that where the educational videos were applied, a statistically significant difference of 4.77 points was obtained.

The results agree with that indicated by: Lloveras López, Yordany "New Learning Strategies Mediated by ICT. Advantages for Education"; where they conclude that, to the extent that the teacher incorporates the use of ICT in his way of acting as a professional, it will allow him to develop knowledge and skills on the subject. Likewise, the use of them allows

promoting innovative experiences in the teaching-learning processes. The use of ICT in the development of classes contributes to diversifying the teaching process and gives a fundamental role to the student to the extent that he is aware of how to use them.

The results obtained are consistent with the data corresponding to other studies, in which it is observed that the use of Information and Communication Technologies allows improving the academic performance of students.

#### V. CONCLUSIONS

After testing the research hypotheses, we reached the following conclusions:

- 1) The result of the learning sessions where the multimedia resources of Information and Communication technologies were applied was efficient, this was reflected in the following result:  
23.1 were regular; 48.1 good and 30.8% very good. In the deficient and very deficient categories, the evaluations yielded 0%, that is, the academic performance of the students in the Image Theory subject was notably improved.
- 2) The result of the learning sessions for the application of the educational videos was efficient, which ensures the validity of the experiment, this was reflected in the following result: 15.4% of them were regular, 46.1% were good and the 38.5 very good. In the deficient and very deficient categories, the evaluations returned 0%, which means that the manipulation of the independent variable gave positive results that benefited the academic performance of the students.
- 3) Learning in the Image Theory subject improves efficiently with the application of Information and Communication Technologies, since students show greater interest in learning by continuously observing new knowledge of a current nature.

- 4) That the use of tics as a didactic tool significantly influences the academic performance of the students of the Image Theory subject of the School of Communication Sciences of the Faculty of Communication Sciences, Tourism and Archeology.
- 5) That, when multimedia resources are used as a didactic tool, they allow a significant improvement in the level of development of study habits in students of the Image Theory subject of the School of Communication Sciences of the Faculty of Communication Sciences, Communication, Tourism and Archeology.

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