

## Uso Pedagógico de las TIC en el Aula

### *Pedagogical use of ICT in the classroom*

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### RESUMEN

Este documento describe los procesos de desarrollo, aplicación y evaluación de una intervención pedagógica, la cual puso en práctica un conjunto de estrategias para contribuir a la formación crítica de los estudiantes de educación secundaria. Se llevó a cabo en la Secundaria Técnica No.27, en la ciudad de Querétaro, en el estado del mismo nombre, durante el periodo escolar 2010 – 2011.

Esta Intervención Pedagógica está sustentada en el paradigma constructivista y propone el uso de la computadora y de dispositivos móviles, tales como el celular, el mp3, agendas portátiles, entre otros, como herramientas del trabajo cotidiano en el desarrollo de los contenidos inherentes al programa de la asignatura “Educación Tecnológica” del segundo grado de secundaria. La intención fue llevar al aula los dispositivos tecnológicos y las habilidades adquiridas previamente por los estudiantes sobre los mismos, con el objetivo de contribuir tanto al aprendizaje como uso racional y crítico de los mismos. Como resultado de la intervención, hubo cambios significativos en la resignificación del uso de la tecnología y en sus procesos de aprendizaje.

**Palabras clave:** Educación, Aprendizaje, TIC, Intervención Pedagógica.

### Abstract

This document describes the processes of development, implementation and evaluation of pedagogical intervention, which implemented a set of strategies to contribute to the critical formation of students in secondary education. It was held in the Technical High School No.27, in Queretaro City, in the State of the same name, during the 2010-2011 school year.

This educational intervention is supported by the constructivist paradigm and proposes the use of the computer and mobile devices, such as cell phone, mp3, portable agendas, among others, as tools of everyday work in the content development inherent in the program of the course "Technological education" of the second grade of high school. The intention was to bring to the classroom technological devices and skills previously acquired by students about the same, with the aim of contributing both to learning as critical and rational use of them. As a result of the intervention, there were significant changes in the resignification of the use of technology and in their learning processes.

**Key Words:** education, learning, ICT, pedagogical intervention.

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## INTRODUCTION

The impact of the Information Technology and Communication (ICT), in the last two decades has been impressive, in some fields such as engineering, medicine, tourism, chemistry, architecture, mathematics, finance, and in many more, things have changed significantly with the passing of the years and, in some cases, have had to completely redefine all forms of work. It seems that with these technologies the world was not as big as it really is, even changed our perceptions and ideas of physical and geographical distances.

However, accused a paradoxical situation, since you can have available enormous amounts of information, and not be better informed; they can obtain definitions and data immediately, but not sure of its accuracy or meaning. That is why now come important skills such as the ability to discriminate information and criteria to select it; having the ability to apply it to real and meaningful situations; as well as possessing the ability to use with adequacy and solvency the technology in the fields of study and/or work.

On the other hand, when we turns our eyes to Education, it seems that for the case of school institutions, and specifically in the classrooms, the time has passed slowly, that the influence of ICT has not reached them completely, in other words, the impact, has not been as significant as in other fields of work, and referring in particular to the actions of the teacher in the classroom, to materials which sometimes used for the development of your

matter, learning objectives, to sources of information, among other things, it has gone unnoticed.

This invited the authors to the following approach, how you can, through a prospective vision, address and attempt to resolve the challenges through an intervention, which is in a position to guide us in the use of media and information and that in turn fosters in students reflective, critical and rational use of them. Allowing be in a position to achieve a construction -a from the information and data received, aims to significant knowledge and tailored to your reality.

How can you encourage students / as skills that are at the height of today's technological world, enabling them to develop and evolve in the best way possible?

And it is precisely for the above approach comes this proposed procedure, which is based on the technologies which are accessible to students and those who have appropriated and used on a regular basis, either to communicate, entertain, organize, integrate socially, (cell phones, MP3 players, laptops, PDAs, cameras, cameras and VCRs, etc.) as tools to develop the themes of the subject technology in the secondary level.

To expose the work, we organize the presentation of three basic sections: The way we approach the object of study and we show the problem through an educational diagnosis, we will call the elements of contextualization, the proposed intervention itself and, finally the results obtained therefrom.

