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ICT TO STRENGTHEN MULTIPLE INTELLIGENCES

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Abstract. The article is based on a study conducted at the Florida Adventist Institute, a private denominational educational center with 340 enrolled in secondary education. It has three educational levels, it is in Vicente López, province of Buenos Aires, Argentine Republic. The purpose was to analyze the use of Information and Communication Technologies, and how they favor Multiple Intelligences when studying History, a high school case. The mixed design research was carried out with a study variable and an analysis category in the context that includes 74 students of the Social Sciences modality, of Upper Secondary Education who used technological resources during the school year. Data collection was carried out on 22 educators, 14 teachers and 8 managers, through a survey and an interview, these were computerized in Excel and CmapTools software. Considering that ICTs are a set of powerful and innovative tools, their technological use is established to determine the development of intelligence, and at the same time identify how students' appropriate knowledge. Technologies accompany the teaching and learning process, they are also useful for those who learn in a traditional way, because they allow breaking structures and expanding study strategies. After the analysis of the results, the importance of implementing the WebQuest integrated to Project-Based Learning is manifested, to improve learning in History with the use of Information and Communication Technologies and favoring Multiple Intelligences.

Keywords: Technology of the information and communication; Multiple intelligences; Project Based Learning; WebQuest; educational innovation.

LAS TIC PARA FORTALECER LAS INTELIGENCIAS MÚLTIPLES Y APRENDER HISTORIA EN SECUNDARIA

Resumen. El artículo se basa en un estudio realizado en el Instituto Adventista Florida, un centro educativo privado confesional con 340 matriculados en educación media. Cuenta con tres niveles educativos, está ubicado en Vicente López, provincia de Buenos Aires, República Argentina. La finalidad fue hacer un análisis del uso de las Tecnologías de la Información y la Comunicación, y cómo favorecen a las Inteligencias Múltiples al estudiar Historia, un caso de secundaria. La investigación de diseño mixto, se llevo a cabo con una variable de estudio y una categoría de análisis en el contexto que incluye 74 estudiantes de la modalidad en Ciencias Sociales, de Educación Secundaria Superior quienes utilizaron recursos tecnológicos durante año escolar. La recolección de datos se realizó a 22 educadores, 14 profesores y 8

directivos, mediante una encuesta y una entrevista estas, fueron informatizadas en los softwares Excel y CmapTools. Considerando que las TIC son un conjunto de herramientas potentes e innovadoras, se establece su uso tecnológico para determinar el desarrollo de las inteligencias, y a la vez identificar como los alumnos se apropian del conocimiento. Las tecnologías acompañan el proceso de enseñanza y aprendizaje, también son útiles para aquellos que aprenden en forma tradicional, porque permiten romper estructuras y ampliar estrategias de estudios. Finalizado el análisis de los resultados, se manifiesta la importancia de implementar la WebQuest integrada al Aprendizaje Basado en Proyecto, para mejorar el aprendizaje en Historia con el uso de Tecnologías de la Información y la Comunicación, y favoreciendo las Inteligencias Múltiples.

Palabras claves: Tecnologías de la información y la comunicación; Inteligencias Múltiples; Aprendizaje Basado en Proyecto; WebQuest; innovación educativa.

Introduction

Instituto Adventista Florida (IAF) is a private, denominational school with three levels of education: kindergarten, elementary, and high school, and with more than 100 years of educational experience. It is located in the city of Vicente López, Province of Buenos Aires.

In this context and when reflecting on today's education, it is necessary to consider the ways of teaching and rethink strategies, so that the teaching and learning process is more meaningful for students.

When a basic diagnosis was made in History class, the use of traditional pedagogies to impart knowledge was noticed. This was evident in the students' poor ability to interact between theory and practice. Based on the belief in meaningful learning, a teaching proposal was designed, framed in an innovative format in which WebQuest (WQ) and Project Based Learning (PBL) interact, where technologies participate, which enhance the intelligences based on the following problem: What is the use that we can give to the Information and Communication Technologies (ICTs) to favor the development of Multiple Intelligences (MIs) in students of Higher Secondary Education (HSE), of Social Sciences of the Instituto Adventista Florida, in the learning of History during the period 2019 and 2020?

The research was based on a mixed methodology, intertwining quantitative and qualitative approaches, the former through a survey to measure the study variable, and the latter with an interview to interpret the category of analysis.

Information and Communication Technologies

ICTs allow the creation of learning scenarios with synchronous and asynchronous itineraries, which favor education in diversity and benefit the development of different intelligences. For this reason, when investigating the institutional context, it was considered that students should be able to relate their previous knowledge with new knowledge and experiences in order to modify or restructure what they have already acquired.

The search, selection, and analysis of the literature provided contributions on the subject of the study, and they give an account of it.

Information and Communication Technologies in the educational area have been in a place of privilege. The concept "revolve in an interactive and interconnected way, they allow to achieve new communicative realities" (Cabero, 1998, cited by Belloch-Ortí, 2012, p.1). This meaningful exchange allows them to be linked through devices increasing communication. After some years, in the UNESCO report (2005, p. 29), ICTs

are presented as central elements immersed in society for the "ability to identify, produce, process, transform, disseminate, and use information to create and apply knowledge necessary for human development." They are capable of processing, administering, and managing information which, in turn, is distributed through various electronic media.

