Virtual education, an engine to increase learning in the pandemic

La educación virtual, un motor para aumentar el aprendizaje en la pandemia

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Abstract

The objective of this article is to know how virtual education intervenes in the learning process of students in Technical Secondary School No. 4 vs. General Secondary School No. 11 during the pandemic. The research that was carried out is of a comparative and differential type since two populations will be analyzed to know the learning process in virtual education; it is also preliminary since it will only have one moment in the validation of the external data. The instrument had 83 variables on a decimal ratio scale and 6 general data items. The statistical treatment was through Statistica 7, with the purto obtaind confidence in the information. The main results of the research highlight that carrying out a practice of the topics seen enhances the learning process in the subjects. The research concludes that the most suitable education for men is the virtual one since they generate a greater type of interrelationships, abilities, skills, communication, and social situations that favor a quality education. It is proposed to carry out a course focused on virtual education to learn about technological tools.

Virtual education, Learning, Pandemic

Resumen

El objetivo de este artículo es conocer cómo interviene la educación virtual en el proceso de aprendizaje de los alumnos de la Secundaria Técnica No. 4 vs. Secundaria General No. 11 durante la pandemia. La investigación que se realizó es de tipo comparativo y diferencial ya que se analizarán dos poblaciones para conocer el proceso de aprendizaje en la educación virtual; también es preliminar ya que solo tendrá un momento en la validación de los datos externos. El instrumento contó con 83 variables en escala de razón decimal y 6 ítems de datos generales. El tratamiento estadístico fue a través de Statistica 7, con el propósito de obtener confianza en la información. Los principales resultados de la investigación destacan que la realización de una práctica de los temas vistos potencia el proceso de aprendizaje en las asignaturas. La investigación concluye que la educación más adecuada para los hombres es la virtual ya que generan un mayor tipo de interrelaciones, habilidades, destrezas, comunicación y situaciones sociales que favorecen una educación de calidad. Se propone realizar un curso enfocado a la educación virtual para conocer las herramientas tecnológicas.

Educación virtual, Aprendizaje, Pandemia

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Introduction

Virtual education is a phenomenon that has favored education, because in this modality students can learn from different spaces, hence the question of How does virtual education intervene in the learning process of students of Technical Secondary No. 4 and General Secondary No. 11 during the pandemic?

The research topic focuses on virtual education because it is a problem that is currently being presented, in contrast to the learning process because we want to analyze the levels of knowledge that students have acquired in times of pandemic.

With this analysis, it is intended that adolescents can detect if they have really acquired learning during their virtual education process during the pandemic, in order to create a solution to this problem.

The main beneficiaries of this research will be the students of Technical Secondary No. 4 and General Secondary No. 11 since it is intended to know how their learning process has been during the pandemic; However, the population will benefit since students will be able to measure how much they have learned in virtual education, finally, society as a whole will benefit from having elements that favor virtual education.

The sections that will be addressed throughout this article focus on the following: the theoretical perspective, which consists of presenting a review of the main authors who provide their theoretical contributions to the phenomenon of study, and in this way have a broader panorama when investigating; the methodology to be developed, in which the type of research is exposed, the sample with which it was worked and the strategic line on which the choice of the topics to be studied was based; the results, in which the most significant data derived from the five statistical levels (frequencies and percentages, characterization, correlation, comparison and integration) are exhibited; the conclusions, where a detailed and summarized synthesis of the contributions provided by the research is made and finally the bibliographic references.

Theoretical perspective

Throughout history it has been detected that virtuality is a phenomenon that has favored education. In the field of virtual education, you can learn from different places and platforms because in this modality it is not necessary for a group of people to attend a school.

Hernández (2022) mentions that there is a significant relationship between the perception of students and virtual education during their training process. As well as that this relationship is positive during the COVID-19 pandemic.

Arteaga et al. (2021) highlight that education in virtual classrooms is conceptualized as an academic modality that makes use of technological means, in this way it gives rise to new ways of perceiving the educational process generating significant learning, radically replacing face-to-face learning scenarios, having to look for different mechanisms to achieve a close interaction between the educational figure and the students.

Among the innovations brought by virtuality is the role played by the teacher, so Atarama (2020), expresses that, within virtual education, the role of the teacher contemplates the planning and accompaniment of the student's learning process to ensure that the objectives of the subject are met. In this perspective, the teacher must be able to facilitate and benefit the use of the media in which students interact, such as social networks, digital platforms, collaborative environments, network activities for educational purposes. Knowing how to implement this type of strategy is right for the educational environment. This author refers to the strategies that the teacher must implement to ensure that knowledge is acquired, taking into account the technological resources so that it is of quality.

