

The ICT application for the education sector: a platform for the scholar curriculum

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ABSTRACT

Education at its most basic, stems from a desire to preserve society. Our changing times, signified by a new educational reform, are an invitation to renewal, where teaching transmutes into an act of building in conjunction. The Technologies of Information and Communication (ICT) take on their meaning not only as a transmitter and disseminator of information, but as also as a medium of transformation. This study which is of qualitative character and situated in an exploratory paradigm, seeks to investigate the integration of the ICT into the Chilean educational system by referring to a group of teachers, administrative personnel, and students of the city of Talca, Chile. The general target of research is to propose a path to eventual incorporation of ICT into the teaching of specific subjects within the national curriculum: Language, mathematics, science, and history. The key findings demonstrate that the integration of ICT is incipient, affecting the motivation to learn, as well as pre-existing uncertainty in its use both due to the lack of training received by teachers and their lack of clear directives received. Thus, the implementation of a national educational platform which makes use of ICT is considered to be both feasible and desirable.

Categories and Subject Descriptors

Social and professional topic ~ Information systems education

General Terms

ICT, Education.

Keywords

ICT, teacher training, educational platform, students, motivation.

1. INTRODUCTION

The present work is conceived from a concern to know the state of art in relation to the use of ICT in our educational platform. While it is true that there exists the network Enlaces from MINEDUC (Chilean Education Ministry), the purpose of which is to incorporate technology into education through a variety of programs, the educational reality does not currently make use of its revealing findings, a fact which is reflected in the low performances displayed by students in the SIMCE (National Learning Results Evaluation System) test.

The latest SIMCE test results, dated 2013, show that there is a low use of ICT in the classroom, since “about 50% of the evaluated students fail to score the minimum established ICT skills.” [8]

Thus emerges the expectation to inquire as to the possible factors that would affect these results. We sought to learn how ICTs are used by a group of students, teachers, and administrators of our

educational system, as well as the impact of their use and the skills developed by the students.

It is therefore suitable to investigate the subject from a different, qualitative perspective, due also to our society’s immersion in the digital world, in which the archetype of a student is that of a “digital native” [16] which requires an education congruent with modern times. It is also relevant to investigate their perceptions respecting the use of ICTs in the process of teaching and learning, which, viewed with practicality, will allow to generate ideas of future change, investigations of greater scope, and possible generalizations.

2. CONTEXT DATA

Currently, Chile seeks to improve in educational matters. One of its initiatives, supported by the use of technologies for education, “provides pupils and students the tools that will enable them to handle the ‘digital world’ and develop it, using technologies in a competent and responsible manner” [12]

Enlaces was created by the Ministry of Education in 1992, “with the objective of constituting a national educational network between all the schools and lyceums subsidized by the government, and incorporate new technologies of information and communication into education” [7] Enlaces has been active ever since its inception, creating various projects to incorporate ICTs into the educational system.

“Up until the year 2010 there was no concrete data to quantify progress in this area, which would allow us to establish a baseline concerning the level of ICT development and skill in students, or to promote wider and better use of ICTs in the national system.” [6]. Due to this lack of data, the SIMCE ICT (ICTs Abilities for the Learning National Evaluation) measurement was developed, and put into effect in the year 2011.

The second SIMCE ITC, IN 2013, was carried out with a sample of 11,185 students, belonging to 492 schools and lyceums from all administrative units and regions of the country, and had a total of 11,067 valid tests.

In relation to national results, 46.9% of the students who took part in the test reached the minimum level, 51.3% reached the intermediate level, and 1.8% achieved the advanced level. The average national test result was of 247 points, an average which was only surpassed by the region of Coquimbo, with 259 points— a statistically significant difference [8].

Generally, it is possible to surmise that there exists a low use of ICTs in the classroom. “Close to 50% of students evaluated, do not reach the minimum result in ITC skills” [8].

Consequently, it will be necessary to strengthen ICT competence in students; not only due to the desirability of technologic mediums as

a learning tool, but also due to the necessity to create citizens who are equipped for the modern world, where technology is of supreme importance. "ITCs are engines of growth and evolution in the betterment of education" [9].