Vaquero (2010), who speaks of technological resources as innovative, forceful, and useful for learning, argues that it is essential that educators recognize the importance of ICTs, and use them to facilitate the teaching of the so-called "digital natives." About this concept, Sunkel et al. (2014, p. 63) say that, "For the most part students will learn to use ICTs because they are generations that have been born inserted in a world that functions and is organized around digitalization and informatics." However, learning alone does not guarantee that they will take advantage of all the potential they have, nor that they will acquire competencies. Therefore, the contribution of Marquès-Graells (2015), in the Conference "ICTs in Education," is considered valuable when stating that "The important thing is not to innovate, the goal is to improve the training of students and school success," so that being born in a digital world is not enough, it is necessary that teaching is accompanied.

Within this framework, Gabarda-Méndez (2015, pp. 3-10), from the Universidad Internacional de Valencia (VIU), conducted a research on "Equipment and use of ICTs in European and Latin American Educational Centers," focused on Information and Communication Technologies in similar and different educational contexts. The sample was carried out in five European countries (Finland, France, Germany, United Kingdom, and Spain) and five Latin American countries (Brazil, Argentina, Uruguay, Chile, and Costa Rica). The objective was to analyze the educational systems under the perspective of technological integration with the following criteria: equipment of the centers, curricular integration of ICTs and their use.

The conclusion reached was that both the United Kingdom and Spain are the European countries where students use the greatest number of computers per week, in addition to being the area with the most educational centers connected to the Internet. In relation to Latin American countries, the study revealed that 51.8% of students and almost 30% of teachers never use technological resources in the classroom. As for the use of computers, the average is one for every 27 students in Primary Education and 17 in Secondary Education. However, the Oriental Republic of the Uruguay has the highest rate of computers per student, one computer per student in each center. At the bottom of the table are Argentina and Costa Rica, with a marked decrease in the number of computers per student.

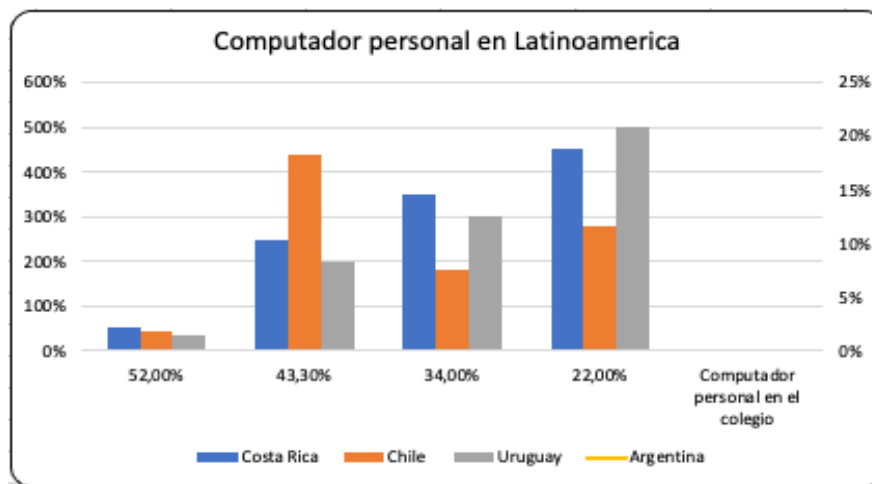


Figure 1. Personal computer in Latin America.

Note: The graph shows the results of the research conducted by the Universidad de Valencia, 2015.

The study provides interesting data: technologies in Primary Education are used as a tool at the service of the areas, and in Secondary Education they appear in the curricula. When comparing the equipment related to socio-digital inclusion of students and teachers on digital programs in Latin American countries, except in the case of Uruguay, it can be said that, without being the expected revolution, ICTs shape transformations in the countries of the region. In this way, the education system in Latin America opens the way to technological innovation with more flexible and creative educators, redefining the skills and abilities of both themselves and their students. As an example, Lugo and Delgado (2020) present countries that deployed proposals related to one computer per student. They are Venezuela with the "Canaima Educativo Project," Peru with the "One Laptop per Child Program," Uruguay with the "Ceibal Plan," and Argentina with the "Conectar Igualdad Plan."

From the conclusions drawn by the author, it is evident that technologies should be part of the educational environment to promote the integration and motivation of students. Hence, the importance of educational centers becoming learning spaces, where teachers, students, and technological resources are part of the Teaching and Learning process (TLP).

On the other hand, Parrón (2014 p. 94), assessing the Educational Policies of Latin America, says that "specialists warn that one of the changes observed with the introduction of ICTs is the breaking of classroom boundaries." This promotes leaving the traditional classroom in search of transformation and technological implementation in order to shorten the knowledge gap. The concept of school environments, presented by Costa and Bordignon (2012), is taken up by the author arguing that they are useful because they enrich the learning process, but he says, they have been slow. However, he highlights the Argentine government for implementing the "Conectar Igualdad Program," with the aim of reducing economic, social, and cultural inequalities, by allocating more than 200,000 notebooks to teachers and approximately 1,800,000 students in schools of the State Public Education System (SEGEP).

