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Use of information and communication technologies (ICT) their impact on the academic performance of students in times of covid-19

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ABSTRACT This work is developed to analyze the use of ICT by teachers to determine students' academic performance and improve the practice and understanding of it and the contexts in which it is carried out. A qualitative approach was applied through a case study method. A focus group, in-depth interview, and a survey were carried out with teachers and students of 4 public schools from Quito canton. The research results allowed us to know how the use of ICT by teachers influences the students' academic performance. It was possible to establish that self-training for ICT use was fundamental for the development of their classes, using technological resources that influence the teaching-learning process. The active interaction between teacher and student and the role of parents in the education of their children are relevant factors. While in the analysis of the focus group, the teachers agreed that virtual teaching is difficult to apply since it is not socialized. In addition, digital literacy should be an essential factor to be taken into account. Therefore, through the development of this research, strategies can be structured to help ensure good management of the use of ICT by teachers and its influence on students' academic performance.

KEY WORDS TIC, investigación acción, enfoque cualitativo, alfabetización digital.

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Uso de las tecnologías de la información y la comunicación (TIC) su impacto en el rendimiento académico de los estudiantes en tiempos de covid-19

RESUMEN Este trabajo se desarrolla para analizar el uso de las TIC con el fin de determinar el rendimiento académico de los estudiantes y mejorar la práctica y comprensión de la misma. Se aplicó un enfoque cualitativo a través de un método de estudio de caso. Se realizó un grupo focal, una entrevista a profundidad y una encuesta a docentes y estudiantes de cuatro colegios públicos del cantón Quito. Los resultados de la investigación permitieron conocer cómo el uso de las TIC por parte de los docentes influye en el rendimiento académico de los estudiantes. Se pudo establecer que la autoformación en el uso de las TIC fue fundamental para el desarrollo de sus clases, utilizando recursos tecnológicos que inciden en el proceso de enseñanza-aprendizaje. La interacción activa entre docente y alumno y el papel de los padres en la educación de sus hijos son factores relevantes. Mientras que en el análisis del grupo focal, los docentes coincidieron en que la enseñanza virtual es difícil de aplicar ya que no está socializada. Además, la alfabetización digital debería ser un factor esencial a tener en cuenta. Por lo tanto, a través del desarrollo de esta investigación se pueden estructurar estrategias que ayuden a garantizar una buena gestión del uso de las TIC por parte de los docentes y su influencia en el rendimiento académico de los estudiantes.

PALABRAS CLAVE Genetic manipulation, gene therapy, cloning, abstract danger crime, genetic rights.

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INTRODUCTION

The covid-19 pandemic unleashed in 2020, and the confinement caused unexpected changes in the work nationally and globally. The development of daily life was transformed, our reality with it. Traditional education as we know it underwent a radical change, as it went from face-to-face to virtual, causing the educational model to change at all levels. Teachers have had to reinvent themselves and couple their teaching methodology to the new reality, which has revealed shortcomings in updating their technological knowledge, influencing students' academic performance. It is necessary to determine the relationship between the use of ICT by teachers and students' academic performance.

Analyzing the management of the use of ICT by the teacher and the students' academic performance is essential to the planning of the strategies that should be implemented, the same ones that focus on captivating the attention of the students and awakening in their investigative spirit. Identify what influence ICT has on teaching practice in situations as unexpected as the pandemic. Although this situation has generated significant changes, it is no less accurate that these changes have served as the basis for creating new educational strategies aimed at quality education and warmth.

This research was carried out in Quito, located in the province of Pichincha, Ecuador, due to the global and national crisis resulting from the covid-19 pandemic presented in 2020. The education sector underwent a drastic change from face-to-face to virtual classes. It focused on teachers and students to determine the health crisis's influence on education, implementing ICT, and the interaction between teachers and students. With this objective, an interview was carried out with five teachers; a focus group was carried out with a different group of teachers and a survey with 16 students.

LITERATURE RESEARCH

The integration of ICT in the classroom requires teachers' training in technologies and their pedagogical use. The key challenge for research and policy is to ensure that the full potential of digital technologies for learning is utilized and that effective learning in the digital age is made possible through systemic and holistic change. Teaching digital competence is the set of capacities, skills, knowledge, and attitudes that teachers must have to make a critical, creative and safe use of ICT in their classes. In short, whatever the methodology for applying ICT to the classroom, training that allows digital literacy, digital competence, and comprehensive education must prevail in any case-analyzing the perceptions that teachers have about the conflicts or difficulties that students present in learning.

According to Fuchs and Woessman (2004), a negative relationship was established between ICT and academic performance since its use has increased at home, and this effect is not due to indiscriminate use but rather to use oriented towards reading activity. While other investigations mention that there is no relationship since no significant correlations have been found between grades and the time students use technology.