It is proposed to foster the use of ICT tools as a resource to benefit the reach of academic achievement. "The ICTs can be used to create learning situations that stimulate students to challenge their own knowledge and build new conceptual paradigms" [13].

In terms of management, it is projected to obtain, through the use of educational platforms, real data concerning the development of students' learning processes within a shorter time span. "The teacher's evaluation of the students' knowledge should develop in a continuous manner, and also at the end of the learning process. They should be based upon their contributions and creations in 2.0 services, both by their quantity/quality, as well as by the evaluations and scores of their classmates, which will give a clearer idea of the present state of knowledge acquired and their aptitudes." [11]

Consequently, search more efficiently for information that will allow for the ability to provide better learning for students by promoting quality educational processes. "A decisive factor to ensure the development of nations" [20]

In terms of management, the Ministry of Education in Chile has invested in providing technological resources to Chilean educational establishments under its jurisdiction. Regardless, said establishments have under-utilized the resources they have received. "Despite the efforts in infrastructure, studies indicate that the majority of teachers still do not utilize ICTs in their classrooms. The regular, widespread use of ITCs by teachers continues to be a challenge to public policy. The reasons for the under-utilization of ICTs are varied and well-researched: Limited preparation of teachers in centers of pedagogical training, insufficient time to become acquainted with pedagogical software, few models of classroom usage, low levels of confidence in the equipment provided, etc." [10]

Parallel to this, the policies proposed through the diverse programs have been lacking in their implementation. "The solutions that limit themselves to overlapping the purpose and the potential of the ICTs to the current curricular structure, without encouraging more profound reforms, are clearly insufficient. It is necessary to work on fundamental modifications to the programs of study, to the textbooks, to other materials and pedagogical technologies, as well as the policies of educational management, and, fundamentally, the policies of pedagogical training." [1]

3. THEORETICAL FRAMEWORK

One important aspect to reflect relates to the archetype of students, children, and young people of the 21st century, who are being subjected to an educational model created at least two centuries ago.

"How to denominate these 'new' students? Some have called them 'N-Gen,' for Net Generation, as well as D-Gen, for Digital Generation. To me, the designation which as appeared to be best has been that of "Digital Natives," due to the fact that they have all been born, and have grown, under the "digital language" of games, video, and the Internet. How to denominate, on the other hand, those of us who, due to our age, have not lived so intensely that windfall but, obligated by necessity to keep up to date, have had to swiftly teach ourselves? I vote for 'digital immigrants.'" [16]

Recognizing that teachers (digital immigrants) teach students (digital natives) with whom there is an obvious generational gap would seem obvious in today's world. However, the actual pedagogical practices experiences in our nation's classrooms do not account for the recognizance of a new archetype of student, one who demands profound transformations to their educational experience, both in form and depth. "The transition from a traditional classroom, an environment controlled by the teacher, to a digital classroom, implies for the teacher a professional, pedagogical, and organizational change of great significance." [10]

We are faced with a generation of student who learn in a different way. The stimuli which were once thought to be distracting now accompany them in their learning processes. "The digital natives, who are the students of today and tomorrow, are not the subjects for whom our educational system and process were designed." [11]

It is no longer strange for anybody to observe children and young adults doing their homework next to a television, wearing earphones that play their music and using a cellphone. It is strange, however, that this is actually their way of "concentrating." "Digital immigrants do not believe that their students can learn successfully whilst watching television or listening to music, simply because they (digital immigrants) cannot." [16]

How can they successfully concentrate with so many distractions? Could it be that their cerebral capacity is unlike ours, and they are in fact more capable than we are to process a variety of stimuli at the same time? "We can say with certainty that their patterns of thought have changed." [16]

It is beyond dispute that they belong to a different generation, that of the 21st century, with a different language not only in regards to the "emoji" they use to express themselves, but also in regards to the modes of virtual communication they utilize, language that their teachers do not use with any regularity. "Our teachers are digital immigrants, who speak an antiquated language, are struggling to teach a population that speaks an entirely new language." [16]

This new generation of students is different. "the consumers, and soon-to-be producers, of almost everything that exists are the digital natives." They are a generation of students who have a different language, in which technological has the role of protagonist.