Within these innovative challenges, he states that, in some educational centers in the Provinces of Salta and Jujuy, technology has dynamized traditional strategies, betting on collaborative activities where good results are observed with the use of ICTs, such as, participation in the network, the creation and management of blogs and others that promote autonomous learning by establishing new relationships. However, he also points out that there are other centers where there is still inequality in the use of these tools.

The authors, Iriarte-Díazgranados, C. et al. (2017, p. 21), state that the use of ICTs must be reflected in the classroom. "...it is urgent to establish and develop pedagogical

practices or methodologies that guarantee meaningful learning, which enable the student to face a labor or professional context."

Marqués-Graells (1999), quoted by Iriarte-Díazgranados, has validated the interest in implementing flexible, dynamic, and interactive tools, so that students can actively participate in the construction of their own knowledge.

At the same time, for innovation to be inclusive, it is considered relevant to improve schools, physical infrastructure, digital educational resources, pedagogical coordination of ICTs, teacher training and updating, and their integration into the curriculum. In this sense, Marqués-Graells (2011) emphasizes that the technological infrastructure offered by the new teaching and learning environments (TE) allows "taking advantage of the full potential of ICTs as a cognitive and learning support tool in general; students should have a computer whenever they need to access information on the Internet, communicate, process data, or perform self-corrective exercises."

In Argentina, the "Conectar Igualdad" Program was implemented through State policies in 2010 to improve the quality of education. The new resources aimed at teaching and learning, provided access to information and knowledge as a guarantee of equal opportunities. In 2018, the name of the program changed to Plan Aprender Conectados, with a comprehensive proposal of pedagogical and technological innovation, with central cores such as content development, technological equipment, connectivity, and teacher training for the development of digital education competencies, skills, and fundamental knowledge. It was later renamed Program.AR, incorporating, among other knowledge, environments with embeddable blocks such as Scratch Jr. and Scratch to ensure the learning of skills and knowledge through digital literacy.

In relation to ICTs and the approach to learning, it should be noted that, "It is possible that the use of different ICT applications has an influence on the mental processes that users perform for the acquisition of knowledge rather than on the acquired knowledge itself." Cabero, 1998, cited by Belloch-Ortí, 2012, pp. 2-3).

The authors, Cenich, Araujo, and Santos (2017), facing the challenge of the 1-to-1 model of the Conectar Igualdad Program, conducted a case study. "Educational uses of ICTs and teaching cultures" in ESS in the cities of Tandil and Necochea in Argentina to address the innovation process. The research design was focused on the use made by teachers in mathematics classes with ICTs integration. Recovering some of the conclusions, the use of some applications for certain functions was weighted. Salinas (2004) states that the results of technological integration in educational practices as a process of innovation depend on the interpretation and implementation made by teachers. Although this study is not consistent with the subject of the present study, it is significant because it was carried out within the same province and in an SSE environment. Information and Communication Technologies are instruments that, when properly used, serve as a means for students to be part of the construction of their own knowledge.

Ausubel (1963), in his book "Psychology of Significant Verbal Learning," shares the concept of Significant Learning (SL), qualifying it as such to differentiate it from rote and repetitive learning. He bases it on the psychology of people and on a constructivist current. The model is based on discovery, privileging previous organizers and new acquired knowledge. For Ausubel, the concept of meaningful learning is to understand, hence the need for the teacher to know the students' prior knowledge. This will facilitate the establishment of connections between pre-existing concepts and new insights. In this way, the traditional teaching and learning style is redefined through the hierarchization of concepts, where the student collects, selects, and organizes information. By managing information, learning is more meaningful.

Project Based Learning (PBL), presented by Ausubel, is a model with constructivist roots, which offers the educational field innovative strategies based on problems and challenges. It provides students with an education based on experience and action through knowledge, the development of their competencies and the formation of their critical judgment. There are authors such as Vergara-Ramirez (2016), who present PBL in seven steps, respecting higher order thinking processes, a process that goes from surprise to evaluation. First, the occasion is the birth of the project, then the intention, which are the first steps, followed by the look that designs the project, then the strategy that decides how to investigate and do, the action determines how to act and generate change, then the architecture that leads to the selection of useful tools, and finally the evaluation, which analyzes what and how to do it.

This model attempts to experience meaningful learning, is suitable for the development of inclusive, critical, and creative thinking, and places the student at the center of the EA process in such a way that the contents can present greater motivation for the intervention of ideas, creativity, and collaboration in achieving a final product.

Therefore, this proposal prioritizes the interaction of WebQuest and Project Based Learning. It is worth mentioning that Dodge (1995), who was recognized as the creator of the WQ, whose design is composed of the introduction, which provides the objective; the tasks where the activities are specified; the process, which establishes the steps; the resources; the evaluation; and the conclusion. Adell, (2006), qualifies it as an attractive and useful didactic strategy to deploy skills in the virtual environment, emphasizing the importance of its use to learn History.

Therefore, and according to Vergara-Ramírez (2016), in which learning is an intentional act and a practical action as well as useful, in this proposal for educational innovation, PBL and WQ interact, involving technologies and intelligences. To think of a project is to take into account the actors involved in order to generate the best activities. An example of this is (see) The Cold War, which to reach the structure it was necessary to approach the interests of the students and strategically interact in the assembly of the didactic programming to make it dynamic and collaborative.