Higher education must stop being on the sidelines of the use of technology to improve the quality of the teaching-learning process. It is impossible to continue teaching students of the XXI century with the tools of the XIX century since the student must be able to generate autonomous learning experiences using technological tools to achieve this objective. In addition, beyond the use of these technologies to generate only traditional learning, it is intended that these be used following postulates such as Vygotsky's social constructivism or Brunner's learning by discovery, where the teacher is the guide and ICT is its greatest tool.

It is known that the use of technologies has positively and negatively influenced this society. With the use of ICT in school performance, it is a complex problem to

study due to the innumerable factors that depend on how it is applied. Therefore, there has been a change in teaching and learning that adapts to the technological environment in which we live, representing an essential change for children. It influences a lot in this generation.

It is crucial to analyze the importance of access and use of ICT as determinants of educational performance. Starting from the hypothesis that the access and use of ICT at school produces a positive effect on the educational performance of middle-level students and this effect is enhanced by the use of ICT at home, it is highlighted that students show positive, almost natural attitudes towards the use of ICT and are seen as essential skills in their future professional life. Regarding teachers, there is an impact on the need to promote adequate initial and permanent teacher training through the interaction of the different dimensions of ICT, taking into account that, at present, the lack of knowledge in terms of technological tools is considered as another form of illiteracy.

RESEARCH METHODOLOGY

This is a study case; in the words of Stake (1995), this studies the particularity and complexity of a single case considering the context. On the other hand, for Merriam (2009) a case study implies a depth description and analysis of an individual unit emphasizing developmental factors about context. The methodology of the case study details, «A contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and its context are not clearly evident. [...]» Yin (1994, p. 13). This fieldwork research is based on data collection through interviews, focus groups, and surveys done by teachers and students from four public schools from Quito canton.

Qualitative research has ethical considerations in its development, so the identity of each of the participants was protected, avoiding providing names or any other form of personal information. Before conducting the research, a verbal agreement was reached with the participants to maintain the confidentiality of their identities.

INTERVIEW

For data compilation, an in-depth interview teacher was carried out. According to Robles Bernardo (2011), the in-depth interview is a method to compile much information about the interviewees' behavior, attitude, and perception. This interview was conducted with five teachers, one for each group member. The idea is to know different opinions to collaborate with the development and implementation of programs and projects carried out with the topic of ICT in schools.

FOCUS GROUP

A focus group was developed to carry out with teachers this research, a powerful research tool on how people attribute meanings regarding a topic, idea, or concept, which allows obtaining preliminary results that can be combined with other research methods. As Garvin (2008) states, group interviews are advantageous in that they can provide reliable information with much lower costs than traditional research tools, which is why in our particular case, five teachers from different educational institutions participated who contributed their personal experiences in the field of teaching and the changes that arose from the pandemic.

SURVEY

A survey was used to collect quantitative data to get students' general ideas about this research. It was also used to triangulate the data. According to Ivan Thompson (2006), the survey is a market research instrument that consists of obtaining information from the people surveyed using previously designed questionnaires to obtain specific information. Therefore, a survey of 16 students between 14 and 16 years of age was implemented.

FINDINGS AND ANALYSIS

The results and analysis of both the interview, focus group and surveys are presented below. For which we had the following themes (see Table 1).

TEACHING-LEARNING THROUGH THE USE OF ICT

Due to the constant change in the development of society, and very particularly to the situation due to covid-19 the use of ICT has become an indispensable element in the teaching-learning process, teachers are obliged to update themselves, for which many of them have opted for the self-financing for their updating in the use of ICT. The different computer applications in the field of education have encouraged teachers to develop classes that captivate the student's attention, the school then becomes an interactive space, where the student will no longer be a simple passive receiver, to become an active part of the teaching process. Although on the other side of the coin is the inappropriate use of ICT by students, for which it is necessary that both teachers and parents are committed to the education of their children.

SELF-TRAINING FOR THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

According to Cevallos *et al.* (2019), for the implementation of technological tools, it is necessary to have the technical knowledge and be clear about the pedagogical objectives when implementing them. We can reaffirm this statement with what was expressed by participant 1: «Sí, de hecho, he tenido que hacer cursos individuales con otras personas que han tenido un poco más de experiencia en el uso de las diferentes plataformas». Even in the surveys carried out, 53% responded that updating courses are always necessary to handle digital applications by teachers when teaching their classes.

Translation: Yes, in fact I have had to do individual courses with other people who have had a little more experience in the use of the different platforms.

It will be interesting to remind students that listening is also part of participation and necessary to develop this capacity. That is, the teacher is constantly attentive to each student's interactions and interventions, promoting the participation of students in the virtual classroom. Such participation is encouraged using applications in the development of their classes to capture the attention of students, as stated by participant 4: «Debido a la situación actual, se nos anima a utilizar la tecnología con frecuencia, ya que es la única forma de impartir clases a nuestros estudiantes».