Then, it is not patently obvious to stress that said students are being educated by a generation of teachers who are digital immigrants, a fact that requires additional analysis. "From the point of view of Natives, their Digital Immigrant teachers too often turn their education into something that is not worth their attention, when compared to everything else that they experience. And then they are accused of not paying attention!" [16].

How can we successfully make teachers "connect" with their students? How do we conceive it to be feasible to teach in a situation where two different languages are being spoken? It appears to be indispensable to incorporate technology into the classroom, with all the considerations this implies. "The biggest obstacle to these new educational possibilities of which I am speaking would appear to be the resistance to renounce our known, comfortable customs." [3]

Technology could become an excellent medium to re-acquaint students with the desire to learn. "The first thing would be to delineate a little more what exactly makes up this generational gap," and distinguish in these new generations of students the

“capacities, interest, technological aptitudes, valuation of training and information that are completely orthogonal to the pre-existing ones.” [15]

To think of introducing the use of ICTs in education implies, at least, a brief revision of the context in which we wish to situate these technologies. Today’s classrooms are populated with today’s students, and nonetheless the educational methodologies that are being used are still not updated, antiquated, and anachronistic. “Digital Immigrant teachers assume that students are still the same as they have always been, and the same methods that worked for teachers when they were students will now work on theirs. However, that supposition is no longer valid.” [16]

Teachers, almost intuitively, have successfully accepted the usage of some technologies, incorporating into their classrooms digital resources which still do not go beyond making use of a projector to show power points slides which, finally, only emulate an old chalkboard full of notes to learn. “According to Cuban, less than 5% of teachers have changed their teaching practices due to ICTs— they merely incorporate them to their pre-existing practices. This also holds true in universities. In summary, there has been no significant educational impact, to scale, due to the introduction of ICTs to educational systems.” [10]

What is true is that these types of classes are still expository, where the role of the students is considered passive. Constructivism proposes that learning be configured by and with the students themselves, a topic which has been widely omitted from the discourse.

“It is hard to keep them attentive in a traditional classroom where content is distributed expositoryly by the teacher, because students have the perception that this content can be readily consulted in the internet, shared among themselves, located from other sources, seen in different mediums. In conclusion, they tend to participate actively in the construction of their own knowledge.” [11].

If we stop to identify the present model that is most widely used in today’s education, it would not be difficult to recognize the persistence of an industrialized educational paradigm, in which schooling is done by block, en masse, from a badly-understood concept of equality, in which the idea of diversity and inclusivity are de-stressed. “When one descend from the pedestal and submerges in micro-reality, where finally everything is decided, it is easy to comprehend that the public service of education does not have to be uniform, that energetic solutions are de-bureaucratized, that the plurality of local responses is the only guarantee of respect for human dignity.” [4]

Traditionally, schools have occupied a role of protagonist in learning, and have been recognized and centers that impart knowledge. This would be easily comprehensible if we imagined that those who are being taught arrive at schools as a “blank slate,” which is to say without any previous knowledge. However, reality has shown that each student, however young they may be, has myriad experiences that directly relates to the stimuli they have received in their environment.

Thus, when a school receives students, it must propose a construction of learning in conjunction— not only imparting knowledge, but also considering the knowledge that each individual student contributes.

In this way, a school can nourish their work with the contributions delivered by each member of its educational community. “It is clear that schools can be remade, revitalized, and renovated in a sustainable manner, not by decree, orders, or rules, but by taking on an orientation of learning. This means to make everyone who belongs to the system express their aspirations, take conscience, and develop their abilities in conjunction. In a school that can learn, groups who traditionally may have lacked confidence in one another—parents and teachers, educators and businessmen, administrative personnel and union members, people from within and without the schools, students and adults—can learn to recognize their common interest in the future of the educational system and what they can learn from one another.” [18]

It is fitting; then, to rethink the paradigm that has been perpetuated up until the present time and still goes strong in numerous cases, mobilizing the actual educational practices. The alternative of constructivism, beyond proposing that the individual builds their own learning from a set of resources provided, rethinks learning as a vigorous and participative process which takes into account the student and their environment.