#### **The elements of contextualization.**

This procedure was performed at the Technical High School No. 27, located in the city of Queretaro, a conurbado ejido largely peasant population engaged in agriculture (for sale and consumption), trade and the provision of such services as plumbing, construction and / or employees of nearby industries to the town.

Currently the ejido is almost completely immersed in the urban area, surrounded by subdivisions of residential, issue conferred a school population of unique features, because very young and different social strata contrasting mix.

The result of this cultural osmosis, is a complex set of relationships at all levels and elements involved in the school. Similarly access to technology is differentiated, and that while most of the students / as living in residential subdivisions to have computer and internet access on a personal level, high performance cell phones, MP3 players and mp4, peers are restricted his

access to technology, reducing to own a cell phone with average benefits, MP3 players and go to the internet cafe three sites that exist in the colony.

In addition to this, we find from the curricular and administrative fields, which not only is not explicitly technological skills training He stated cross training in the management of information-but nor is there an institutional approach or proposal methodological originating from the same coordination, aimed at developing educational work on technology. The little that takes place in the classroom in this sense, is at the initiative of some teachers, including issues related and seek equipped so that it can carry out, not always successfully.

To elaborate on this through interviews conducted with teachers, they were able to identify two types of problems: Technology and Education. With respect to the first mentioned, that technological resources -when any, need to be in good condition to provide adequate service, which is directly related to financial resources. The institution is the responsibility of teaching the computer workshop keep them in good condition. Referring to teaching, educators say that there is an underutilized technology resources and preparation technologies qualify as poor.

In this regard it should be noted that although most teachers perceive ICT as auxiliary tools, not incorporated into the learning process, Colly Monereo (2008) report that about:

... Not in ICT or its own specific characteristics, but the activities that lead to teachers perform and students thanks to the possibilities of communication, exchange, access and processing of information afforded by the ICT, we must seek the keys to understand and assess their impact on school education, including the effect on learning outcomes (p.79).

Also, teachers who are regular users need technologies but recognize they need relevant training. Moreover comment

it is good use and handling, but do not clarify how, just do not determine exactly what would be the direct benefits for them and for students / as derived from common and rational use of technology.

In relation to students is relevant to mention that, derived from socio-economic conditions of most of the alumni / ae of the institution, very few have the opportunity to use the computer constantly 23%, while almost all other states that hardly occupies 72%.

However, students who show a frequency of regular use, note that is 35% of the time we used to play and to keep in touch with friends, while for issues that could be considered more on the school is the rest with research and homework 31% to 34%. So the use of computer equipment among youth of the institution is well balanced between the three main activities, fun, homework and research.

With regard to where the student uses the computer most often, 49%, states that it is at home; following him the cafe with 46%, and the school or media room with only 5%.

They manifest also relevant way that is motivating for them to work with technologies 88%, although there are a significant number who do not feel motivated to work with them 12%. However, a constant present on each occasion that talks to young people about technology, it is the majority opinion that simplifies things they either work or research while intellectually challenging for them not knowing any program or application and have to use it to solve a need, which is encouraged by the ease of use of new graphical interfaces

While not considered much of them as experts in computer use they are recognized as regular users of technology, and it shows that keeping a positive attitude towards the increased use of it.

As can be seen, it is clear that young people in the area of technologies are developed in conjunction with their teachers regarding the use and management of ICT, there is no evidence that teachers generally take the necessary steps to try to save the technological gap mentioned above.

Based on the foregoing, it can be corroborated in the teaching act where the primary and leading to the achievement of the objectives proposed in the plans and programs of study is part applicable. Teachers now face the challenge of using ICT in order to provide their

students / as the tools they need in this century. It is imperative then implement a set of activities from intervention in order to bring about change and educational knowledge in education present reality.

The process of pedagogical intervention

The general objective that guided the proposed educational intervention consisted of implementing the pedagogical use of ICT in the classroom, through the application of learning strategies to improve academic achievement and knowledge construction.

Additionally it was intended:

Design, implement and evaluate a set of cooperative learning strategies through electronic devices that can access the student / a; and to promote an educational way the development and improvement of skills in the alumni / ae to use ICT.

