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ICT IN EDUCATION: DISRUPTIVE INNOVATION

There is a chance that by 2015, 30 million students in Latin America may have an electronic device for personal use devoted to aid in their learning¹. This represents an enormous educational challenge.

According to IDB's vision, Information and Communication Technologies (ICT) can help improve the quality of education, as long as some conditions regarding its design, implementation and evaluation are met. In particular, ICT can force and lend support to needed changes in educational practices, which will allow them to be adapted to the demands of the twenty-first century.

Without serious, systematic incorporation of ICT, education systems will be unable to adapt their operation to the traits of the students and their families, and the demands of the labor market and society.

Hence, we recommend considering incorporation of ICT into education not only as a new input, but also as an element of disruptive innovation, i.e., to force a change in education practices and, definitively, a substantial change in school systems.

This will only be possible if their emergence into the sphere of education helps improve learning results significantly. To accomplish this, as we shall examine, ICT must open up a new opportunity for personalized education, in the context of mass, inclusive school systems. They must also be designed, implemented, and evaluated holistically (taking into account a set of variables simultaneously in educational policy as a whole).

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The disruptive innovation of ICT in Latin America today

Though proportionately few students today have personal access to their own digital devices (notebooks, netbooks, smartphones and other mobile terminals for personal use), and by 2010 we will have barely surpassed million personal device mark, they have grown explosively in numbers over the last four years.

It is precisely this adaptation curve which allows us to assert that we are witnessing a disruptive innovation that will be penetrating the educational policies and budgets swiftly over the next few years region-wide.

A disruptive innovation is a new solution that affords a response to those who, prior to its appearance, had no other available options. To function effectively, its appearance must meet three conditions: affordable price, adequate initial quality, and potential for continuous improvement.

Increasingly cheaper portable devices with features adapted to the needs of educators and students (in some instances designed specifically for this purpose) and widely distributed throughout the region serve this exact purpose. This, in view of the preexisting reality in which neither national budgets nor those of families made it possible for all or even most students to even dream of gaining access to and using them.

The magnitude of success for the introduction of netbooks and other personal digital devices into education will be measured by their potential for continuous improvement, meaning nothing short of their flexibility to respond with increasing precision to the needs of the education system, educators and students.

It is precisely in this process of continuous improvement that the role of the IADB can and wants to be relevant. This would entail processes for follow-up and evaluation, for creating knowledge and collaborative work with countries in the region aimed at improving the impact of education through the approach of comprehensive, long term projects that take a set of variables into account that the literature and experience have determined crucial.

Potential for Continuous Improvement

Adequate Initial Quality

Affordable Price

Focus on student learning experiences

The actual experience of users (educators, students, managers, families, schools, national and sub-national systems) is vital to the continuous improvement of these devices, with respect to their potential for the education system. Tangibly meeting their needs and demands will guide the development of increasingly more relevant technological solutions. In terms of the ICT industry and design of public education policies, this means properly answering three questions: for whom, for what reason, and how.

From the Bank's point of view, the answer to the first question is obvious. The poorest children in Latin America have limited access to education (one of every three fail to advance to ninth grade), and to make matters even worse, those who do attend school receive low quality education (four out of five students fail testing on third and sixth grade content)².

Even though the price of new devices continues to be unaffordable for most Latin American families, the new context provides an opportunity for the State, through development of new public policies, or on a lesser scale, private organizations, to invest in providing access to new technology for poor students.

Therefore, the poorest children are both the logical beneficiaries of this initiative (students from families with more resources will most likely have access to other technologies as well) and, from the point of view of education policy, those who require special care to draw them to school, make sure that they stay enrolled, and provide attractive strategies to improve their learning experiences ³.

The second question is for what reason. What is the aim behind efforts to incorporate ICT into education systems? Reference has been made to many concepts in designs for plans developed in the region to date, all of which are enormously relevant: inclusion, inequality, poverty, access, integration, competitiveness, work, social or technological gap, segregation, connectivity, equal opportunities, productivity, use models, participation, etc.