Educational innovation requires an extensive revision of the potentialities within programs of study. The incorporation of new techno-pedagogical designs presents a new opportunity. Each subject could be transformed into a new possibility for educational innovation and other specifics of the processes of teaching, and learning.

However, it is necessary to stress that the incorporation of ICTs into pedagogy do not symbolize an instant solution to achieve optimally efficient results in the educational process. Still, it could become a potential starting point for new innovations towards a better future.

“...The digital ICTs allow us to create environments that integrate the known semiotic systems and widen human capacity to present, process, transmit, and share large quantities of information with ever-decreasing limitations of space and time, in an almost instant manner, and with an ever-decreasing economic cost.” [5].

The state of art in relation to the use of technologies in Chile is fundamentally based in the Enlaces network and its diverse programs. Among these is “Yo Estudio,” a platform which delivers interactive activities and tutorials from NTI to 12th grade. However, this platform is still in development.

The network also offers digital textbooks, which deliver activities to support learning in technological subjects, where it also seeks to develop ICT skills as per the national curriculum. However, these are only supported up until the 6th grade.

Even though the Enlaces network offers a great opportunity to incorporate ICTs into Chilean classrooms, it is still in the process of incorporating these on a massive scale, as almost all of the programs it offers are offered through participating projects, to the effect that its coverage is not provided to the entirety of the educational population of Chile. It also does not offer online evaluative alternatives of the learning objectives proposed in the national curriculum, which would permit feedback, and subsequently allow for the taking of decisions in a manner congruent to the educational process. “Feedback is understood to be a dialogical activity in which teachers and students analyze the results of evaluations in comparison to the proposed criteria, and proceed to take actions which would develop, and better, learning goals.”

4. METHODOLOGY

This study is sustained on a qualitative paradigm of a documentary type, based on the revision of documents from which data concerning the thematic use of ICTs in Chile, and the world, has been selected and analyzed. It is also an exploratory study, because it seeks to provide a general vision concerning the object of study. Deductive methods have been used, based on the general information collected from a variety of documents by contrasting these to the information gathered through field data. The primary instruments utilized are group interviews of two groups: one of teachers and administrative personnel, and one of students.

The study has been entirely made up of teachers, administrative personnel, and students from a variety of administrative dependencies. The general population of the study was divided into two groups: Digital Immigrants, encompassing teachers and administrators, and Digital Natives, encompassing students.

In relation to the sampling, it was decided to use a theoretical one, with two groups of nine key informants in each one of these. All were from the city of Talca, Chile, and all fit the profile of the study.

Data was gathered through the use of a list of eight questions, the same for both interviewed groups. These questions were framed in the need of answer to the present study's objectives: What are ICTs? What ICTs are currently used in your educational establishment? What impact have these had? What skills do you believe would help develop the use of ICTs? How do you prepare your environment for the use of ICTs? How could you adapt the use of ICTs in your educational establishment? Do you believe that the student should build their learning paradigm, or should the teacher continue to be the epicenter of learning? Would you agree to use a platform in which the student is responsible for their learning, and the teacher occupied mostly a role of mediator?

The processing and analysis of the data was performed in the manner of a qualitative investigation. Because of this focus, the data was processed based on the theory that "relates data in a systematic manner and analyzes them through a process of investigation." [19]. The processing began with the gathering of data, followed by its organization, its analysis, and finally the comparison of the results with those of the existing literature.

This process began with an open encoding of each focus group, proceeded to do reading, analyzing paragraphs and sentences rescuing concepts; After this, an axial coding was done where possible relationships between dimensions and belongings that was observed were identified, giving rise to the use of categories, which received a definition, to be adjusted to the comments from respondents, allowing a new organization of the information.

5. CONCLUSIONS

A methodological triangulation, to order the information obtained through the two focal groups analyzed was used to clarify the results. The information was grouped in a segmented way: concepts associated with the question in accordance with the categories found.

Responding to the objectives that supported this study and the research questions that enlighten up the search for information, it emphasizes the following findings:

Concerning to the specific objectives, responding to the first of these: characterize the use of ICTs in the Chile, particularly in educational practice.