Thus, the goals that were raised for the project intervention were primarily qualitative, and preponderantly were formed in two ways:

a) Comply with the official purposes b) Contribute to meaningful learning, using ICT pedagogically, to say:

- Comply with the specified learning outcomes in the curriculum, as well as contribute to the formation of the graduate profile of the alumni / ae of Secondary Schools
- Contribute to an improvement in the quality of teaching and learning.
- Digital literacy student / a, should acquire basic skills in the use and management of ICT.
- Innovate in teaching practices, in order to harness the potential of technology.
- Convert the carpentry workshop in a more efficient and productive space.

The proposed methodology is part of a constructivist pedagogical approach, ie, students / as build their learning from their knowledge and interrelated interacting with their peers. With the proposed activities was intended to favor dialogue, active and equal participation and contextualization of the contents of the curriculum, to place them in the immediate environment of students.

The whole process was conducted using four intervention strategies:

Strategy 1 "Group Proposal"

This strategy raises the aim to involve and integrate all pupils / as in creating a project in relación con technology workshop, which will take place during the quarter. This, by writing, by alumni / ae and teacher, of a set of project proposals to choose from, taking as a criterion for choosing the coverage as much or all of topics and subtopics for the program.

Strategy 2 "technological scenarios"

Discuss with students the possibilities that current technology provides communication and information, mainly that have at their disposal, in order to assess the uses that are given, and propose a renewed form of use, trying to encourage the above student creativity in the information and communications technology, leading it to develop independent thinking and the ability to analyze and criticize the uses that the student group gives current technologies.

Strategy 3 "Digital Literacy"

Train students in the use and management of technological tools, the computer first and then in the efficient use of the application software of conceptual maps and graphic organizers, to communicate effectively both as a graph schematically.

Strategy 4 "Intelligent Search"

Guiding the student / a over the proper use of Internet search engines, so that they can search for accurate and targeted manner, choosing sites where the information is desired and also possesses the reliability criteria intended for it.

Similarly the tools used as technological support of it were:

a) The Novel Technology

This tool consists of essay writing on the same topic in three or more parties using a device to capture information. The importance of this tool lay in the possibility of drafting texts into the workshop without the need to use a conventional computer, while diversifying the use of cell phones.

b) The Podcast Content

This tool is to record an mp3 via electronic device, the voice of the students / as. Una of the main reasons for using this tool is primarily on leveraging technology students / as brought to school regardless del a Celular phones as devices mp3 players, mp4 files.

c) Trades on YouTube

Students / asse recorded on video using any portable electronic device (cell phone, video camera, etc.) performing a teaching activity, preferably related to the emphasis of the workshop.

d) Educational Publications

This tool involves the generation, scanning and document scanning, in addition to production of these in PDF format. The former allows the student / to express their opinions about a topic, in writing and given by reference documents published on the Internet, an important element here is the proper selection of information sources, criteria to be discussed in full the group, and will serve as a basis for further substantiation of the selection by the alumni / ae of your own reference sites.

The results of the intervention

In developing the strategy a significant increase in the interest of young people in participating in teams, as evidenced by strong participation in the group and enthusiastic within teams, it was evident also perceived a change in the traditional use computer equipment when working in a school investigation (by some young people), which is seeking some related topics, copy text from the screen and paste them on a sheet of a word processor, in this case there was a target research and a desire to propose a project that was chosen by classmates. The purpose transcended the use of technology, which was seen only as a means to an end, about Cebrián de la Serna says:

1. There are positive evidence when technologies are used especially in motivation and attitude of students, and also especially to create a variety of methodological strategies for teaching. Similarly, percentiles [harvesting] are higher when they are being used technologies in teaching: students learn more in less time.



2. There is evidence in some studies of how learning technology is less effective or even ineffective when learning objectives are unclear and technology arises diffusely. Likewise, for many different areas studied they have not shown positive effects because of using or not computers (2009, p.21).

