

ICTs AND TEACHER COMPETENCIES

CONTENTS:

Urgency for action

The big picture of effective change

Standards: an important piece of the puzzle

Professional development

ICTs: both the cause and the solution

Recommendations

References

URGENCY FOR ACTION

Technology is a critical component of education in the 21st century; today's students live in a global world and need to compete intellectually with peers worldwide. Data suggest that digital tools and strong pedagogy may help schools employ the best strategies for student achievement of both traditional and 21st-century skills. The goal of information and communication technology (ICT) initiatives in schools is not simply to use ICTs more effectively in teaching; rather, the goal is to impact and improve economic development at many levels through the use of ICTs. Learners around the world are comfortable using technology for daily connecting, creating, and sharing. The students in our classrooms today are the first to have grown up with digital tools at their fingertips; using those tools, students interact with information, create knowledge, and communicate their results to a real audience. Digital tools are always "on", accessible anywhere there is Internet access, and many are collaborative. Learners have an expectation that their education will include the same authentic, relevant, and interactive characteristics. However, despite the great potential of technology as a catalyst for transformative change in education, it has yet to be widely implemented.

Today, new conditions exist that make it possible for technology to impact education for all. Technology is more readily available everywhere; even inexpensive mobile phones are capable of interacting with the world in ways previously unimagined. Our students are interconnected and ready; it is our teachers who require support for understanding when and how to use ICTs in teaching and learning in order to engage with and enrich students' experiences. Education change, however, is a complicated process; it rarely happens by itself, and all components of this system (access, teachers, administrators, learners, ICTs) are essential but still not sufficient to have the impact that is required for larger systemic change.

Multiple organizations have identified goals for classroom deployment of ICTs and frameworks and standards for educators in the use of these tools. Now several factors are interacting so that it is even more imperative that educators have the ICT skills identified by UNESCO and the International Society for Technology in Education (ISTE). These factors include a growing need for instruction in new skills (information, technological, and visual literacies), awareness that students have changed but educational practices have not, and an awareness of the needs around the world for students who can contribute to the work force and economic system.

The existence of ICT frameworks and standards for teachers is not enough to facilitate the change needed. The preparation and continuing professional development of educators is a major element that is required for school transformation and appropriate use of ICTs. The literature is clear that among other factors, high-quality professional development for teachers is critical, yet often lacking in education reform efforts. This lack of effective professional development for teachers is often considered a root cause of the divide between what learners could potentially achieve and the reality they actually face in classrooms throughout the world.

THE BIG PICTURE OF EFFECTIVE CHANGE

A cursory analysis of the challenge of leveraging ICTs for effective teaching and learning points to an obvious solution: prepare teachers for creative applications and they will implement the desired changes. To some extent, that can be done; however, change in schools entails a complex process and takes years to achieve. An organization will not change until individuals within it change; furthermore, the culture of the organization can present a major obstacle to implementing new ideas and practices. Michael Fullan (2001), a renowned expert on educational change, characterized this challenge as the **25/75 Rule**: 25% of the solution is having good directional ideas; 75% is figuring out how to get there in one local context after another. Peter Senge, a prominent theorist on organizational change, adds, “The fundamental flaw in most innovators’ strategies is that they focus on their innovations, on what they are trying to do – rather on understanding how the larger culture, structures, and norms will react to their efforts” (1999, p. 26). In the case of ICTs in education, most change efforts have overly emphasized acquisition of hardware and software supported by generic technology training – at the expense of actual implementation in the schools.

Fullan (2011) warns that technology alone will not be an effective driver of whole system reform; we also need the policy and strategy levers that have the best chance of having an effect on student learning. Clearly, a key driver for successful reform is capacity-building of educators through professional development. There is growing evidence, however, that while technology can be a powerful partner to change, it is not a primary driver. Fullan asserts, “There is no evidence that technology is a particularly good entry point for whole system reform, but it will be a dramatic accelerator if we can put instruction, and skilled motivated teachers and students in the lead” (p. 6).

To enable reform, policies must be in place to help provide and sustain a number of essential conditions. ISTE has delineated a comprehensive set of *Necessary Conditions to Effectively Leverage Technology for Learning* that includes: shared vision, empowered leaders, implementation planning, consistent and adequate funding, equitable access, skilled personnel, ongoing professional development, technical support, curriculum framework, student-centered learning, assessment and evaluation, engaged communities, support policies, and supportive external context (<http://www.iste.org/standards/nets-for-students/nets-for-students-essential-conditions.aspx>).