Translation: Due to the current situation, we are encouraged to use technology frequently as it is the only way to deliver classes to our students.

For Gutiérrez *et al.* (2018) the didactic strategies must be articulated from the planning, delineated with the didactic sequences to promote meaningful learning scenarios

Table 1. Theme analysis

Theme	Subtheme	Code	Categories
Teaching-learning through the use of ICT	Self-training for the use of Information and Communication Technologies	SICT	- Use of technological tools (canva, genially, Prezi, etc.) - Capture the attention of students and simulate their participation. - Teaching strategies
	Active interaction between teacher and student	AITS	- Didactic, participatory and collaborative activities - Provide educational material - Assessments, games
	Knowledge assessment to students	KAS	- Difficulty in evaluating students. - Consequences in learning.
ICT in online education	Abuse of Information and Communication Technologies.	AICT	- Distraction by scattered information - Dependence due to excessive use of ICT - Information plagiarism.
	Traditional library vs virtual library	TVL	- *Virtual*: facilitates access to unlimited information. It generates poor or no socialization in many cases. - Traditional: outdated content. Difficult access in pandemic
	Technological resources that influence the teaching-learning process	TRTL	- Students develop negative behavior with inappropriate use of the internet - Lack of technological equipment - Motivation to develop the investigative side of the students
Strengthening teaching-learning	Parents' role in the education of their children	PREC	- Guidance for the use of ICT - Activity control - Support in learning development
	Virtual Literacy in the triangle of education	VLTE	- Alphabetization to parent - Training for teachers - Digital research by students
Differences between Fiscal, Municipal and Private education		DFMPE	- Adequate infrastructure and equipment - Different teaching methods

and with this achieve meaningful learning as final learning products. As confirmed by participant 2: «En mi caso como docente fue mi principal herramienta, tuve que familiarizarme con el uso de algunos programas para hacer las clases divertidas y que los alumnos entendieran la teoría, aunque me tomó mucho tiempo».

Translation: In my case as a teacher, it was my main tool, I had to familiarize myself with the use of some programs to make the classes fun and for the students to understand the theory, although it took me a long time.

ACTIVE INTERACTION BETWEEN TEACHER AND STUDENT

It is called Collaborative Learning Techniques (TAC), to the ways of structuring interactions between the participants in different collaborative learning activities and the information that is exchanged and the objects that are manipulated. The authors Moreira and Hernandez (cited in Cedeño, 2017, p. 137) state that active and participatory strategies aspire to make students active constructors of their own learning. This can be affirmed by participant 4: «En general el uso de aplicaciones como canvas, PowerPoint, powtoon, me ha brindado la oportunidad de hacer mis clases más atractivas, activas y participativas, pues si desarrolla la clase en base a estas aplicaciones es más amena lo que atrae y mantiene la atención de los estudiantes».

Translation: In general, the use of applications such as canvas, PowerPoint, powtoon, has given me the opportunity to make my classes more attractive, active and participatory,

because if you develop the class based on these applications, what attracts and maintains attention is more enjoyable of the students.

As Torres E., & García A. (2019) point out, virtual education using Web 2.0 technological tools and the development of adaptive virtual didactic materials, which are the carriers of digital content, which make possible the learning and tailor instruction to individual student needs through applications, systems, and contexts. This is confirmed by participant 2: «Estas aplicaciones a la hora de impartir las clases ayudan bastante, facilitan materiales didácticos ya que estos programas tienen una infinidad de interacción ayuda al desarrollo de las interacciones entre estudiante y maestro».

Translation: These applications when teaching classes help a lot, facilitate teaching materials since these programs have infinite help in the development of interactions between student and teacher.

Challenge-based learning, collaborative games, oral presentations, and small projects, using scoring systems, badges, and other recognition systems that can be transferred to official evaluations of the subjects and allow teachers an evaluation of diversified skills of students, going beyond mere grades and traditional exams that can also be part of a modified assessment. This can be affirmed by the participant 1: «Ya en este caso utilizo mucho el PowerPoint, también el Excel, si canvas no lo he utilizado la verdad, he utilizado la pizarra del Zoom, también Zoom nos ha dado es una buena aplicación que también se puede trabajar por medio de creación de grupos dentro del Zoom para que puedan trabajar y socializar los estudiantes, entonces éstas han sido las aplicaciones que más las he utilizado. Prezi la he utilizado también a pesar de que no la mencioné, ahí también la he utilizado no muy seguido porque tal vez es un poco más complejo para los estudiantes trabajar en este tipo de herramientas».