Alvarez-Herrero (2018) considers that WQ benefits learning by relating digital competencies with those others that satisfy the construction of knowledge. Therefore, it can accompany the management of PBL, considerably improving learning.

That is why, when referring to the study of history, Carretero and Montanero (2008) consider that the discipline has the responsibility to contribute to society's understanding of the historical evolution as well as to perceive the reason for the events. It is a complex discipline that involves abstract thinking; therefore, it is not easy for everyone to understand and assimilate it, so it is necessary to address the cognitive and cultural aspects. For this, ICTs can accompany the process.

Romero-Morante (2001 pp. 130-157) already qualified the use of technological resources in the study of history as important. He argues that they can predict innovation or simply mask a traditional framework. ICTs should enhance the set of students' abilities or intelligences, which is why it is necessary to implement pedagogical proposals with simple and effective tools; for example, design presentations where it is possible to transmit ideas, images, or graphics with quality information. The author enriches his presentation by proposing the use of maps with interactive challenges, Google Maps, or Google Earth to explore and find countries or geographical areas, and to investigate their organization in time and space. In this way, individual and collaborative learning is stimulated by accessing the knowledge of the historical context.

The author concludes that well applied ICTs will be a valuable resource for developing competencies in educational challenges.

Adell, et al. (2018), reflects that the use of technology contributes to a new way of being a teacher. Undoubtedly, there is a paradigm shift where, among other resources, digital whiteboards, E-books, and mobile devices intervene, highlighting the need to act to be in line with reality.

Multiple Intelligences

Gardner (2001), American psychologist and educator in the eighties, presented a model of conception of the mind, called "Multiple Intelligences." A new vision that broadens the scope of human capacity, going beyond IQ, breaking with the traditional model of intelligence, exposing that they are a set of talents, skills, and abilities that interact autonomously. They operate in an independent way and at independent levels; their work is coordinated to solve complex contexts.

For Antunes (2008), the fact of thinking in MI triggered a plural perception of the mind where biological factors are related, those that make it possible to generate and develop cognitive abilities and skills. This responds in certain circumstances to the interaction of the human being, in the case of acting individually and even more, when acting collaboratively. For example, when he can excel when playing a musical instrument, when playing field hockey, when reasoning in a logical-mathematical way, or when he can tell a story. These actions motivate, excite, and give the student confidence.

It should be noted that Valverde-Berrocso, et al. (2010), in " Educational policies for the integration of ICT in Extremadura," state that even if there are improvements in classroom equipment and programs present innovations, there will only be success when teachers implement them to develop competencies.

Castro-Vega et al. (2014) also refer to the need to strengthen teaching strategies by promoting Multiple Intelligences. The proposal carried out by these authors was in a Colombian institution, combining games and technologies. They concluded that improvement would be more favorable with pedagogical intervention.

Gabarda-Méndez (2014, p. 4), in " Multiple Intelligences, a teaching perspective," states that, by considering the TMI as a disruptive approach within psychology, it expands to education, this is a substantial paradigm shift by moving from "a rigid, homogeneous concept where the assessment of academic results predominated to a much broader and heterogeneous vision of intelligence." Gardner (2005), quoted by the author, also emphasizes the possibilities that teachers have in promoting the types of intelligences in a simple and practical way. The following is a reference to proposals considered significant for the area of History and its context.

Linguistic Intelligence: It is possible to use books and reading materials, organize contests that enhance the learning of the study content, play board games, or online games, such as Scrabble.

Logical-Mathematical Intelligence: Different classifications, enumerations, data graphs can be used through a logical construction. Also, strategic games that respond to the theme of the moment.

Body Intelligence: It is comforting to relate the movement of a direct skill, when listening to music with historical reference, as well as to interpret it in a corporal form and that at the same time has relation with a content of study, an example would be an Egyptian, Arabic dance or a tango that make reference to a certain culture.

Spatial Intelligence: It is convenient to use graphic arts through books and audiovisuals such as videos, animations, and presentations from computers.

Musical Intelligence: It is possible to use music to carry out the proposed activities, such as introducing sounds and basic musical instruments. Always according to the topic of study, such as native music.

Naturalistic Intelligence: Using geographic spaces and organizing outdoor activities or excursions to historical museums in virtual form is favorable for studying space and thinking about the context in a natural way.

Interpersonal Intelligence: Collaborative work groups can be organized where students interact, conduct discussions, and other training activities.

Intrapersonal Intelligence: It is important to reflect, verbalize decision making, and motivate capabilities on a constant basis.

Armstrong (2017) highlights the Theory of Multiple Intelligences (TMI), recognizing Spearman (1923), who presents the dimensions on how the aptitudes configure intelligence, the contents or perceptions, and the ways of operating. Everything that involves the procedures and the final product.

The great challenges of MI also serve as a support to manage diversity and accompany the processes of integration and inclusion of students, those with special needs and those with high abilities. It is a way to value and experience personal skills. And even more so when ICTs are used in educational proposals.