As stated by Bravo and Magis (2020). the study of virtuality becomes increasingly relevant, because online education in 2020 is an unprecedented fact since it marks a before and after in pedagogical practices and in all current educational systems globally, since it has become evident there are great social inequalities, cultural and economic in more than 180 countries that have been victims of the COVID-19 pandemic. He speaks in relation to the fact that virtual education is a new event that has no precedent which marked a pattern in the pedagogical fact, and therefore mentions the inequalities that were caused in the countries as a result of the pandemic, so the school has had to adapt to this situation.

Virtual education is related to the learning process, considering that this is the way in which students follow methodological processes in order to acquire knowledge.

Methodology to be developed

The research that is being carried out is of a comparative and differential type since two populations will be analyzed with to know the learning process in virtual education; It is perimental since it will have a single moment in the validation of external data.

Therefore, two populations were selected with differences in their operating characteristics, which will be 50 students from Technical High School No. 4 and 50 students from General Secondary No. 11, since it is expected to know the number of students who have acquired learning in their virtual education. The concordance refers to the fact that both are at the basic level, however, one is technical and the other general, the population has the same age range.

Regarding the processing of the relative frequencies that were obtained, the instrument was processed through the Statistic 7 program, with the purpose of obtaining validity and confidence in the information.

Results

In order to provide a reliable explanation and scientific rigor to the research axes which corresponds to the topic virtual education and the contrast learning process, the relative frequencies were processed, which were collected through the online instrument, using the programs Statistica 7 and Excel in order to explain the phenomenon statistically through the levels of frequencies and percentages, characterization, correlation, comparison and integration.

Frequencies and Percentages

The processing of the section of frequencies and percentages aims to characterize the study population so that once the levels of confidence in the phenomenon are reached, the information can be extrapolated to other populations with equal characteristics, which implies the generalization of data. At this level we operate with signalitic variables which correspond to:

Age

Table 1 shows that thesmallest part of the participating population is 16 years old, which is reflected in the fact that its frequency is 2, which is equivalent to 1%, however, most of it is represented by 14 years, denoting a frequency of 135 equivalent to 80% of the subjects. It is inferred that students with 14 years are the most represented, so the information can be extrapolated to other populations with this characteristic as long as the variables of the phenomenon present the levels of confidence.

Age	Frequency	Percentage
14	135	80%
15	31	19%
16	2	1%
Total	168	100%

Table 1 Statistical behavior of frequencies andpercentages of the age variable, (2022)Source: Own elaboration

Gender

With regard to Table 2, it is observed that the smallest part of the group surveyed are men, which is reflected in the fact that their frequency is 73, which is equivalent to 45.5%, however, most of them are represented by women, corresponding to a frequency of 95, equivalent to 56.5% of the population. It is inferred that the female gender is the one that is mostly represented.

Gender	Frequency	Percentage
Female	95	56.5%
Male	73	43.5%
Total	168	100%

Table 2 Statistical behavior of frequencies andpercentages of the gender variable (2022)Source: Own elaboration

School adaptation

Table 3 shows that the smallest part of the group surveyed did not adapt to virtual education, which is reflected in the fact that its frequency is 64, which corresponds to 38%, however, most of it is represented by those who did adapt to virtual education with a frequency of 104, which is equivalent to 62% of the population. It is inferred that students who adapted virtual education are predominantly in research.

Education	Frequency	Percentage
No	64	38%
Yes	104	62%
Total	168	100%
Total	168	100%

Table 3 Statistical behavior of frequencies andpercentages of the school adaptation variable (2022)Source: Own elaboration

Characterization

Table 4 presents the behavior of the mean, which reads that the variables found in the low values (0,1,2,3), technological resources (X = 3.93), adaptation (X = 2.92), change (X = 3.92), virtual classroom (X = 1.89), model (X = 3.45), school (X = 1.96) and extracurricular activities (X = 1.63). It is inferred that the pandemic has brought an educational lag, therefore, virtual environments do not favor meaningful learning processes. June 2022, Vol.6 No.15 1-9

Variables	Х
Technological resources	3.93
Adaptation	2.92
Change	3.92
Virtual classroom	1.89
Model	3.45
Escuela	1.96
Extracurricular activities	1.63

Table 4 Average statistical behavior (2022)Source: Own elaboration

Correlation

Next, the correlation readings that were significant are presented taking in to account a probability of p = .000001 with a correlational level of r = 0.31.