The use of the Tics is characterized in questions N ° 2 and N ° 5. For teachers (immigrants) the use of ICTs is recognized poorly. Is possible that the problem is originate by the abandonment that teachers expressed, facing the fact of not having received an appropriate training that would give them tools for a proper use and consequently feel suitable in its use. In this respect, the students (native) expressed that current technologies are occupied in the same way that primitive technologies.

In addition to the foregoing, the immigrants raised also difficulties regarding to preliminary disposal to receive ICTs, since resources lacks clear lines of action which would constitute, per, a risk for effective use of these, adding the obstacle of insufficient training they have received and don't have a specific time to include ICTs in their schedules.

However natives expressed their hope in a future where the establishments are prepared to incorporate the use of ICTs. However, for now, the abandonment of the students is because of the fact of not receiving clear guidance from their teachers, highlighting that even though their educational establishments are equipped with technological resources, a complete use of these is not done, attributing it to the lack of training of their teachers.

Responding to the second specific objective: show the most successful experiences of ICTs applications to education in Chile.

It is not possible to show successful experiences because that information was not found throughout the participants answers. Only some comments from teachers who accused, not receive clear guidelines for the use of technologies are extracted and in addition students revealed a primitive use by their teachers.

In certain times this use, even though was considered rudimentary, motivated them, as for example, when was presented a video or a good slide, since they stripped of the routine, taking them away of the ancient methodologies. However, submitting (teaching) occasionally a different methodology would not necessarily mean a competent use.

Responding to the third specific objective: propose a path to incorporate ICTs in the classrooms as an indispensable condition of quality education.

The possibility of proposing a path to incorporate ICTs in the classroom is characterized in the question N ° 8.

There is willingness from teachers for the idea of using a platform that provides information in accordance to curricula, in addition to support in the evaluation process. The idea that the student is the responsible for his own learning seems acceptable for them, as long as he keeps its role as mediator of the learning and is trained fully in the use of this.

Concerning to students, they recognize agreeing with the use of a platform that provides them information related to their study programs, they find attractive the idea of being responsible for their own learning, evoking memories of the experiences that have done in their establishment, about the use of ICTs; This fact has allowed them to feel that they can develop a job with greater autonomy, which motivates them.

The desire for an updated education is manifest, as well, they propose the aspiration of a shift to a evaluative paradigm that

considers diversity, i.e., the individuality of each student, fact that nowadays is recognized in the approach of Universal design for learning (CAST, 2006), so also, such proposal of the CAST "passes to give greater flexibility to the curriculum, to the media and to the materials so that all the students can access to the learning. Doing this is more possible now than years ago using ICTs (information technology and communication) actively in the teaching-learning process, due to the characteristics of flexibility and versatility that have digital media"[14].

However the above, natives, estimate risky the incorporation of a platform in its current context, because they believe that the educational system is not ready it for now.

Regarding to the research questions and responding to the first of these: what are ICTs currently working in Chile in education?

Concerning the type of ICT that is used today, this is characterized in questions N ° 2 and N ° 3.

The use of the technologies runs on a discrete way, students denounced a primitive use from their teachers, that is reflected in the mainly use of the overhead projector as well as an overutilization of the slides, emulating a change of the traditional slate by a projection of slides full of non-attractive texts.

Responding to the second research question: what impact have had in Chile-ICTs in education?

Regarding to the impact that ICTs have had in Chilean education, it's possible to characterize such question in question N ° 3.

Teachers expressed uncertainty, first of all because they claim that there are no clear guidelines on how to incorporate ICTs into learning. In addition, they consider the incorporation of technologies in the educational system as an incipient event, which does not allow them to refer about the impact of these.

On the other hand, students consider a negative impact, due to a limited use of ICTs by their teachers, who uses the slides instead for the Board, issue attributed to the low preparation of their educators in the use of the technologies. However, they rescue some specific experiences where technologies were incorporated in the classroom; such situations have stimulated and motivated them to learn.

In reply to the third question of the research: do skills develop the use of ICTs in Chile?

Respect to the skills that develop the use of ICT in the students, it has been possible characterize their response in question N ° 4.