Currently, the knowledge model, Technological Pedagogical Content Knowledge (TPCK), was presented by González (2017) as novel and necessary in academia. A proposal that should be considered when implementing technologies effectively in educational practices. The knowledge that integrates it was contributed by Koehler and Mishra, in reference to disciplinary (CK), technological (TK), and pedagogical (PK) contents. They state that the success in using ICTs in education will be when the teacher manages to articulate his knowledge with the specific content in a deep and quality way, and then add technology to it.

López-Espinosa et al. (2018) comment on the importance of facilitating ICTs to interact in teaching, and that, in turn, it favors the development and acquisition of skills that allow the teacher to use tools and applications in a didactic way in learning environments.

In order for these concepts to be optimal for learning, the permanent changes established by the Information and Communication Society, which are neither automatic nor immediate, must be taken into account. For this reason, State policies on ICTs in the pedagogical environment are needed. Lugo (2016, p. 119) says that, "This translates into the need for digital technologies to be at the service of innovation processes and improvement of the quality of student learning." For this to become a reality, the focus should be on teacher training; it is worth considering that several countries in the region are already providing a training space on the use of these strategies.

For Fernández-Piqueras (2009, p. 115), teacher training is important because of the need to have "an intercultural attitude and aptitude, mediated by very significant aspects with current technologies, which break the simultaneity of space and time in which different cultural models are present".

Marcelo (2013, p.30) states that "innovation needs innovators." In any environment there must be people who are excited and committed to implement changes in the usual practices.

This project was designed to strengthen the learning of History with the use of ICTs, in addition to privileging the skills of the intelligences; for this, teachers and managers with continuous training are needed, capable of looking to the future and accepting the challenges promoted by the information society. The purpose of the study is based on incorporating powerful and innovative educational projects, with resources such as WebQuest as a support and complement to PBL, deepening the skills to improve learning. In this opportunity, the main hypothesis is highlighted, "The greater the use of Information and Communication Technologies, the greater the development of Multiple

Intelligences in students of Higher Secondary Education, of the Social Sciences modality of the Instituto Adventista Florida and the learning of History in a secondary school case." And the secondary schools:

- 100% of the ESS students of the Social Sciences modality of the Instituto Adventista Florida, during the 2019 - 2020 period, use Information and Communication Technologies in the subject of History.
- Students use at least six types of Multiple Intelligences in the study of ESS History of the Social Science modality at Instituto Adventista Florida during 2019 - 2020.
- The level of learning in History, on the part of ESS students of the Social Sciences modality of the Instituto Adventista Florida during the 2019 - 2020 period, is advanced.

Method

The inquiry was focused on a case study, where Multiple Intelligences and Information and Communication Technologies were combined; for this, it was necessary to consider new ways of teaching in different scenarios. A mixed approach research, of non-experimental type and concurrent triangulation design, DIATRIC, where the concepts of the study variable and the category of analysis converged with their own characteristics.

The IAF's Secondary Education population, at the time of the study, had 340 students. The research was designed on the 74 students of ESS of the Social Sciences modality (4th-6th year). Fourteen teachers participated, 12 teachers of Social Sciences and 2 of Educational Informatics, plus 8 directors: general director, vice-directors, pedagogical advisors, and specialists of the school orientation team (E.O.E.). They all responded to the survey on the "Academic use of ICTs in History" and to the interview "The application of Multiple Intelligences." The instruments used were created with Microsoft Forms and processed with Excel and CmapTools personal management software.

For the opinion survey on the use they make of technology, a Likert scale with five levels was used: Always, Almost always, Sometimes, Almost never, Never. And for the interview, questions were asked about what resources they consider important to develop the skills of the intelligences.

E.O.E. professionals and teachers from the area participated in the development of the tools, providing support and guidance. Once the options were created, they were sent to four experts for consultation. After including their contributions, the pilot test was applied, and later the same was done with the research subjects.

The information to explain the variable was extracted from 16 questions on the (see) "Academic use of ICTs in History" of the survey. It was applied to twelve History teachers, two Educational Technology teachers, and eight directors, focused on activities where technology benefits the skills of the intelligences.

For the analysis, an operational average was established between 80% - 100% as favorable response, being greater than or equal to 80% of the total of the subjects interviewed. The responses related to the options Always or Almost always were considered unfavorable with responses equal to or less than 79% of the total number of respondents, related to the options Sometimes, Almost never, or Never.

The information to explain the category (see), "The application of Multiple Intelligences," was extracted from the interviews conducted on what they considered

important to develop the skills of the intelligences. For this treatment, CmapTools was used as management software to classify and analyze the data obtained.

In order to investigate the academic use of ICTs and interpret how the intelligences are applied in History classes, it was decided to find out how students learn. Therefore, two instruments were used to collect information, a survey and an interview. The first one to measure the students' opinion regarding the acquisition of knowledge, with the items of the dimensions of learning, according to Kolb (1984): divergent, assimilative, convergent, and accommodative (see), learning styles survey. And the interview was focused on the aspects considered useful for the appropriation of skills, (see) use of resources and skills in class.

Results

Educational professionals

In each of the tests, the items of the instruments used were analyzed, always within a referential and theoretical framework. In the case of the survey on the study variable, "Academic use of ICTs in History," there were 16 queries measured with a Likert scale in order to endorse its application and preserve the reliability coefficient. The participating groups stated statements or judgments.

The 16 items on the use of ICTs in classes to favor the skills of the intelligences in History are presented below.