According to the IDB, the main concept is LEARNING. We understand that investment in initiatives to use ICT in education is directly related to efforts toward offering quality education to students. This means potential improvement in their learning experiences, both in terms of contents proposed for national curriculums and in the terms of development of competencies and skills essential to performance in the knowledge society ⁴.

At the end of the day, and as part of an ongoing process of innovation and evaluation, the test that ICT must pass in education will be: how they help education provide better and more complete learning experiences that are better connected to the needs of the society into which ICTs are introduced.

Finally, the tangible way in which projects are implemented makes an enormous difference on their results. As borne out in the latest evaluation, the “how” of implementation is fundamental.

This deals with the hardest question, which can and must be answered in the first place, with a clear conviction regarding what cannot occur, i.e., no more of the same. We cannot expect education systems to produce better results in students if inclusion of technologies leaves practices unchanged ⁵.

To date, many investment in ICT for education experiences have met with frustration in terms of achieving positive results because the new tools have simply been assimilated by schools, educators and/or education systems, allowing them to continue on with business as usual, only now with technological support.

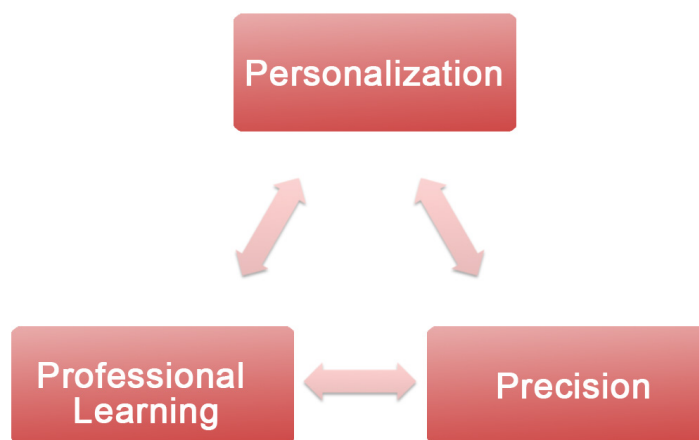
According to the Bank, a successful approach to implementation of initiatives requires the capacity to negotiate the coordination of three dynamics virtuously: personalization, precision and professional learning ⁶, as described below.

Three key dynamics

Following the proposals made by Michael Fullan and his coauthors and based on the experience gained through the different projects in the region that have relied on the participation of the Bank⁷, we recommend that implementation of ICT in education projects must dynamically take into consideration at least three elements if it aims to meet the essential requirement of substantially modifying practices in education:

Personalization

Education in the 20th century, heir to industrialization and massification, with its consequent increase in the diversity of the inside of classrooms, has inevitably had to consider students in terms of an average of skills over which the same contents are allocated, with the same strategies and at the same rate. This system assumes that most students will be able to adapt to this average delivery and that the acceptable price to pay is that some gifted students



(with greater stimuli, better context, superior conditions) will become somewhat bored and at the other extreme (another group in poorer conditions) will fail to meet these standards.

Recent research provided by neuroscience and developmental psychology, and the daily experience of hundreds of thousands of educators, accounts for why each student is different: different interests, conditions, personality traits, strategies for creating or acquiring knowledge, learning rates, etc. The “one-size-fits-all” fantasy is no longer considered valid for school systems. Society and students themselves are demanding a different kind of education which is able to recognize, take on, appreciate and capitalize on this diversity, rather than ignore it.

Current development of ICT allows us to imagine, for the first time since education reforms significantly broadened the coverage of school systems, education that is at the same time massive and personalized.

Development of new pedagogical models that make it possible to create tailor made strategies for each student, his/her abilities and interests (facilitating its connection with curricular learning objectives and the needs of the knowledge society, offering personalized itineraries) translates into new opportunities for knowledge, motivation and learning. There are no reasons for us to forsake high expectations regarding the achievements of all students if we can develop an appropriate strategy for each one.

Precision

Precision deals with correct access and use of available data and information for the purpose of developing appropriate strategies. In this sense, precision is an essential requirement upon which educators must insist in order to make development of personalized learning strategies possible. Without up-to-date, secure, timely, and accessible information, development of personalized education is not possible.

