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Competencies for the 21st Century: Integrating ICT to Life, School and Economical Development

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Abstract

This paper proposes that technological competencies for teachers and students cannot be developed and/or studied without considering an array of factors that impact the Teaching and Learning Processes (TLP) inside and outside of school. Specifically, it proposes to pay attention to other competencies that should be developed by both teachers and students. This essay presents some successful experiences and problems associated to the use of the Information and Communication Technologies (ICT) observed in the countries’ members of the OECD (Organization for Economic Co-operation and Development) and in Latin America and the Caribbean, suggesting herewith possible solutions.

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1. Introduction

Several international studies declare that mere use of technologies in the classroom does not guarantee learning improvement (Anderson 2008). This essay suggests that a possible explanation for this issue is that many nations have focused on providing ICT to schools without making an educational project that considers other factors that also impact the TLP, besides ICT. García & Largo (2008) propose that the use of ICT involves changes in an educational system as a whole. I suggest that in order to produce good quality learning using ICT, students should develop technological and learning competencies, and teachers should develop teaching, learning, professional, and technological competencies in order to make ICT improve learning outcomes. It is believed that this can help students become lifelong learners. It is crucial that these competencies are explicit for teachers and students in order to improve the TLP and at the same time be able to evaluate them. It is also recommended to differentiate the competencies mentioned above. The idea is to help students become “experts in learning” and to make teachers become “experts in teaching” and in the contents of the disciplines they teach.
2. Competencies for the 21st century

It is necessary to identify and differentiate today’s 21st century learning, teaching, professional and technological competencies in order to improve the TLP. Many countries have already started doing so. But all of these competencies have a different essence, so it is important for teachers and students to understand the nature of every competency. The best educational systems in the world are not focused only in the use of ICT, but also in the other competencies shown in Table 1.

3. Tables

| Learning Competency | Student | Teacher | Teaching Competency | Technological Competency | Professional Competency | Learning Competency |
|---------------------|---------|---------|---------------------|-------------------------|-------------------------|--------------------|
| Example: self-discipline | Example: effective Internet search of information | Example: express ideas clearly | Example: correct use of a projector in the classroom | Example: knowledge of the different stages of childhood and adolescence | Example: the teacher is able to learn from his/her daily teaching practice |

It is fundamental for teachers and students to perceive technology as (1) an important element of their present and future lives and (2) as essential in the development of their countries. That understanding is indispensable for the way both teachers and students use ICT as an educational resource. On the other hand, teachers must consider that the way people are learning is different in today’s century, so they must accommodate technology to their teaching practices.

A learning competency is a human ability that facilitates learning. Every habit or ability that helps a student learn more and better is within the learning competency. Teachers must also keep learning for the rest of their lives, inquiring constantly about the latest and best practices in their area of study and learning about the new contents of the taught discipline. A technological competency can be used by both teacher and student to improve the TLP (Claro 2010), and also to potentiate learning outside of the classroom. A teaching competency is the teacher’s ability, different from professional competency since it is only related to pedagogical strategies. On the other hand, a professional competency is shared by most of the professional disciplines, and it is related to elements such as: ethics, correct use of time and others. A teaching competency can be located within the professional competency.

The teachers’ knowledge of the different stages in a student’s life (childhood, adolescence, etc.) and how they use this valuable information to produce good quality learning can be located within the teaching competency (Andere 2010). I propose that teachers who have good teaching, learning and professional competencies have a higher probability of using ICT in an efficient way. This means that the focus when using ICT in the TLP has to consider these four competencies, and not only the technological competencies. Something similar occurs with students. Many of them are already technologically competent, but their learning habits and abilities stop them from learning using ICT in an efficient way.

Understanding how to improve the TLP is tremendously complex, so the implementation of any pedagogical resource in the classroom (not only ICT) should consider the influence and connections of many other factors that are sometimes forgotten (Andere 2010). I propose that along with using ICT as a pedagogical resource, it is imperative to pay attention to some elements that are occasionally considered “traditional” but that are in essence fundamental, such as: (1) quality of the relationships established among students and between students and teachers, (2) amount of support, guidance and supervision students receive from their families, (3) culture and traditions of the schools and the community where they are located, (4) quality and type of the school leadership, (5) quality of
the education received by the teachers in college, (6) ongoing training for teachers, (7) amount of time teachers have to research, prepare and evaluate their lessons, (8) quality of teamwork among teachers (how they share the best experiences and support each other), (9) social value of the teaching career and (10) labor conditions of teachers and principals, including salary.

4. Use of ICT in different Subjects

The use of ICT in each subject is probably the biggest challenge teachers face right now. The use of these pedagogical resources varies tremendously among the different subjects and school grades. Every teacher should become an expert on the use of ICT in the course and grade he/she teaches (Plomp et al. 2009). For example, it is not the same to use ICT in first grade to teach students how to read than using them in High School to teach math. This is exactly the problem observed in many countries of Latin America and the Caribbean. They teach many grades and sometimes several subjects, getting away from expertise in one specific subject and grade. Even though the use of ICT is not the final solution for learning outcomes, it is a powerful tool when it is available for teachers and students and when used properly. ICT can be efficient in the TLP because:

(1) Many (if not most) students in today’s world communicate, learn and play using ICT, so it is an important part of their lives. This phenomenon will increase, letting students access new technology and information through cell phones and other massive technological objects.