- The first one refers to whether "They present activities for the student to develop word processing skills."
- The second, if "They present audio recording activities for the student to develop interviewer skills."
- The third asks, "Do they present activities with mind maps so that the student can develop synthesis skills."
- The fourth, whether "They present playful activities so that the student can develop coordinated skills".
- The fifth question, "Do you present activities so that the student can develop information search on the Internet."
- The sixth, if "They present activities so that the student can develop musical skills."
- The seventh, if "They present activities for the student to create visual or audiovisual/multimedia presentations using ICTs."
- The eighth question asks, "Do you provide activities for the student to film?"
- The ninth, if "They present activities so that the student can develop graphic skills mediated by generators."
- The tenth question, if "They use virtual platforms to accompany the teaching and learning process."
- The eleventh, if "They use the institutional computer lab and/or digital classrooms."
- The twelfth question, "Do you use technological tools for the development of methodological projects?"
- The thirteenth question, whether "They use ICTs in teaching history."
- The fourteenth, whether "The use of technological resources in the classroom serves to process information skills."
- The fifteenth examines whether "The use of technological competencies in the classroom favors collaborative work."

- The sixteenth, whether "The use of ICTs in the classroom is useful in problem solving."

Table 1 shows the total percentages of favorable and unfavorable per question of the survey.

Table 1
Summary answer by question.

Questions	Teachers		Managers	
	Favorable	Unfavorable	Favorable	Unfavorable
1	93	7	100	0
2	57	43	50	50
3	79	21	75	25
4	79	21	75	25
5	86	14	88	13
6	50	50	63	38
7	86	14	100	0
8	64	36	75	25
9	57	43	75	25
10	100	0	100	0
11	79	21	75	25
12	86	14	88	13
13	100	0	88	13
14	93	7	100	0
15	100	0	75	25
16	93	7	63	38
Average	81	19	81	19

Note: The totality of favorable and unfavorable responses of the research subjects is observed.

Figure 1 shows the total average of favorable and unfavorable responses to the use of ICTs in history classes.

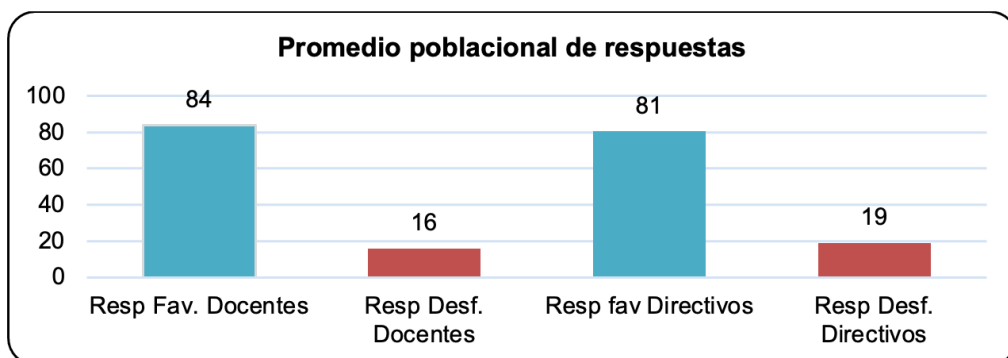


Figure 1. Population average of responses.

Note: Symbology: Resp. = response; Fav. = favorable; Unfav. = unfavorable.

In the interview on the category of "The application of Multiple Intelligences," 10 questions related to the development of intelligences were asked to the same research subjects. The data were processed and presented through the management of CmapTool. The queries made are presented below.

- The first question asks what ICT resources do you consider important for developing communication skills?
- The second, what aspects do you consider important to develop spatial skills?
- The third, what aspects do you consider important to develop logical-mathematical skills?
- The fourth, what aspects do you consider important to develop body skills?
- The fifth, what aspects do you consider important to develop musical skills?
- The sixth, what aspects do you consider important to develop interpersonal skills?
- The seventh question, what methodological projects do you use in your classes that favor the development of Multiple Intelligences or skills?
- The eighth, what are the skills that are developed in your classes?
- The ninth, which skills were most developed in your virtual classes?
- The tenth, what is the use of the computer lab and/or mobile classrooms?

Table 2 shows the skills with the greatest coincidence among the research subjects by question.

Table 2
Highest matching skills

Questions	Educational professionals Outstanding MI skills
1	<ul style="list-style-type: none"> • Word processors, • Read.
2	<ul style="list-style-type: none"> • Mind maps, • gamification.
3	<ul style="list-style-type: none"> • Mental calculations.
4	<ul style="list-style-type: none"> • Balance, • displacement.
5	<ul style="list-style-type: none"> • Singing, • use instruments.
6	<ul style="list-style-type: none"> • Collaborative activities.
7	<ul style="list-style-type: none"> • ABP.
8	<ul style="list-style-type: none"> • Cognitive, • linguistic.
9	<ul style="list-style-type: none"> • Communication, • information management.
10	<ul style="list-style-type: none"> • Collaborative work.

Note: The table shows the skills with the highest coincidence in the research subjects.

The response of the participants was based on their teaching work, emphasizing methodological projects, specific learning skills, the use of the laboratory and the mobile classroom.