Correlation of the Oportunidades variable

Table 5 shows that when teachers provide opportunities to students, they better understand the educational programs (r=0.49) that were implemented during the pandemic to favor their training (r=0.45) and this has increased motivation in students (r=0.47). It is inferred that educational programs potentiate the opportunities for virtual education.

Correlation Opportunities	r-value
Educational Programs	0.49
Motivation	0.47
Formation	0.45

Table 5 Correlational behavior of the oportunidadesvariable (2022)Source: Own elaboration

source: Own elaboration

Correlation of the interaction variable

Table 6 shows that interaction is a key factor in group work (r=0.46) in which participation (r=0.44) and collaboration of all students (r=0.47) must be implemented. It is inferred that when students are active in their education, this increases their knowledge.

Interaction correlation	r-value
Group work	0.46
Collaboration	0.47
Participation	0.44

Table 6 Correlational behavior of the interaction variable(2022)

Source: Own elaboration

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Correlation of the variable methodologies

Table 7 shows that the methodologies implemented by teachers are linked to self-regulation by students (r=0.46), in which equity is implemented (r=0.47) at the moment in which the teacher motivates them to continue learning (r=0.48). It is inferred that motivation potentiates the method that the teacher implements for learning.

Correlation methodologies	r-value
Self-regulation	0.46
Motivation	0.48
Equity	0.47

Table 7 Correlational behavior of the variablemethodologies (2022)Source: Own elaboration

Correlation of the collaboration variable

Table 8 analyzes that during the pandemic collaboration between students was represented by the realization of group work (r=0.56) in various subjects (r=0.43) and this has raised the levels of self-management related to participation in decision-making in the classroom (r=0.50). It is inferred that group work potentiates collaboration in virtual education.

Correlation ollaboration	r-value
Group work	0.56
Self-management	0.50
Matters	0.43

Table 8 Correlational behavior of the collaborationvariable (2022)Source: Own elaboration

Correlation of the practical variable

With regard to Table 9, it is explored that when students perform exercises to reinforce a topic as a practice they develop their critical analysis (r = 0.42), in this way they improve their communication (r = 0.43) in the various subjects (r = 0.48) in order to present the needs to the teacher (r = 0.46). It is inferred that carrying out a practice of the topics seen potentiates the learning process in the subjects. June 2022, Vol.6 No.15 1-9

Practical correlation	r-value
Critical analysis	0.42
Communication	0.43
Needs	0.46
Matters	0.48

Table 9 Correlative behavior of the practical variable(2022)

Source: Own elaboration

Correlation of the communication variable

Table 10 shows that communication in virtual classes is a factor of the participation of students (r=0.64) in the different subjects (r=0.50) and this has favored self-management in relation to students participating in the decisions made in the classroom (r=0.56) to meet their needs (r=0.59). It is inferred that the participation of students potentiates the learning processes.

Communication correlation	r-value
Participation	0.64
Matters	0.50
Needs	0.59
Self-management	0.56

Table 10 Correlational behavior of the communicationvariable (2022)Source: Own elaboration

Comparison

At the bottom, comparisons are presented to observe the concordances and differences using the student t statistic of two groups in the significate variables of gender and school.

Comparison of the gender variable

In order to find the significant differences between the variable Gender and the variables that correspond to the phenomenon of study, a student's t test was performed for independent samples in the Statistica 7 program, with a probability of 0.05, in order to accept or reject the null hypothesis, with a sample of 168 students with a difference in the variable Gender in male and female, All of the above can be seen reflected in Table 11.

X			T-Value			
Variables	Μ	F		Mexico City	р	р
Interrelation	5.7	4.59	2.24	166	0.03	0.78
Students	5.9	5.14	1.98	166	0.05	0.27
Social environment	5.8	4.56	2.62	166	0.01	0.50
Skills	6.23	4.85	2.74	166	0.01	0.34
Skills	5.34	4.16	2.28	166	0.02	0.96
Communication	6.25	5.18	2.05	166	0.04	0.37

Table 11 Comparative behavior of the genderindependent variable (2022) Source: Own elaboration

As shown in Table 11, the interrelation variable reads that women are the ones who almost do not communicate through virtual education (x=4.59) while men are the ones who present greater communication in this modality (x=5.73). It is inferred that the most comfortable in this type of education are men since they are the ones who present more ease in their interrelation.