Finally, for technology-based innovations to come to fruition in schools, guiding frameworks, standards, and strategies need to be disseminated and ultimately adopted by districts and the educators within them. One key attribute that increases the rate of adoption of a new approach or method is its perceived **relative advantage** – a clear sense by users that the innovation in question is better than the tool or practice that it replaced. Research and evaluation, then, are critical to help document what works with ICTs. Teachers will adopt new approaches that are proven to effect student learning. Further, relative advantage will be most apparent to teachers when ICT integration is aligned with current curriculum and assessments. This, in turn, would inform and support the dissemination and adoption of ICT standards.

STANDARDS: AN IMPORTANT PIECE OF THE PUZZLE

In recent years, several individual nations (United States, United Kingdom, France, Italy, China, and India) and UNESCO have created and supported large projects designed to define an appropriate framework for ICT use by teachers. ISTE produced the first set of standards in 2000, revising these standards in 2008. The UNESCO ICT-Competency Framework for Teachers (ICT-CFT) was developed in 2008 through collaboration among Microsoft, Intel, Cisco, ISTE, and the Virginia Polytechnic Institute and State University (Virginia Tech). The creation of this framework marked the first international effort in this area. The contributions of both ISTE and the UNESCO recognize the complexity of change in educational programmes, and the framework and standards combine ICT skills with emergent views in pedagogy, curriculum, and school organization. The overall goal of the UNESCO project is to improve teacher practice in a way that contributes to a better-informed citizenry and higher quality workforce that will ultimately impact a country's economic and social development.

The UNESCO Framework acknowledges that different countries are in very different places with respect to ICT skill development for teachers, and although all countries must focus on teacher education in ICTs, countries will begin their work at different levels, defined as technology literacy, technology knowledge deepening, and knowledge creation. More specifically, the objectives of the UNESCO ICT-CFT project are to:

- constitute a common core syllabus (defining various ICT competency skills for teachers) that professional development providers can use to develop learning materials sharable at a global level;
- provide a basic set of qualifications that allows teachers to integrate ICTs into their teaching;
- extend professional development of teachers, advancing their skills in pedagogy, collaboration, and school innovation using ICTs;
- harmonize different views and vocabulary regarding the uses of ICTs in teacher education.

The UNESCO ICT-CFT clearly recognizes that ICT education must go beyond learning about technology, and must be adapted to the curriculum, culture, and climate of different schools, districts, and nations. The UNESCO Framework also advocates for embedding ICT work in larger efforts to transform content and curriculum. While the UNESCO ICT-CFT project specifies the competencies needed to effectively use technology to support educational change, it is up to approved governmental, non-governmental, and private providers to design and deliver training for these competencies.

The next step in implementing the UNESCO Framework must be the establishment of international, national, and local policies that make the framework a reality on the ground. It is urgent that educators and policy makers understand the myriad ways in which successful 21st-century schools operate and simultaneously realize what it will take to prepare educators for such schools. The carefully developed framework and standards that now exist mark the first step in a very important process. A large part of each national or local implementation effort must involve high-quality ICT professional development for teachers.

PROFESSIONAL DEVELOPMENT

The educational community has solid evidence on the characteristics that constitute exemplary professional development. In many ways, these characteristics are similar at the initial preparation and in-service levels, although the implementation may differ at each stage. For example, a large-scale study of US federally funded projects (Garet et al., 2001) identified various factors associated with successful professional development, including:

- **The duration** of the activity (both time per session and number of sessions). Findings indicate that longer is better.
- **Collective participation** of groups of teachers from the same school, department, or grade was found to be more effective than individual participation.
- **Active learning** opportunities were associated with effective professional development.
- **Content focus** was deemed more effective than generic teaching strategies not tied to particular content areas.
- **Coherence** is the degree to which the activity is tied to school goals, policies, standards, etc. The greater the coherence for teachers, the more effective the professional development.

Unfortunately, the authors found that this combination of factors was rarely present in the programmes reviewed. Difficulties found include increased cuts in monies for professional development and the challenges of providing long-term, sustained efforts. However, online communications bring new potential to meet the criteria for effective professional development in cost-effective ways. A particularly promising benefit of online professional development is the ability to sustain a professional learning community or community of practice. Participants in a community of practice learn from each other by addressing problems directly related to their work in which they share experience and expertise. In technology-rich environments, teachers need opportunities to learn what instruction methods, assessment practices, curricular resources, and classroom management skills work best. Overall, this is the essence of quality professional development and support for ICTs: helping teachers identify promising practices in their areas, while also providing the essential conditions that guarantee effective implementation, including the support and leadership of local administrators.