The general perception of how this strategy was good, because the original intention was to capture the interest of alumni / ae, a situation reflected in the photographs taken during the presentations of the projects -where the focus on evidenced rapporteur The quantity and quality of the questions during the same yen the amount of accessed Web sites for information, on average 18 per team. Technology was used differently, increasing productivity chuch group and obtaining resultados.La difference here was the creativity shown by young people, through the search for new practices, more creative and adaptable to the context. In this sense Cebrián de la Serna says: "... behind every seemingly simple good practice with technology there is also a network of socio-cultural variables, historical, psychological... in users" (2009, p.27).

In the second strategy (Scenarios Technology), and made the list of features of their mobile devices, it was observed that most young people are frequent users of its technology, ie, they present their funcionesy capabilities, using them when they have opportunity, which gives regularmentese out of school, when sharing music files, they record their own videos, play and entertain, among others; precisely, are those activities which tries to bring to school with an educational purpose.

Derived from conversations between alumni / ae, who expressed some unauthorized use by teachers of these devices, such as assisting in examinations, in exhibitions or internet searches of concepts challenged, teachers used the situation to request the group's development of a written reflection, which manifest where are the positive and negative aspects of having the freedom to use these technologies in the workshop, with free access to Internet and with the authorization of the teacher. Resulting from the above, expressing opinions emerged:

"I think it's good, is positive, no longer have to go to cyber all the time, and hopefully give us a chance to use it all day," HRCA, scratchpad

"It is a good idea, and hopefully could be done in other materials ..." BOD, scratchpad

"It would be great to use here in the shop, that's progress as human beings, technology needs to be used" HCMA, scratchpad

Which gives a clear idea that the majority of young people have a positive view on the use of technology and a permanent attitude and try to keep close to their actions and style vida. Al integrated technology to life people, the appropriate time slots available, to be used as an aid in student or work life, it is then that it becomes commonplace, everyday something and begins to pass unnoticed; It is the starting point of the actual impact on the lives of people:

Cognitive changes are not fast. We have taken many centuries to determine the influence of the thinking and writing is not possible to know how information and communications technology will alter our cognition. What does seem clear is that the alteration will not for the fact of using computers occasionally, but when there has been an appropriation of (Gros, 2000, p.32, 33) technology.

Another interesting during the development of this strategy was the stage at which the students shared information between their mobile devices, because it was perceived at that time that technology was not the target or focus of the alumni / ae but only a means, information sharing and quality was central. This was evidenced when, to detect some failed transfers, because the devices had protocols with some differences in version (which resulted in lower resolution files, videos without sound), the attitude of almost the majority of young people shared faulty files; They tried in various ways, causing delayed transfers to other devices, downloading to computers, using format conversion programs, including investigating the characteristics of audio and video formats "to know more" (FJJA, Journal of Teacher), committing with the task of exchanging information, leaving aside the possibility of other activities, since the opportunity was real enough. In connection with the above Bruner (1988) Hernández (2008) comments:

"... Understand the educational processes as <cultural forums>. That is, as spaces in which teachers and learners negotiate, discuss, share and help rebuild codes and curricula in its

broadest sense: knowledge in which include not only the knowledge of concept, but also skills, values, attitudes, norms, etc. (P.230) ".

In this sense César Coll (2008) notes:

"... However, ICT and especially some applications and sets of ICT applications, have a number specific features that open new horizons and possibilities for teaching and learning and are likely to generate, when properly exploited, ie, when they used in certain contexts of use, dynamics innovation and impossible or very difficult to obtain in the absence (p.84) improvement. "

In the second strategy, digital literacy, use of concept maps, using the CmapTools application aroused due to the natural curiosity of students / as when using a different program to those who already know a great interest in exploring their capabilities and limitations.

This activity occurred involving alumni / ae who managed to identify functions and / or new features, which showed an increase in voluntary holdings of them in the development of the class.

When sharing work experiences, both the development of concept maps, and the use of the tool, students showed:

"At first I did not understand him, but after Graciela explained to me, I understood a little, and by the middle class became easier for me" (Journal BMDL teacher).

"At first I was confused, for me concept maps were otherwise not be in the machines (computers) it helped me" (Journal JRDA teacher).

Importantly, the application program used to have a graphical interface facilitates the use of the appropriation also organized to present information visually, clarifies thought, prompting greater participation, reinforcing the understanding and better structuring and subsequent concepts principales. In addition to being a self-assessment tool where the same alumni / ae can track the process of understanding and constitutes evidence of it.