The statistical results of the survey respond to the use of ICTs, and those of the interview express the use of technologies to favor the skills of the intelligences.

Alumni

Figure 2 shows the results of the survey on the dimensions of ways of learning. Concrete experimentation, EC; abstract conceptualization, CA; active experimentation, EA; reflective observation, OR; and the totals of the answers given. The survey had the purpose of knowing the students' strengths in order to achieve better results; it was conducted on the 74 ESS students of Social Sciences and processed in Excel software.

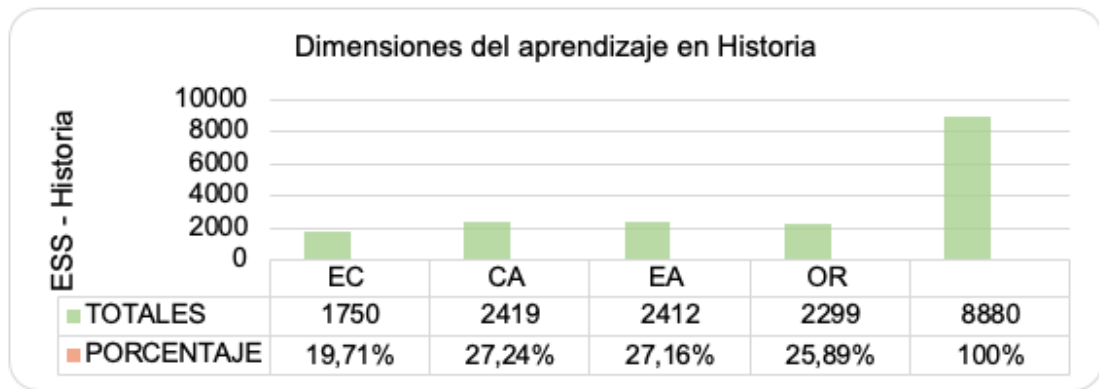


Figure 2. Learning dimensions in percentage.

The interview with the students was designed to focus attention, synthesize, verify, and see their point of view. The questions were the following.

- What did you think about working with technological resources in History classes?
- What was the resource that caught your attention the most?
- What concerns did it generate in you to work with different resources?
- Were you able to understand the historical period of work?
- What is the argument to prove that you appropriated the knowledge and in turn the resources?
- What did you do well and what should you continue to do to keep building your knowledge?

This yielded some significant results. In the first question about whether they used ICTs in class, 70% answered always, 25% almost always, and 5% sometimes. The second question, related to the resource of greatest interest, the result was 40% for dynamic presentations and 33% for timelines. Word processors and the use of videos resulted with the same percentage, 11%, closing with 5% other resources. The third question concerning the use of technology, 65% responded that it helped them to understand the subject, 33% motivated them to study and continue researching, and 2% were bored.

In the fourth question, which deals with the comprehension of the historical period, all of them answered yes, and in the fifth question whether they were able to appropriate the knowledge, 93.3% answered in the affirmative as opposed to 6.7% who answered in the negative. When asked about the appropriation of knowledge, there were favorable answers, some examples, 'To recognize historical stages previously unknown,' 'to be able to understand and give an opinion,' or 'To explain the subjects with my own words.'

In the question about what to do to continue building knowledge, 5% responded that they do not know, the rest of the answers were significant. Examples such as, 'adapt to changes,' 'do good comprehension of texts,' 'put more work effort,' and 'befriend technology'. And among others, 'study what I am interested in,' 'research, read, reason,' and 'watch documentaries.'

The proposals designed for the students were answered individually and could also be discussed. The answers were analyzed, processed, and graphed in Excel software for further information.

The concurrent triangulation design study, DITRIAC, favored the meeting of findings between the routes and the theories consulted. In such a way as to cement the

interpretations extracted from the information collected and to highlight them as possible convergences.

In general terms, it should be considered that the survey, for the sole purpose of the study, is favorable for the research subjects, teachers, and managers because it reaches the established parameter of 80% according to the operationalization.

The "Tools for word processing," such as Microsoft Word; "Tools for the use of presentations," PPT, Tiki-Toki, and Prezi; "Learning environments" and "Use of ICT resources for information processing" stood out with 100% over the established parameter of 80%.

The rest, such as mind maps, gamification, film production, and others that favor problem solving are gradually being consolidated, as are laboratories and mobile classrooms. Three are below expectations, those for musical use, audio recorders, and graphic generators.

As a result of the interview, teachers emphasize communication, body, music, and interpersonal development skills. In the methodological context, Project Based Learning, the development of cognitive skills in the classroom, and communicative skills in other learning environments stand out. Differences were observed with the responses of the managers who emphasized logical-mathematical, bodily, and musical skills. However, they coincide in PBL, also in the cognitive proposals in different environments, the major finding recorded among the interviewees. The use of the laboratory/mobile classroom was perceived as very favorable for developing computer programs, while teachers mentioned it in a lower percentage.

The qualitative analysis allowed for an interpretation of the teachers' opinions on how to develop the skills.