(2) ICT can be used as a didactic resource in every class as they facilitate teaching in different ways, helping teachers to communicate better and to make classes more entertaining.

In an experiment carried out in Chile (Oyarzo 2010), students who were used to submitting printed homework participated approximately 90% more by submitting their homework via e-mail. After school all of these students were connected to the Internet, so it was much more motivating for them to do their homework Online.

5. Economical Development

Teachers and students should perceive ICT as an important tool for the growth and development of their countries. Scientific progress in all disciplines (medicine, education, economy, construction, agriculture, engineering, etc.) has been potentiated with the use of ICT, so they are crucial for today’s worldwide society. A problem seen in many countries of the OECD is that contents taught in the classroom are separated from reality, from science and from market and work force. One way to make students distinguish the importance of ICT for today’s world is connecting the classroom with what happens outside of the school. This is possible only when teachers: (1) are experts in the subjects they teach, (2) update their knowledge and teaching practices, (3) teach contents as part of the outside world and not limited to school content and (4) establish good connections with the community where they are located. Another way to connect schools with the outside world is bringing professionals and technicians from different disciplines into the schools and/or taking students into the outside world, in order for them to visualize that ICT are used in most disciplines, making life easier and better when used properly and with purpose. This correlation of seeing the effects of “school” learning and “life” learning can have a big impact on students.

6. Ethical Issues

The use of ICT in schools requires students to understand that these resources can also be used to harm humans and the natural environment. In the school context, computers and students’ cell phones can be used to harm classmates or teachers. Also, technological garbage (like a cell phone) can be very harmful to the environment, so students should learn how to dispose of technological objects in order to protect the environment (Plomp et al. 2009). Factories can also harm the environment when technology is misused. But yet, in a hospital, a technological object can save a life, an example that proves the importance of technology for today’s society. Considering that students are in essence the future of humanity, it is central that they understand the importance of using ICT in
conjunction with a strong ethical base, to protect the society and the environment, and to avoid using cell phones and laptops to commit fraud during testing.

The use of Internet must be coordinated with the student's families, to prevent any type of virtual risk for the students such as harassment, access to restricted Web sites, etc.

7. Conclusions and Recommendations

(1) Train teachers constantly on developing teaching, professional, and learning competencies and in state-of-the-art ICT, especially the ones they can use to improve learning and the ones students use in their daily lives.

(2) Support students to consistently develop both learning and technological competencies.

(3) Make school content significant to the students, connecting it frequently to the outside world.

(4) Integrate ICT to the students’ daily lives and to the study of every subject. In areas where students already have contact with ICT, teachers must know how to use these resources in order to facilitate learning. In most of these areas ICT is already an important part of the students’ lives. It is necessary to be explicit in the use of ICT for every grade and subject, spreading the best and most efficient practices within the school system.

(5) Make teachers and students understand the importance of technology for their own lives and for the development of their countries. A person who manages ICT well can become a better communicator, and is connected to the world in a more efficient way. He/she can produce more and at higher quality, and result, in some cases, in a higher income.

(6) Establish high quality communication nets with students and parents using ICT.

(7) Help students understand that ICT must be used in conjunction with a strong ethical base, making them become aware of Internet dangers.

(8) Avoid referring to ICT as “new technologies”, because they are not new anymore.

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References

Andere, E. (2010). Finland: the success in PISA and beyond, it starts in Primary School, and before. Mexico DF: Priz. (Chapter 5)

Anderson, R. (2008). Implications of the information and knowledge society for education (pp. 7-30). In J. Voogt & G. Knezek (Eds.), International handbook of information technology in primary and secondary education. New York: Springer.

Claro, M. (2010). Proposals for a conceptual framework and list of 21st century competencies for the development of an evaluation system of ICT competencies for the 21st century for 15 year old Chilean students. Santiago: MS. (Chapter 1)

García, G., & Largo, A. (2008). Proposals to improve Chilean education in a world with penguins that wear earphones and cell phones. Santiago: Acapulco. ( Chapters 1-7)

Oyarzo, F. (2010). The ICT in the contemporary school: an analysis of its impact on good quality learning. Santiago: Profe Digital. (Chapter 1)

Oyarzo, F. (2009). Quality teaching: environments that promote quality learning, a view from personalized education. Santiago: Pontifical Catholic University of Chile. (Chapter 2)

Plomp, T., Andersen, R., Law, N. & Quale, A. (2009). Cross-National Information and Communication Technology. Policies and Practices in Education. IEA, IAP, North Carolina. (Chapters 2-7)

Strunk, W., Jr., & White, E. B. (1979). The elements of style. (3rd ed.). New York: Macmillan, (Chapter 4).

Pieri, M., & Diamantini, D. (2010). Teachers of Life and ICT. World Journal on Educational Technology, 2(3), 158-168.