According to Novak in Ontoria (2003) the conceptual map is consistent with an educational model that has the features:

- Focused on the student and not the teacher
- Which serves the development of skills and is not satisfied only with the rote repetition of information by students.
- It claims the harmonious development of all dimensions of the person, not just the intellectual (p.93).

Likewise for Boggino (2009) concept maps indicate:

- Organization holistic knowledge units or groups, ie when one of the examples is activated, the rest will be actuated.
- Segmentation of holistic representations interrelated subunits.
- Serial and hierarchical structuring of representations. In concept maps highlighting especially the hierarchy, in the same way that ignores important feature as temporary ordination

Strategies "Smart Searches" and "Technology Scenarios" dialogue and exchange of views on the possibilities offered by the Internet, just by knowing where to look and how to properly write the search request was promoted. The information caught the attention of the students were boolean<sup>1</sup> operators that are integrated into search words, which refine and sitiosconsultados files. In this regard, they manifested themselves that:

"For me it's like a process or experiments that have revolutionized our lives" (SPR notepad student / a).

<sup>1</sup> binary operators are used to combine words or phrases and refine the search, such as and (y), or (o), near (nearby), not (no).

"With a little effort and enthusiasm you can accomplish many things, just have to know how" (ITG Book student / a).

Situation showed the niche of opportunity that has to train students / as most critical, better informed and make better use of technology, to take charge of their own learning, who can distinguish what is the relevant information at the time who they need it and to take as their

own responsibility to build their knowledge, so that they are able to minimize the difficulties peculiar to the alumni / ae (Rivas, 2008) acquisition.

In short, through this strategy will influence the type and quality of the requests to the network, ie, the knowledge acquired served as the basis for the investigation of additional knowledge, with consequent mejorado process quality and for the benefit of learning itself.

Of which Begoña Gros (2000) mentions:

"Students use computers to practice with exercises designed to increase the fluidity of a new skill or remember one they already own. Using this approach assumes that students have previously received some training on the concept, principle or procedure to be practiced.

Features

- Provides a basic practice to enhance memory and maintain attention skills.
- You can also apply in the case of acquisition of psychomotor strategies (p.172)

Another goal achieved through the strategy, is that these improved information search results encourage young people to increase

time spent on research and / or homework, to therefore be more rewarding and productive use their mobile devices or computer.

Similarly, with the completion of video on mobile devices, the vast amount of knowledge that young people have demonstrated their devices, in addition to exchanging ideas to solve problems, which showed that the main uses that give technology are playful, because of the activities that mostly practiced as a means of entertainment is video recording, coinciding with the information initially diagnosed.

The exchange of information allowed the alumni / ae move from the abstract to the concrete, which was an important to equip them with the cognitive tools to be able to reflect their reality and achieve a better understanding of the same element. For which Valdes (2000) notes:

"The knowledge society, hovering your requirements in the workplace, in the development achieved by the sciences, professional and social life in general, requires creative individuals, to critical and self-critical spirit, ability to think, to learn to work in teams to deal with change flexibly, to assume responsibility for their professional and personal decisions. This kind of capacity can not be transmitted, are part of a new attitude that is the result of an educational process designed to these changes, then simply install many computers as new teaching resource (p. 127) ".

Moreover, we want to stress that the use of ICT within the strategies promoted collaboration among alumni / ae of the intervention group, when using mobile devices and computers with a specific objective in the classroom-workshop. In addition, students had the opportunity to explore different aspects of some programs that had used, to manipulate with a

different purpose, to experiment with application programs that had not been used, in addition to exchanging experiences and information in connection with the operation of the programs with their peers. Another perceived benefit was the use of social networks by pupils, not only in social activities, also proposed collaborative work.