Translation: Already in this case I use PowerPoint a lot, also Excel, if canvas did not really use it, it used the Zoom whiteboard, Zoom has also given us a good application that can also be worked through creation from within Zoom to those students can work and socialize, then these have been the applications that used them the most. I have also used Prezi even though I did not mention it there I have also used it not very often because perhaps it is a little more complex for students to work with this type of tool.

KNOWLEDGE ASSESSMENT TO STUDENTS

For Román R. (2020), the evaluation of learning is an 'art' since several variables must be taken into account for the evaluation of learning. For example, the subject that is taught, the discipline to which it belongs, where the subject is located in the curriculum, institutional regulations, the educational model of the school, the training intentions, the evaluation mechanisms, and even the teacher's personal beliefs about what evaluation is and what it is for. The virtual modality allows to be more strategic by prioritizing what the students will learn, in the case of the evaluation, they are the learning processes that the students will have to exercise and the appropriate mechanisms to achieve it, this is confirmed by Participant 1: «Al final del día cuando uno quiere ver resultados en el rendimiento académico yo creería que no encontramos mayores beneficios solo es una dificultad de establecer, digamos los resultados o una mejora en el rendimiento académico a través la virtualidad porque es difícil medirlo, uno se limita a recibir los trabajos, los documentos, entonces como bien se decía, no sabe si bien lo hizo un estudiante por ahí como docente puede realizar un trabajo en clase o realizar un trabajo a mano antes que a computadora».

Translation: At the end of the day, when one wants to see results in academic performance, I would believe that we do not find greater benefits, it is just a difficulty in establishing, let's say, the results or an improvement in academic performance through virtuality because it is difficult to measure it, one it limits itself to receiving the work, the documents,

then as it was well said, it does not know if a student out there did it as a teacher, he can do a job in class or do a job by hand rather than by computer.

Negative and positive consequences are evidenced in the learning process in virtual education, among the negative we have:

1. Knowledge is not strengthened, nor is the existing digital gap between generations closed. As confirmed by one of the participants, when mentioning that: «Sí queremos en este año lectivo potencializar mucho más las TIC, tener mejores estrategias que nos ayuden a llegar a nuestros estudiantes, esto será imposible si los estudiantes no van avanzando con nosotros, de qué nos sirve implementar nuevas y mejores estrategias si ellos no están actualizados y sus padres tampoco, entonces la educación no va a funcionar, lo que ocasionará frustración».
2. Inappropriate use of virtual classrooms in the student learning process.
3. Misapplication of resources and tasks.
4. Lack of autonomy when studying.

Translation: If we want in this school year to enhance ICT much more, to have better strategies that help us reach our students, this will be impossible if the students are not advancing with us, what is the use of implementing new and better strategies if they are not up-to-date and neither are their parents, then education is not going to work, which will cause frustration.

This is confirmed by participant 1 by mentioning that «La falta de conocimiento del uso de las TIC nos genera inconvenientes, pues como profesores queremos aplicar mejores estrategias de enseñanza, pero a su vez esta situación requiere mejores habilidades y destrezas de parte de los estudiantes».

Translation: The lack of knowledge of the use of ICT generates inconveniences for us, because as teachers we want to apply better teaching strategies, but in turn this situation requires better abilities and skills on the part of the students.

Among the positives we have:

1. It allows unlimited learning resources, in virtual classrooms such as simulators and practical exercises, as well as access to multiple databases of scientific journals and remote access books. This is confirmed by participant 1 when he says that: «A raíz de la pandemia hay muchísimos modelos y programas educativos súper interesantes, incluso a modo de video juegos que resultan bastante llamativos para ellos, se puede incluso hacer la clase a modo de video juego con recompensas y más actividades que resultan atractivas para el estudiante».
2. Encourages the use of videos, documents, and presentations that are shared at the time of class and are easily accessible.
3. Classes stimul ate creativity, are more dynamic, promote the use of ICT and the expansion of technological versatility; somehow, they resemble face-to-face classes.
4. The teachers make an effort to explain, the slides and audiovisual material are better seen, and it is a material that can be saved; they can record the sessions and return to the topics to strengthen their understanding.

Translation: As a result of the pandemic there are many super interesting educational models and programs, even as video games that are quite attractive for them, you can even do the class as a video game with rewards and more activities that are attractive for the student.

ICT IN ONLINE EDUCATION

The use of ICT has innovated the teaching-learning method, although there are teachers who question the quality of learning that occurs, it cannot be ignored that the use of ICT awakens

the research that we carry within, it is also notorious that the misuse of ICT creates dependency, particularly in children and its relationship with video games. In general, ICT are well seen by teachers, as they generate up-to-date information, unlike traditional libraries

ABUSE OF INFORMATION AND COMMUNICATION TECHNOLOGIES.