This requires not only efficient data gathering systems (already hard to find nowadays), but primarily a way to access data that will facilitate action and decision making and the role of educators. In this context, precision implies knowing the traits and circumstances of each student, offering options for clear, enduring feedback to everyone involved, and providing specific options for dealing with potential difficulties.

Only with this level of precision is it possible to generate continuous learning dynamics based on the rationale of knowing the current situation, the desired situation, and the most effective path (for this student in this context) to take from the former to the latter.

Again, current development of ICT helps enormously to facilitate the precise work of educators involving the learning experiences of each student by devising tools and applications that strengthen the educator's

role of manager of his/her students' learning processes. The key challenge along these lines is, precisely, to negotiate the way in which knowledge (of students and their learning results) connects with new strategies and methodologies. Thus the role of educators will inevitably be different, but also necessary in a different sense: there is no room for discourse suggesting that teachers and schools will no longer be necessary.

Professional Learning

The challenge of personalization and precision, then, demands a new role for educators beyond new initial training to deliver new teachers to schools. It requires constant practice of new teachers aimed at continuous learning and training: educators must become learners of the processes that they manage in schools every day.

This does not advocate behavior in which teachers have not been engaged previously. Educators are always being challenged to change and learn by their context. What is needed is for the focus to be on pedagogical practices geared toward the learning of each student, in a process necessarily imparted in service, and as such requires much more teamwork, with peers, to detect and reinforce effective teaching practices.

The impact on learning of many education reforms has been limited, due precisely to the difficulty of changing teaching practices. Thus it is essential to consider new models for teacher training and professional learning that better adapt to the context of massive and personalized education. We believe that this is more feasible to achieve through deliberate, ongoing continuous learning that can be found in the everyday practices of educators, and not by following traditional training strategies.



Conclusion

The introduction of ICT into education systems is an inevitable phenomenon occurring at a very accelerated pace. It is rather hard to image that in a few short years every student, from a very young age, will have a very robust relationship of intensive access and use of digital media through mobile devices that they will carry with them all day long, every day, even at school.

In the context of society where ICT enjoy a growing presence in the professional world and in leisure, this essentially represents an immense educational opportunity, if the school systems, schools, and educators reformulate their tasks to capitalize on ICT potential.

We at the IDB are optimistic about this. Education systems have proven to adapt, sooner or later, to the demands of society. We think that many governments have already awakened to the capital importance of integrating ICT into their set of education policies (and not as a separate component). The Bank itself is bolstering its work and research agenda to improve the support it lends to this effort, which will demand creativity and innovation in years ahead.

Notes

- ¹ This estimate was arrived at by applying the Disruptive Innovations Model developed by Clayton Christensen and coauthors (2006), according to which, unlike continuous innovations, disruptive innovations display a specific behavior that can be plotted as an “S” curve. Slow growth is observed at the outset, followed by a very abrupt rise in phase two, and a new plateau as 100% adoption is approached.
- ² SERCE, 2006
- ³ While there is a plethora of literature on the motivational potential of ICT associated with school enrollment and attendance, the third element (improvement of learning experiences) an effective though moderate impact has been observed. cf: E-learning Nordic (2006), SITES (2006), ImpaCT2 (2002), OECD PISA (2003-2006), World Bank - Colombia (2009).
- ⁴ “All the studies reviewed have identified a range of important wider benefits of ICT on learning. These include the positive impact of ICT on students’ motivation and skills, independent learning and teamwork. Increased motivation leads to more attention during lessons which can be exploited by the teacher. Aspects for more individualized learning were described in a variety of ways. Students learn more independently, at their own pace and according to their needs. They also take more responsibility for their own learning process. As seen, ICT can benefit likewise academically strong and weak students and students with special needs” The ICT Impact Report: A review of studies of ICT impact on schools in Europe. Anja Balanskat, Roger Blamire, and Stella Kefala, 2006
- ⁵ World Bank, 2009
- ⁶ Michael Fullan, Peter Hill, Carmel Crévola (2006)
- ⁷ Support for Plan Ceibal in Uruguay, Paraguay Educa in Paraguay, Fundación Pies Descalzos in Colombia, to name a few.

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