Examples of policies leading to effective professional development

The existing literature on professional development for teachers provides a clear direction for what works in this area. Unfortunately, many schools have instituted professional development initiatives for teachers that do not follow these guidelines. Policies that support effective professional development for educators' use of ICTs can be found at national and local levels, and these policies must be implemented in ways that allow educators to gain skills, experience, and ease in using ICTs.

Some exemplary schools and districts have developed policies that embrace 'best practices' and have achieved significant results. The following are a few examples of effective policies designed to promote teacher use of ICTs, as well as professional development activities that are outcomes of these policies.

USA policy example: In the Lake Washington School District in Redmond, Washington, educators are expected to accomplish proficiency in one ICT skill each year. One district selects a technology focus each year; educators are offered multiple ways to learn the skill and to demonstrate their knowledge. Educators who complete the process satisfactorily earn a bonus.

Danish business-focused gymnasium's policy: All staff will use ICTs for educational-appropriate activities, including integration into curriculum. Every staff member (including administrators) must demonstrate proficiency in basic technology skills (spreadsheets, word processing, searching, etc.); it offers training for those who need assistance. They encourage informal professional development through a large teacher workroom with technology systems and planning time so teachers can work together.

Turkish Policy: FATIH Project (Project for Enhancing the Possibilities and Improving the Technology). This policy supports the Turkish Development Plan. The project states that all classrooms will be equipped with ICT tools and that ICT-supported instruction will be practiced in all classes. To support the training of teachers for using ICTs in the classrooms, online and face-to-face professional development activities have been planned to support approximately 600,000 teachers.

One school district's policy: Several school districts have successfully used teacher experts, identified in every school for each major initiative, to ensure that their colleagues will be able to use ICTs effectively to prepare learners for future careers. To support this policy decision, the school district has developed a summer institute for teachers and administrators.

New Zealand policy: In New Zealand each school develops its own policies based on the national policy goals: "For New Zealand, the development of a prosperous and confident knowledge society means the development of new skills and knowledge. It will require a culture of continuous enquiry, innovation and improvement, risk taking, and entrepreneurship. This can only come from the education system" (Ministry of Education, 2006, p. 3).

Commonalities of successful approaches

Taken together, these successful approaches to professional development all address the individual needs of teachers and focus their energy on creating a culture that supports technology integration, peer-to-peer interaction, and risk-taking. They also incorporate technology into the overall goals and directions of curriculum work in the schools or districts. Implicitly, these approaches all recognize that ICT integration must be situated within content areas and pedagogical approaches in schools.

The examples above also demonstrate that successful professional development using ICTs is definitely possible. Our challenge, then, is to use effective professional development to scale up from successful “pockets” to large-scale, systemic change.

ICTs: BOTH THE CAUSE AND THE SOLUTION

The need for an effective use of ICTs in schools and the existence of clear guidelines for teacher competencies in this area has created an additional and urgent need for more effective professional development for teachers. At the same time, the effective use of ICTs also provides a part of the solution for this challenge, since each of the characteristics necessary for effective professional development, as identified by Garet et al. (2001), can be attained through the use of ICTs in professional development. For example, the first characteristic, **duration** (longer is better), has been problematic for educators. In the past, it was relatively easy to bring in experts and have them work with teachers for a given period of time, but in many cases there was little follow-up for the teachers after the experts departed. In contrast, today interactive ICTs provide an ideal set of tools to sustain contact and communication with experts over long periods of time and to obtain feedback from these experts on specific classroom challenges.

Similarly, teachers used to face immense challenges in regard to the second characteristic, **collective participation** (of groups of teachers from the same school, department, or grade), since many of them spent most of their working hours confined in classrooms with learners. Using ICTs, teachers can now communicate, create, and problem-solve with their colleagues at times convenient to their schedules, and therefore are no longer as isolated from professional contact and stimulation. In addition, using ICTs to deliver professional development can greatly expand the teachers' networks of colleagues and experts. Teachers with high levels of ICT use and experience can connect with others at the same high level, and this way they can collectively work to develop their skills and thus become professional development leaders for their schools and localities.

We are in an exciting time with a combination of important factors coexisting:

- Urgent need for effective ICT use in schools.
- Knowledge of effective strategies for implementing change.
- High-quality international ICT competency frameworks and standards for teachers.
- Knowledge of effective professional development approaches.
- Availability of ICTs to provide professional development for teachers.