In general it is possible to affirm that both teachers and students failed in identifying properly such skills possible to be developed through ICTs; however, teachers recognize the possibility of certain skills with the use of ICTs, like information and selection search among others. On the other hand students exposed their needs of not being left exposed and instructed on what to do by promoting the moral education in the use of ICTs.

Responding to the fourth question of research: how can be adapt the use of ICT in the Chilean reality?

It has been possible to characterize this answer in question N ° 6.

According to the expressed will of teachers, there is difficulty to suit the use of technology in the classroom, mainly due to the lack of time for an incorporation of ICTs in the classroom, being for that reason restricted to the use of technology, essentially, slides.

In addition students consider necessary to leave behind the traditional methodologies that do not consider their interests, that fact implies, adapt technologies in the classroom from an approach that includes a modern methodology: which interprets them as well as also protects them from potential risks.

6. PROPOSAL

Because of the above reasons the idea of an educational platform is thought, which considers a direct use of the technologies attending the dispositions of the national curriculum, but in a renewed way, in accordance with the current times "digital natives, students of today and tomorrow, are not subjects for which educational systems and learning processes were designed" [11] and to the interests of today's students: "digital natives" [16].

Finally responding to the general objective: propose a possible path to incorporate the use of ICTs in the educational practice in specific subjects: Language, Mathematics, Science and History, of the national curriculum.

It is explicitly a proposal called "Platform for methodological update as a setting for effective learning," whose objective focuses on: providing real spaces within the educational field, which allows students to construct their own learning with the mediation of the teacher through the use of ICTs.

Arises to incorporate in the classroom, the use of ICTs as a learning tool, benefiting the updating of pedagogical practices meet the interests and motivations of the students, using a renewed communication code, promoting through the use of ICTs, the construction of learning that generates interest and motivation to learn.

Is explicit a propose called "the use of a platform Web, that contains for the students (through filters), information contained in the texts of study and that considers consistently the learning objectives of the study programs proposed by the Ministry of Education, in specific subjects of the national curriculum for primary education complete: language. mathematics, history, and natural sciences and in secondary education, all of the above mentioned, as well as chemistry, physics and biology.

Jointly, enable a system that will allow assessments "in-line" where students have questions, in random order, associated with the themes taught in classes. Promoting and facilitating an effective evaluation process, contributing to a consistent and differentiated feedback according to the need of each student.

In addition, the platform would offer teachers, a Bank of questions, graduated according to levels of achievement, regarding to Bloom (1956) taxonomy and updates, which allows the construction of evaluative instruments regarding to the taught, reducing the time of preparation and review of evidence, since the system will provide the right answers.

The teacher and the management team of the educational establishment can count at the same time, with information on the progress of each student. Within their attributes, platform, offers innovative practices both methodological and evaluative, strengthening teaching and fostering quality learning.

In addition proposes to guard the permanent updating of strategic methodologies for the achievement of learning outcomes (other than frontal or exhibition classes), where students manage their own learning.

The implementation of this system would allow a potential improvement in the effective learning of students; at the same time, in economic terms, would reduce public spending in school textbooks, as well as also, decrease expenses in training teachers in educational materials and the use of ICTs.

Finally should be noted that according to the type of study made and of the limitations of the same, qualitative, is not possible to make generalizations concerning the thematic treated, however the finds of the same, have allowed to know the perceptions of the participating's of the present study, respect to the ICTs in the educational area, with a greater depth. However it emphasizes the its limitations, as it is a particular and specific information of the consulted group.

7. RECOMENDATIONS

New research in a greater scope and possible generalizations, respect to the subject matter of the use of ICTs in the national educational reality, is recommended in order to elucidate the critical points that have not realized progress in educational facts from the use of information and communication technologies.

The challenge is raised, both authorities and teachers have to first start hosting the nowadays students who require relevant changes to be attend, as long as it aspires on provide and deliver profitable and updated education that tribute to the teaching and learning process.

What is essential now is to distinguish gaps between natives and digital immigrants. Agree on a common language, will open a essential dialogic movement, as a start point to a dialogic education, as proposed by Freire (1970), focusing on the person and their exchange with the community connection.

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