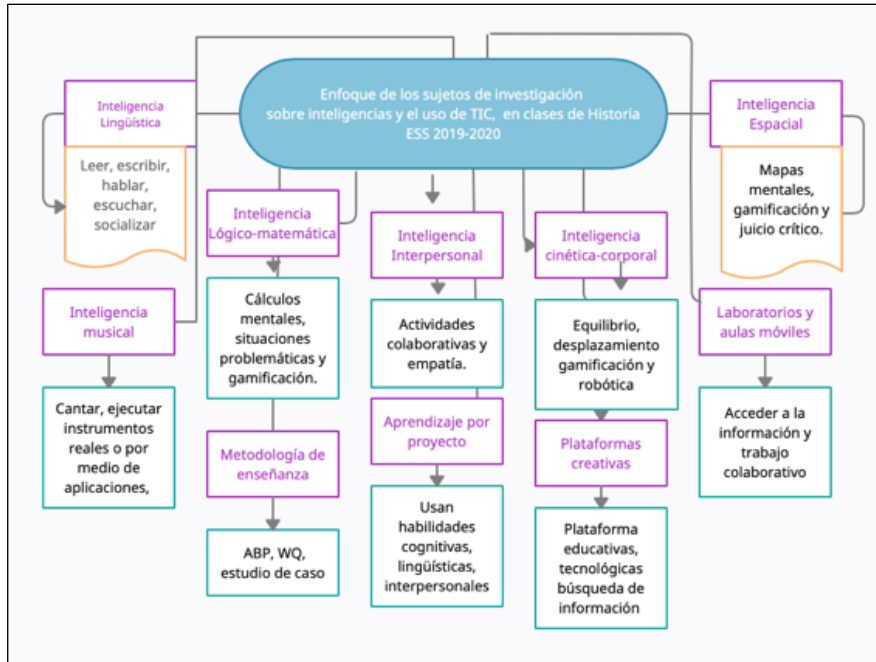


Figure 3. Relevance in the category of analysis.

Note: The research focus on MI and the use of ICTs can be seen. Own elaboration.

Discussion and conclusions

The survey determined that text processing tools, the use of dynamic presentations, learning environments, and the use of ICT resources to process information were considered as the most outstanding technological proposals in the teaching of History. The data extracted from the interview emphasized cognitive, communicational, corporal, musical, and interpersonal development skills in a methodological context where Project Based Learning predominates. Although these data are encouraging, it does not imply that the acquisition of knowledge is automatic; therefore, methodological components are necessary to generate knowledge.

The extracted findings are related to the objectives of the study, all related to the ESS students of the Social Sciences modality of the Instituto Adventista Florida during the 2019 - 2020 period. The first one, to establish the use of Information and Communication Technologies in the learning of History, which was assisted by the treatment of the study variable 'Academic use of ICTs in History,' with the main finding the 'learning environments,' referring to the use of virtual platforms both e-learning, b-learning in the teaching and learning process.

The second objective, determine the development of Multiple Intelligences in the study of History, was established through the category of analysis 'The application of Multiple Intelligences'; determining that the 'communication skills,' which respond to the Linguistic Intelligence in which the skills of writing, listening, speaking, reading, and socialization have an impact, are the most outstanding ones.

And the third, identify the learning of History, with the findings extracted from the routes and theories consulted, allowed finding convergences between the variable 'Academic use of Information and Communication Technologies in History,' and the category of analysis, 'The application of Multiple Intelligences.'

Limitations

In analyzing the results of the research, there are some points that could be improved in order to provide comprehensive teaching.

While it is true that there are good proposals with technological uses and attempts to deploy skills, it is necessary to delve deeper into the techno-pedagogical field so as not to lack support. Technologies are powerful tools that are reflected as teaching and learning alternatives; however, they should adapt to new models and move away from old paradigms to favor transformation and change.

Developing the skills of the intelligences through strategies should be a turning point, with interdisciplinary experiences for the progress of all.

For this reason, the educational institution must be involved in improving technological equipment, and favor professional training on an ongoing basis.

Implications and proposal

According to the context, when opening the doors to the new challenges of the 21st century, it is necessary to generate a new organizational culture that incorporates educational innovation.

Students today have the knowledge of some digital systems and, by the mere fact of being familiar with their use, they are favorable for teaching disciplinary contents. Hence, an innovative proposal, where the teaching is framed in the WebQuest format, interacting with the PBL, always accompanied by strategies that have the purpose of making the classes more enjoyable, where the students learn to use them make the classes more enjoyable, where students learn based on the use of ICTs and the development of the skills of the intelligences.

Nowadays, computational thinking is promoted, as it favors logical reasoning, management and learning to solve problems. This benefits the expression of ideas,

sharing solutions, designing and creating through games, and programming environments. And to dynamize the classes and the learning of History, at a certain moment the use of Scratch and Micro bit was implemented, involving the learning of programming language in blocks, in addition to the board, both focused on creativity and logical thinking. This presents a great opportunity to work multidisciplinary projects, where teachers of Science and Technology area can be a part of and teach these programs, forming a pedagogical partner in order to clear all doubts.

It is highlighted that, in order to identify students' learning in the teaching context by relating the academic use of ICTs in History, with the ways in which teachers consider applying Multiple Intelligences, it is conclusive to respect students' ways of learning.

The incorporation of more powerful and innovative instruments serves to learn how to use the tools, strengthen the intelligences and, thus, learn history in a more meaningful way. Therefore, the research hypotheses were accepted.

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