Similarly through this intervention, aspects were handled in relation to the socialization, the availability of information to all members of the group contributed to lowering the barriers of individuality, promoting collaborative work, because the network and its contents were accessible and were available to allow them to share information obtained as well as their own, text, slides, video files, audio, etc., particularly during the implementation of the so-called "technological scenarios", same that served as a platform for exchanging data , views and information on the topics of technology, between the alumni / ae and their peers. Which does not diminish the quality of the relationship, with the fact that technology-mediated are only interacting in a different dimension; it was observed a transformation in the forms of interaction among young people, they went from a passive-receptive attitude to another-purposeful active with deobtener mood information related to the subject of processing, to produce and socialize, transcending this in the interpersonalesy relations inthe process improvement of knowledge acquisition. Well respect thereto (2008) says:

Therefore, in a broad sense, all our learning is social and culturally mediated, to the extent they arise in contexts of social interaction, such as family relationships, school or work and professional areas. Learning is a social activity that requires good education so as eating, dressing etiquette or dance with someone other than oneself [...] some learning outcomes can be considered specific social and cultural rights, to be

It originated in mechanisms of social transmission of knowledge (p.412).

To also be integrated into a dynamic work differently, involving all team members, motivating working autonomously and collaboratively, allowing at the same time and where appropriate, improving aspects personales. Del encouraged Similarly, feeling part of a group, a team, a community integrated into the tuck and help consolidate their aspirations and relationships fostered a sense of belonging, which was a key feature for cooperative work. Ferreiro (2009) mentions:

Cooperative learning is a form of organization of teaching in small groups [...] to promote the development of each of them with the help of the other team members.

Peer learning, as it is also called, it enhances the interaction of students in a group so that everyone learn the assigned content, and in turn ensure that all team members do, but this is reduced to Mere learning of knowledge (information) is also considered as skills, attitudes and values (p.26).

Finally, regarding the strategies implemented it could be said that the integration of ICT in the classroom is possible, guided by the teacher, who must know their risks and / or benefits when integrating, also you have to assess whether integration it adds value to learning, in order than a distraction that would alter the purpose of the activities. And teacher-of-the should also knowing how to use, meet their teaching to guide students / as well as accepting that this integration will require more effort compared to a teaching without technology, to train and renewal. Well knowing that this addition will get benefits (including the wealth of information available).

## CONCLUSIONS

It is appropriate to reflect on the role to be played by teachers in all this technological evolution, one of the main missions is to guide and promote student interaction with peers

about working together, it should also support and develop better environments learning through educational planning and addressing content.

We must take a self-critical stance that helps illustrate what areas have deficiencies, tie this vision with institutional, with the aim of appropriating a new educational model and be in the right to promote the comprehensive development of students.

We are immersed in an evolution that can not be reversed, it is imperative that our school system, institutions and teachers themselves, adapt to changes, our society is demanding that young people are formed integrally in turn they must of have sufficient knowledge and proper approach to address many problems and our own yet.

Currently we have technologies that we have not worked with sufficient depth or with the required commitment, for example, television. This means there is an amount sufficient and relevant information to meet the educational spaces with quality programs. The video; currently there are documentaries, movies and short films that have great educational value, that are not being utilized in our institutions.

Similarly, it is easy to fall into the easy criticism or immobility, simply by not having the right equipment to the needs of each space. Technological tools are finally that; tools. Even the most primitive technology is likely to be maximized. It is precisely at this time that the ingenuity of teachers, the knowledge of how students learn, lesson preparation and a genuine concern for young people, is highly significant.

Current and potential contributions of technology, present a serious challenge not only for educators, including teachers, parents, managers, etc. At the institutional level, to belong to a formal education system are evident actions undertaken by public bodies, to try to functional areas or spaces that are occupied or should be occupied by computer, without obtaining the desired results .

The role of the teacher as an agent of change that promotes the use of ICT, will be decisive, also comply mentoring functions with the aim that the student to appropriate use and management, so that it can meet when there is a need for information identify this need, the ability to work with different fonts, information overload control, evaluate, discriminate quality, the ability to organize and express their thoughts.



This implies that, as teachers, we become leaders in schools and play with innovation, creativity and risk, not fear and confusion that generate changes. And with these new horizons the role of teachers must be configured differently from the traditional concept - face, to the performance of some more significant practices, primarily as a mediator of learning situations, tutor, virtual counselor, among others.

Thus, the successful use of ICT will not be an accident, but through analysis, reflection and work will get results in learning. It should also be channeled to the also-students, to engage with their own learning, helping them to be more independent and responsible.

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