In the student variable, it is observed that women have presented greater difficulty in entering virtual classes (x=5.14) while men are facilitated to attend meetings (x=5.97). It is inferred that men have been more aware of distance classes for their training.

In the variable social environment, it is read that women presented greater problems when functioning in society during the pandemic (x=4.56), while men have developed more easily (x=5.89). It reads that virtual education has favored men in their social development.

In the variables skills it is observed that women have found it difficult to express themselves (x = 4.85), on the contrary, men have been more expressive (x = 6.23). It is inferred that during the pandemic men developed their ability to express themselves in a greater way.

The skills variable reads that women need to be more focused on the subject in order to learn (x=4.16) while men can learn with distractions (x=5.34). It is inferred that men have the facility to learn with noise and this facilitates their virtual education. In the communication variableit is observed that generally women do not present their doubts to the teacher (x = 5.18) on the contrary, men ask the teacher their concerns (x = 6.25). It is inferred that men feel more secure when presenting their doubts in virtual education.

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It is generally inferred that the most suitable education for men is virtual education since they generate a greater type of interrelationships, skills. abilities. communication and social situations that favor quality education.

Comparison of the school variable

In order to find the significant differences between the School variable and the variables that correspond to the study phenomenon, a student's t-test was performed for independent samples, which is shown in Table 12. It should be noted that we worked with a probability of 0.001, in order to accept or reject the null hypothesis, with a sample of 168 students from General Secondary No. 11 and Technical High School No. 4.

Variables	X General No. 11	Technique N°4	Mexico City	р	р
Session	9.19	3.89	166	0.00	0.00
Formation	7.76	6.12	166	0.00	0.14
Continuous	8.87	7.71	166	0.00	0.00

Table 12 Comparative behavior of the school independent variable (2022) Source: Own elaboration

The session variable reads that in technical secondary school No. 4 students did not attend virtual classes daily (x = 3.89), while in general secondary No. 11, students adapted to the distance modality (x = 9.19). It is inferred that in general secondary school No. 11 there will be less educational lag because students continued to learn day by day.

In the training variable it is observed that the students of the technical secondary N°4 are not satisfied with the education they are receiving at a distance (x=6.12) while the students of the general secondary N°11 if they are satisfied with their education (x=7.76). It is inferred that the teachers of general secondary school No. 11 implemented the necessary strategies to transmit knowledge. In the continuous variable, it is read that the students of technical secondary school N°4 have presented periods of time where their education has been interrupted (x=7.71), while in general secondary N°11 the students have taken an education without interruptions during the pandemic (x=8.87). It is inferred that general secondary school No. 11 has implemented its curriculum properly.

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It is generally inferred that the general secondary No. 11 has shown greater interest in students having adequate training, so they have implemented the necessary strategies so that their students do not show a greater educational lag, likewise, the students have not had interruptions in their learning process which will favor their education.

Integrative

This segment presents the integration analysis based on the factorial statistic, integrating the 168 students and 86 variables that make up the research of the parametric statistics of the study phenomenon; with a main method R^2 = multiple communities with a normalized Varimax rotation, a signatic cut Eigenvalue of 1, a level of p=. 000000001 and an r=.46.

Intrafactorial Analysis

Factor 1: Educational aspects

Table 13 shows the first factor that corresponds to the teacher's responsibility to motivate (exp=0.64) and guide students in the learning process (exp=0.80) as well as to make innovations in the contents (exp=0.66) so that these are important topics (exp=0.74) that cause interest in students (exp=0.47), since in this thev will better understand wav the explanations (exp=0.49), however, the teacher must be flexible (exp=0.68) in relation to returning to those topics that are not clear to students (exp=0.67) so that there is greater participation by students (exp=0.48) in addition to having the opportunity to improve a task or activity (exp=0.57), For this, the teacher presents the way he will have to work during the course (exp=0.71) and the way to evaluate (exp=0.67) following a teaching methodology (exp=0.60) so that students are satisfied with the education they are receiving (exp=0.47) and there is coverage (exp=0.52) in an equitable manner (exp=0.62). It is inferred that the learning process during the pandemic depends largely on the actions implemented by the teacher.