The attention that the student must pay to the development of the class on multiple occasions is diminished by dispersed distractions. For this reason, the teacher must make a class that captures and maintains the students' attention. When distracted, they stop paying attention to something and drift to the new point of interest. This is confirmed by participant 1: «Nosotros como estudiantes virtuales tenemos más facilidad para distraernos ya que tenemos a la mano herramientas tecnológicas que muchas veces no las utilizamos con un fin educativo sino más bien como distractores como, por ejemplo, al utilizar las redes sociales, videojuegos, videos que no son educativos, etc.». Even in the surveys carried out, 53% responded that technology almost always creates dependency.

Translation: We as virtual students are more easily distracted since we have technological tools at hand that we often do not use for educational purposes but rather as distractions, for example, when using social networks, video games, videos that are not educational.

According to studies, it is considered that, although the use of mobile devices in young people is usually associated with addictive behavior, there is no conclusive evidence in this regard. However, their indiscriminate usage is associated with personality traits such as low self-esteem and extraversion, being women with low self-esteem the most vulnerable group. They also associate the use of the devices with psychopathological symptoms such as depression. We can see this fact reflected in the experience of participant 4: «El uso de las TIC en general afecta de forma positiva a los estudiantes, pues disponen a la mano de gran cantidad de información, lo que le ayuda en su tarea investigativa, aunque también si no se le da las directrices correctas pueden desarrollar adicción al uso de las TIC, pues hay chicos que son blanco fácil para caer en adicciones a determinados sitios de internet que no le ayudan en su formación».

Translation: The use of ICT in general positively affects students, since they have a large amount of information at hand, which helps them in their investigative task, although also if they are not given the correct guidelines they can develop addiction to use of ICT, because there are children who are easy targets to fall into addictions to certain Internet sites that do not help them in their training.

According to the RAE, plagiarism is the action of «substantially copying other people 's works, giving them as one's own». This can be reaffirmed by participant 2: «En internet hay muchos programas que son útiles para su entorno, pero también programas que no agregan valor, hay padres que no se hacen responsables del manejo del internet de sus hijos no hay control, incluso no les revisan y ellos lo que hacen es copiar y pegar las tareas, lo cual no es fructífero para su educación». This practice is very common redundant among students, so it is necessary to raise awareness about the ethical way of using information that is not their own.

Translation: On the Internet there are many programs that are useful for their environment but also programs that do not add value, there are parents who are not responsible for managing their children's Internet, there is no control, they do not even review them and what they do is copy and paste homework, which is not fruitful for their education.

TRADITIONAL LIBRARY VS VIRTUAL LIBRARY

Virtual

The open-access of virtual libraries is an educational tool of vital importance since it reinforces each person's knowledge and helps awaken their creativity. Promoting scientific

knowledge and disseminating it as widely as possible has clear benefits not only for researchers but also for society as a whole. In this pandemic, open access to virtual libraries has generated significant advances in research, as it is an inexhaustible source of information. This is confirmed by participant 4: «Entre lo más destacado: las bibliotecas virtuales, están siempre a disposición, sin límites de tiempo o espacio, además existe información actualizada de temas variados».

Translation: Among the highlights: the virtual libraries are always available, without limits of time or space, there is also updated information on various topics.

The virtual library is established as a social space for the development of knowledge that allows the accessibility and usability of tools and collective and individual activities (Sánchez García and Yubero, 2015). In contrast to the ease of access to a virtual library, professionals tend to react negatively to physical libraries (Bolt, 2014). This can be corroborated by participant 2: «Accesibilidad permite consultar la información a cualquier hora, desde cualquier lugar y desde cualquier dispositivo, sin límite de usuarios, sin límite de descargas». In addition, participant 4 mentions something very important: «Otra ventaja de la biblioteca virtual es que no necesitas salir de casa para buscar información, aunque claro está que también, el est udiante pierde su desarrollo social».

Translation 1: Accessibility allows information to be consulted at any time, from any place and from any device, without limit of users, without limit of downloads.

Translation 2: Another advantage of the virtual library is that you do not need to leave home to look for information, although of course, the student also loses his social development.

TRADICIONAL

The key points for the care of the collections so that they are relevant and useful is that the training of the library staff is continuous, that the facilities and equipment are adopted and kept up to date, in the same way the library management programs stated the Baratz Community (2019). This can be confirmed by participant 3: «En las bibliotecas tradicionales con libros muchas veces no se encuentran volúmenes y preguntas actualizadas, pero creo que debe haber un equilibrio en el sentido de que el alumno tampoco se olvide de hacer una consulta física, no solo sea cien por ciento virtuales, entonces deberíamos usar ambas formas».

Translation: In traditional libraries with books, volumes and up-to-date questions are often not found, but I think there should be a balance in the sense that the student does not forget to make a physical consultation, not just a hundred virtual percentages, so we should use both ways.