The missing piece necessary to bring together these important factors to provide professional development opportunities for teachers is policy. Schools, districts, professional organizations, and nations all need to establish effective policies to use ICTs to provide high-quality, future-oriented professional development opportunities for teachers.

Research by Robert Kozma makes it clear that several nations are currently at the vanguard in terms of national ICT policies. According to Kozma, national policies tend to be established based on four major rationales:

- Support for economic growth.
- Promotion of social interaction and development.
- Advancement of education reform.
- Support for education management.

The work of countries that have established successful policies can serve as a model to others working to implement such policies. For example, Singapore has a long tradition of linking education policy to the economic system, and the country's latest ICT Master Plan provides a good example of this approach. Jordan is another nation that has designed a national ICT plan to establish a knowledge economy. Highlighting the social impact of ICTs is a rationale especially attractive to developing countries, and work done in Chile provides a good example of policies emphasizing access in rural schools. Australia and South Africa both provide good examples of countries where national ICT policy is focused on issues that advance education reform. Finally, several countries have included policies based on the use of ICTs for management issues such as assessment and student attendance data. Malaysia is one country taking the lead in this area (Kozma, 2008).

RECOMMENDATIONS

In summary, we affirm that today is the best time for the creation of knowledge-based local and national ICT policies, and we provide the following recommendations for both local and national policy makers.

➤ **Work as an international community to create policy to effectively disseminate the UNESCO ICT Competency Framework for Teachers in a manner similar to the national dissemination of the ISTE NETS-T standards in the United States:**

- Provide resources for presentation of the UNESCO Framework and examples of successful implementation at international professional meetings on the topic of technology in education, including EDUsumMIT, Society for Technology in Teacher Education, ISTE, and other national meetings around the world.
- Provide resources to support research and evaluation on the implementation of the UNESCO Framework in a variety of contexts.
- Create policy to include the UNESCO Framework in local and/or national teacher accreditation requirements.

➤ **Create policies that encourage and support:**

- Use of ICTs to disseminate specific professional development approaches and models that are working through sharing these successful implementations.
- Funding of pilot projects implementing the UNESCO Framework across a variety of countries and contexts.
- Use of ICTs to enhance and sustain professional learning communities for long-term, high-quality professional development.
- Use of a range of technologies and strategies to make professional development widely available, including the rapidly expanding base of mobile technologies.
- Diffusion of education leaders' best practices to support, encourage, and develop teacher leadership, as well as formal/informal ICT activities.
- Allocation of sufficient funding, optimally 25% of technology project budgets, to support administrator and teacher professional development.
- Dissemination of models for making ICT standards part of teacher credentialing requirements.

➤ **Disseminate and highlight the work of local, national, and international policy makers who have created and implemented successful ICT policies to support high-quality professional development for teachers.**

REFERENCES

- Fullan, M. (2011). *Choosing the wrong drivers for whole system reform*. Center for Strategic Education. Retrieved from: http://www.michaelfullan.ca/home_articles/SeminarPaper204.pdf
- Fullan, M. (2001). *The new meaning of educational change* (3rd ed). New York: Teachers College Press.
- Garet, M. S., Porter, A. C., Desimone, L., Birman, B., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Education Research Journal*, 38, 915–945.
- Kozma, R. B. (2008). Comparative analysis of policies for ICT in education. In J.Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 1083-1096). New York: Springer.
- New Zealand Ministry of Education. (2006). *Enabling the 21st Century Leader*. Wellington, NZ: Author.
- Senge, P., Kleiner, A., Roberts, C., Ross, R., Roth, G., & Smith B. (1999). *The dance of change*. New York: Doubleday.

Current work on defining teacher competencies in ICTs has produced a clear understanding of what teachers need to know. Current data on young people suggest a strong need to effectively use ICTs in their education. Despite these facts, the lack of effective use of ICTs in schools remains and can be traced to a lack of professional development opportunities for teachers. The purpose of this brief is to identify the policies that are needed to take teacher ICT competency work to the next level. We suggest that policies focused on the use of ICTs for effective professional development can accelerate worldwide progress in teacher ICT use. We also suggest using exemplary policies at the national and local level to inform policy makers worldwide.

Author: Lynne Schrum, Neal Strudler, Ann Thompson

Published by the UNESCO Institute
for Information Technologies in Education
8 Kedrova St., Bldg. 3
Moscow, 117292
Russian Federation
Tel: +7 (499) 129 29 90
Fax: +7 (499) 129 12 25
E-mail: iite@unesco.org
<http://www.iite.unesco.org>

© UNESCO, 2011

Printed in the Russian Federation