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Factor 1	Factorial load
Motivation	0.64
Accompaniment	0.80
Innovation	0.66
Pertinence	0.74
Contents	0.47
Pedagogical	0.49
Flexibility	0.68
Orientation	0.67
Inclusion	0.48
Opportunities	0.57
Educational program	0.71
Planning	0.67
Methodologies	0.60
Formation	0.47
Coverage	0.52
Equity	0.62

 Table 13 Intrafactorial statistical behavior of educational aspects (2022)

 Source: Own elaboration

Factor 2: Working Links

Table 14 shows that if students live together (exp=0.81) and talk to each other (exp=0.77), most become friends (exp=0.83) and thus provide help when they need it (exp=0.59), which favors collaboration (exp=0.56) and participation in group work (exp=0.49), as well intervening in classroom decisions as (exp=0.53), With this, students better express their ideas (exp=0.61) and present their doubts to the teacher (exp=0.47), this develops the ability to express themselves (exp=0.57) and function in society (exp=0.60). It is inferred that the links established between students favor their learning process.

Factor 2	Factorial Load
Interaction	0.81
Interrelation	0.77
Self-management	0.53
Group work	0.49
Collaboration	0.56
Communication	0.47
Skills	0.57
Social environment	0.60
Support	0.59
Ideas	0.61
Links	0.83

Table 14 Intrafactorial statistical behavior of work links(2022)

Source: Own elaboration

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Factor 3: School factors

In relation to table 15, it is read that students have a quality education (exp=0.66), because they are learning (exp=0.63) and acquiring adequate knowledge during the pandemic (exp=0.60), in this way students meet their educational objectives (exp=0.53) and are satisfied with their education (exp=0.61). It is inferred that receiving a quality education potentiates the learning process during the pandemic.

Factor 3	Factorial load
Quality	0.66
Knowledge	0.60
Learn	0.63
Formation	0.61
Objectives	0.53

 Table 15
 Intrafactorial statistical behavior of school factors (2022)

 Figure 2
 Figure 2

Source: Own elaboration

Factor 4: Educational exploration

Regarding Table 16, it is explored that when students are satisfied with their education (Exp=0.68) they follow the instructions given by the teacher (Exp=0.61), perform their activities in the established time (Exp=0.59). strive to do (Exp=0.54) and fulfill their tasks during the pandemic (Exp=0.63), investigate in various sources to clarify their doubts (Exp=0.69) and understand a topic (Exp=0.57) with this they build their own definitions (Exp=0.50) and use critical analysis in classes (Exp=0.53), these actions have a purpose (Exp=0.57), related to the understanding of subjects (Exp=0.59) and have fundamental elements when studying for an exam (Exp=0.49). It is inferred that investigating in various parts broadens the knowledge acquired by students and favors their learning process.

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Factor 4	Factorial load
Responsibility	0.63
Self-regulation	0.57
Instruction	0.61
I am a student	0.49
Matters	0.59
Activities	0.56
Research	0.69
Critical analysis	0.53
Formation	0.68
Constructivism	0.50
Effort	0.54
Explore	0.57

Table 16 Intrafactorial statistical behavior of educationalexploration (2022)Source: Own elaboration

Factor 5: School tools

At the bottom is table 17 where it is highlighted that during the pandemic students have handled computer applications more easily (exp=0.61), so with this means it is easier for them (exp=0.74) to enter virtual classes (exp=0.48), perform their tasks (exp=0.71) and save them on digital platforms (exp=0.54). It is inferred that technological resources have played a fundamental role in the distance modality.

Factor 5	Factorial load
Technological resources	0.71
Tools	0.74
Class	0.48
Digital platforms	0.54
Software	0.61

Table 17 Intrafactorial statistical behavior of school tools(2022)

Source: Own elaboration

Conclusions

Subsequently, the conclusions are presented through intervention proposals for the research axes with the aim of potentiating excellence at the secondary level. For this reason, it was of special importance that the data processing be carried out with a basis in parametric statistics, in this way to achieve the criteria of confidence and validity in the results. Therefore, the contributions to generate a change for the benefit of the school community to improve the teaching-learning processes are observed below:

- Take the data to a congress where this topic can be exposed, as well as its results.
- The realization of a course focused on virtual education where it implies knowing what is related to technological tools.
- Publicize the results in general secondary school No. 11 and technical secondary No. 4 so that both can know their areas of opportunity and thus offer a better quality education.
- Disseminate the results through social networks such as Facebook so that society in general knows more about virtual education.
- Publicize the results to various high schools in the state so that the faculty can identify areas of opportunity for their virtual classes.
- Take the results to the state congress to discuss the importance of virtual education and establish an educational policy that favors the realization of strategies to improve learning processes in the distance modality.
- Establish an intervention model focused on distance education as a factor of potentiation in educational quality.
 - Establish dynamics in schools so that students can give their opinion related to the implementation of the distance modality.

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