According to Sierra and Saldarriaga (2020), institutions and organizations of various kinds had to look for alternatives to provide their services, and libraries were no exception. Mainly, digital access was initially the option to obtain documentation from libraries and, later, other procedures were sought.

TECHNOLOGICAL RESOURCES THAT INFLUENCE THE TEACHING-LEARNING PROCESS

According to Kraut *et al.* (1996) they mentioned that it is evident that the Internet is producing an accelerated change in people's customs and ways of life since, in a certain sense, it is modifying the way in which we relate to each other. A clear example of this is social networks, which are currently almost indispensable in our society, both to be able to fit into a group or within society itself. In addition, having access to the Internet and not having control over it can be dangerous for children and adolescents in their development. This

is confirmed by participant 4: «Aunque también si no se dan las pautas correctas, pueden desarrollar adicción al uso de las TIC, ya que hay niños que son blanco fácil de adicción a ciertos sitios de internet, que no les ayudan en su formación. Además, el mal uso de la tecnología genera dependencia, ya que no toda la información a la que acceden es adecuada».

Translation: Although also if the correct guidelines are not given, they can develop addiction to the use of ICT, since there are children who are easy targets of addiction to certain Internet sites, which do not help them in their training. In addition, the misuse of technology generates dependency, since not all the information they access is adequate.

The lack of technological resources for education greatly affects the decrease in educational quality since its importance lies in the insertion into the technological world. In addition, the introduction of technology in a classroom implies learning to work collaboratively. This is affirmed by participant 1: «Considero que sí, si puedes mejorar tus calificaciones con el uso de la tecnología, ya que cuentas con medios y recursos que te permitirán abrir tu campo. Cabe destacar también que la mayoría de los alumnos sí tienen un poco de complicaciones ya que no tienen computadora, pero sí tienen celular, entonces considero que tienen una alta probabilidad de mejorar su nota, al mejorar la presentación de sus trabajos utilizando las diferentes aplicaciones».

Translation: I think yes, if you can improve your qualifications with the use of technology, since you have the means and resources that will allow you to open your field. It should also be noted that most of the students do have some complications since they do not have a computer, but if they have a cell phone, then I consider that they have a high probability of improving their grade, by improving the presentation of their work using the different applications.

Motivated students understand and investigate values such as objectivity, respect for evidence, the point of view of others, tolerance, ambiguity, honesty with results, and analytical rigor must be developed. The author Oquendo (2019) based on Tamayo and Tamayo (2005), highlights that «there is no difference in terms of competencies between a child, an adult or a trained researcher, the difference between them lies in the levels of systematization of the processes that are developed» (p. 128). This is how participant 4 can affirm: «Pienso que sí, porque si se dirige con una visión investigadora, el alumno recibe estímulos que desarrollan habilidades, las que a su vez promueven su vertiente investigativa, lo que conlleva una búsqueda más detallada de información, lo que a su vez influye en sus calificaciones». Even in the surveys carried out, 53% responded that the use of technology always helps in the acquisition of knowledge.

Translation: I think so, because if it is directed with an investigative vision, the student receives stimuli that develop skills, which in turn promote their investigative side which leads to a more detailed search for information, which in turn influences his ratings.

STRENGTHENING TEACHING-LEARNING

Online education has been the most suitable tool, so as not to suffer a sharp setback in society, due to the restrictions caused by the pandemic. So, it is the obligation of all of us who are part of the teaching-learning process, that is, teachers, students, and parents, to have the basic knowledge for a better performance in the teaching learning process.

PARENTS' ROLE IN THE EDUCATION OF THEIR CHILDREN

The role of parents in education is essential, due to the support they can transmit and even more so in times of pandemic, where parents stopped being simply observers, to become an

active part of the learning process. Even though many parents do not know about ICT management, their role has been highlighted since they help consolidate teaching from home.

This is only achieved in a context where the engine is pro-learning interaction, which implies building harmonious climates and mutual collaboration.

By definition, each student is unique and has different learning needs. Inclusion is known among educators as the ongoing process that facilitates access and engagement for all students. Therefore, the teacher must know his students to strengthen integration and learning.

The fundamental thing in the education of the students is the active participation of the parents since everything they learn in the family environment is reflected in their daily lives. Since they acquire behavioral habits, such as the values and attitudes of each family to which they belong.

In school coexistence, it is necessary to involve the parents of families in educational tasks, they must have knowledge about the education that is imparted creating a conscious commitment to support their child in the academic task. Also control the proper use of ICT, and how to take advantage of them in learning. In this sense, participant four tells us «En el internet existe infinidad de información, claro que no toda es cien por ciento segura, ni adecuada para los estudiantes, por tal razón es de vital importancia saber guiar al estudiante en el manejo de la información que se encuentra en internet. Además, en esta situación es importante la ayuda que se reciba en casa, los padres son un pilar fundamental en la formación educativa de sus hijos».

Translation: On the internet there is an infinity of information, of course not all of it is one hundred percent safe, nor suitable for students, for this reason it is of vital importance to know how to guide the student in handling the information found on the internet. In addition, in this situation the help received at home is important, parents are a fundamental pillar in the educational formation of their children.

VIRTUAL LITERACY IN THE TRIANGLE OF EDUCATION

From the experience teachers had in the pandemic, make a call to be oriented towards digital literacy, that is, the capacity a person has to perform different tasks in a digital environment, which would include the ability to investigate and analyze information using the technology. Digital literacy should be understood as a medium and a new form of communication, creation, and comprehension of information. This is emphasized by participant 2, when he emphasizes that: «[...] es imprescindible, no solo para los padres, sino también para los estudiantes y los mismos maestros, tener conocimientos de las TIC, pues este cambio brusco del formato de educación de presencial a virtual ha traído sus complicaciones, por lo que es súper importante que se tome en cuenta la alfabetización para los padres, pues tener conocimiento básico por ejemplo de los formatos o pesos de archivos, ayuda a tener claridad en el manejo de las tareas, la falta de conocimiento del uso de las TIC nos genera inconvenientes».

Translation: «[...] it is essential, not only for parents, but also for students and teachers themselves, to have knowledge of ICT, since this sudden change in the format of education from face-to-face to virtual has brought its complications, so it is super important that literacy is taken into account for parents, because having basic knowledge, for example, of file formats or weights, helps to have clarity in managing tasks, the lack of knowledge of the use of ICT generates inconveniences».

Even in the surveys carried out, 56% answered that digital literacy is always necessary in the educational community. It is imperative that learning begins with words that many may be familiar with, such as 'mouse', e-mail, or Google, to more complex terms such as drive card, embed code, or streaming. Its mastery and use have become essential to understanding the new world. Knowing how to use a pencil to write is no longer enough; the mouse has also become a basic learning and personal development tool.

The education sector has been advocated to face and adapt to the change in the educational model due to the pandemic, so strategies should be focused on promoting teacher training to develop their skills in ICT management so that, in turn, teachers have more tools for the development of their educational strategies and thus have better results in teaching/learning. This was confirmed by one of the participants by saying that: «La educación en línea, nos ha enseñado a los maestros a utilizar nuevas herramientas digitales, las cuales facilitan el aprendizaje, y se quedará grabado para nuevas generaciones y tecnologías avanzadas, además las TIC contribuyen a una mejor investigación ya que hay bibliotecas virtuales que son de fácil acceso». Even in the surveys carried out, 68% responded that almost always the use of technology used in online learning is appropriate.

Translation: «Online education has taught us teachers to use new digital tools, which facilitate learning, and will remain recorded for new generations and advanced technologies. In addition, ICTs contribute to better research since there are virtual libraries that are easy to access».

DIFFERENCES BETWEEN STATE, CITY AND PRIVATE EDUCATION

According to the Organic Law of Education TITLE I OF THE GENERAL PRINCIPLES SOLE CHAPTER OF THE SCOPE, PRINCIPLES, AND PURPOSES. Art. 6. Obligations. - literal g. Guarantee the compulsory application of a national curriculum, both in public, municipal, private, and fiscal institutions, at its various levels: initial, basic and high school; and modalities: face-to-face, blended, and distance. Concerning cultural and linguistic diversity, it will be applied in the official languages of the various nationalities of Ecuador. The curricular design will always consider the vision of a plurinational and intercultural State. The curriculum is complemented according to the cultural specificities and peculiarities of the various educational institutions part of the National Education System. This is stated by participant 2: «*En la institución municipal de hecho muy poco, a pesar de que en cuanto a la infraestructura esté bien dotada en la institución municipal se tiene un proyector por cada aula digamos que hay la posibilidad de internet para los muchachos sin embargo no se hacía un uso digamos tan adecuado de estos implementos*».

Translation: In the municipal institution in fact very little despite the fact that in terms of infrastructure it is well equipped in the municipal institution there is a projector for each classroom let's say that there is the possibility of internet for the boys however it was not used let's say so suitable of these implements.

Senescyt (2015) observes that, both in the Sierra and the Coast, students from public schools obtain lower scores than students from private establishments, the problem being more serious in rural areas. Although there are differences in both the characteristics of supply and demand captured by each of the studied establishments, they had comparable results in educational terms or are developing pedagogical innovations. In addition, statistical information on secondary education and a literature review on education reforms in the country and the region were used.

CONCLUSION

In conclusion, after the analysis carried out, we can verify that the 2019 pandemic affected the normal development of society in general, particularly in the area of education. This is because the usual face-to-face teaching took a 180° turn when it abruptly switched to virtual teaching, which caused significant changes, one of the most visible being the implementation and use of ICT in an accelerated way. While many teachers were not trained and updated in using technological tools, students had ICT not as a research tool but rather as entertainment. However, on the positive side, it was achieved that parents Absent

from face-to-face education will be forced to get involved in virtual education and help in its proper development.

Some of the participating teachers stated that the main challenge is finding strategies to keep students committed to learning and achieving active classroom participation. Teachers are concerned that e-learning is exacerbating social inequalities. Likewise, teachers draw attention to communication obstacles since available channels such as the telephone and WhatsApp are not ideal for establishing effective communication between parents and teachers.

In relation to the students' survey, we can conclude that ICT have been allies in acquiring new knowledge. Likewise, they believe that the technology applied in learning is adequate. Also, from their personal experience, they think that teachers are not 100% trained. Many students believe that technology creates dependency when it is misused. Regarding the management of technological equipment, many of the students stated that they had problems entering the different platforms due to insufficient knowledge in their initial handling. Students believe that most teachers show empathy towards them and their need to engage in the virtual education system, although they consider that updates should be given to teachers in digital applications. It should be noted that students themselves consider that digital literacy should be carried out in the educational community (teachers, students, and parents).

In short, it was possible to show in the research that our society was not prepared to face virtual education, being in many ways illiterate in the use of technologies, given that before the pandemic, ICTs were primarily used recreationally and socially and were not given the correct or appropriate educational use.

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REFERENCES

Cevallos *et al*. (2020). Uso de Herramientas tecnológicas en estudiantes del noveno de básica de las unidades educativas Walt Whitman, Salinas y Simón Bolívar, Ecuador. *Revista Ciencias Pedagógicas e Innovación,* VII(2), *86-93, enero-junio.* https://incyt.upse.edu.ec/pedagogia/revistas/index.php/rcpi/article/view/304/427

Chamorro, C. (2013). *El manejo inadecuado del internet influye en la generación de conflictos escolares* (tesis de licenciatura). Universidad Tecnológica Equinoccial. http://repositorio.ute.edu.ec/bitstream/123456789/3018/1/50670_1.pdf

Comunidad Baratz. (20 de mayo de 2019). *Las 5 claves para tener una biblioteca actualizada y plenamente viva*. Comunidad Baratz. https://www.comunidadbaratz.com/blog/las-5-claves-para-tener-una-biblioteca-actualizada-y-plenamente-viva/

Gutiérrez *et al*. (agosto de 2018). *Las estrategias didácticas de enseñanza y aprendizaje desde una perspectiva interactiva*. https://www.comunidadbaratz.com/blog/las-5-claves-para-tener-una-biblioteca-actualizada-y-plenamente-viva/

Hernández, A. (09 de 09 de 2021). Evaluar con juegos. Herramientas y métodos para una evaluación diversificada en la ludificación. *Enseñanza de las Ciencias de la Tierra*. https://raco.cat/index.php/ECT/article/view/372929

Hernández, J. (21 de agosto de 2017). Rol de los padres en la educación de sus hijos. *Temas de Interés*. https://www.uss.cl/blog/rol-de-los-padres-en-la-educacion-de-sus-hijos/

Oquendo, A. (2019). Estrategias para el desarrollo de la competencia investigativa en estudiantes de básica primaria. Universidad Autónoma del Caribe. hijos/https://www.redalyc.org/journal/4766/476661510009/html/

Robles, B. (2011). La entrevista en profundidad: una técnica útil dentro del campo antropofísico. *Cuicuilco, 18*(52), septiembre-diciembre. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-16592011000300004

Román, R. (27 de julio de 2020). Evaluación del aprendizaje en tiempos del covid-19. *Instituto para el Futuro de la Educación. Observatorio.* https://observatorio.tec.mx/edu-news/evaluacion-del-aprendizaje-en-tiempos-de-covid19

Sierra, K. y Saldarriaga, K. (01 de mayo de 2021). La biblioteca pública en temas de salud e infodemia frente al covid-19. Caso biblioteca Pedro Elio Cevallos de Portoviejo. *Rehuso. Revista de Ciencias Humanísticas y Sociales, 6*(2). file:///C:/Users/USER/Downloads/3444-37-11858-1-10-20210501.pdf

Thompson, I. (septiembre de 2010). Definición de Encuesta. *Promonegocios.net*. https://www.promonegocios.net/mercadotecnia/encuestas-definicion.html

Torres, T. y García, A. (2019). Reflexiones sobre los materiales didácticos virtuales adaptativos. *Revista Cubana de Educación Superior, 38*(3), sep.-dic. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0257-43142019000300002