

# Research Report for GeSCI Meta-Review of ICT in Education Phase Two -Partial document-

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**In response to:**

Terms of Reference for GeSCI Request for Proposal

Meta-review of ICT in Education Research

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## Concluding Discussion

### Leadership

This literature review has revealed a variety of broad themes. In the section discussing leadership and management, several studies address the unrealized transformational promise of ICT for change and the fundamental nature of schooling. Many contemporary schools throughout the world continue to be structured on a hierarchical industrial model. When technology is simply layered onto a traditional framework, its potential is severely constrained. Educational leaders are therefore challenged to examine the larger educational structure before considering the particulars of improvement through technology. Technology has been described as "disruptive." In this sense, disruption is positive and necessary. If curriculum is not disrupted, then technology will offer nothing more than superficial window dressing masquerading as innovation. Disruption is uncomfortable. Effective leadership accepts such discomfort and pushes beyond it in order to yield authentically beneficial change.

Since schools perform the double duty of curriculum and social supervision, the critical role of the local principal has been repeatedly stressed in the research, as has the necessity of deep, continuing communication among all levels of policy jurisdiction. Educational leadership is also urged to assure the provision of resources so that educators may pursue innovation in sensible and safe settings. This means that vision-driven professional development, persistent communication, material resources, and ongoing research are critical to the success of ICT-rich transformation.

Several studies stress the importance of initial teacher education, not only equipping prospective teachers with technological skills but also instilling confidence and habits that they will transport into their new professions. The research offers a broad variety of innovative techniques to improve teacher education and to make it relevant to a technologically networked world. As for the efficacy of ubiquitous computing, otherwise known as one-to-one laptop distribution, research stresses the importance of sound educational planning to realize the benefits of massive laptop infusion. Absent such planning, the computers might just as well remain on the vendors' shelves.

### Transformation

In the discussion of educational transformation and ICT, interesting metaphors appear. The "grammar of schooling" and "landscape of education" are terms that describe entrenched practice. Thus, it becomes incumbent upon educational leadership to create "disruption" in order to change the grammatical rules and to

rearrange the landscape. In doing so, however, cross-border differences and regional cultures need to be understood and respected. Received truth in the West might be regarded as heresy in other parts of the world; priorities for resource distribution in rich countries could seem insane in regions where basic sustenance for survival is brutally scarce. The ubiquitous distribution of \$200 laptops, for example, might make little sense where such a sum represents an average citizen's monthly -- or even annual -- income. This does not imply, however, that children in those countries should be denied access to the benefits of ICT and up-to-date research on efficacious educational practice. It means that resources for accessibility and application are deployed in diverse ways.

The importance of research on how young people learn is stressed in the literature on transformation. The well-worn factory model of schooling lends itself to the tradition of instruction "delivered" to learners. Contemporary research, however, shows that lasting knowledge is "constructed" by learners based on their interactions with appropriate tools and materials and with other human beings. Although knowledge is constructed internally, it may or may not be reflected in externally observed behavior. Temporal exhibitions of behavior do not necessarily signify deep learning. ICT offers many affordances for the effective creation of constructivist learning environments. The research reported in the main body of this report points to specific strategies for doing so.

New technologies are transforming the way human beings fundamentally interact. Throughout the world, perpetual mobile connectivity is becoming commonplace. With 3-G telephony, young people are linked to a kaleidoscopic global universe everywhere and all the time. Already, their mobile gateway to the Internet is perceived quite differently than that of their elders, who were introduced to networked computing on fixed-location machines anchored to desks and connected only at predetermined times. New Web-based applications such as virtual cohabitation on mediated "campuses" (e.g., *Second Life*), shared workspaces, social networks, and round-the-clock bursts of public chatter constitute standard social practice for today's youth. Students are living parts of their lives virtually and are quite literally all a-twitter. If schooling fails to respond by taking its own transformational initiative, then the technological revolution occurring under our noses will continue altering the fundamental shape of education: inevitably, aimlessly, and negatively.

## Equity

The question of equity in the distribution of ICT resources is complex. This question may be approached in countless ways. We have chosen to create two categories: equity related to gender, race, ethnicity and nationality; and equity related to special learner need and socioeconomic status (SES). In western European countries and North America, ICT resource disparities between the genders seem superficially to be in decline. Nevertheless, enabled by computer networks, cyber-bullying among

schoolchildren seems to be spiraling out of control. Wherever cyber-bullying occurs, boys tend to be the perpetrators and girls, the victims.

In some cultures, gender disparities appear to be even starker. In Greece, for example, high school boys were found to be more facile with computers than their female peers. These disparate levels of technological confidence seemed to be associated with scholarly achievement. Some researchers found that inequities can be reduced through the application of creative ICT-embedded teaching strategies such as gaming, role-playing, peer coaching or adult mentoring. In some cases, strategies varied in their relative effectiveness for boys versus girls. Inequities across and within national boundaries are revealed on the basis of relative affluence and SES. Leadership for educational transformation is lacking.

Discussion about the equitable distribution of ICT resources has historically emphasized comparative machine counts. This, of course, fails to tell a more meaningful story. Rather than analyzing computer-to-student ratios, we ought to be looking at what actually happens in classrooms. The more important questions have to do with curriculum design and school structure. In the context of transformational vision for curriculum, we need to examine what is being accomplished with the machines we count; their condition, their software support, and professional development for teachers who are expected to implement ICT-based methods effectively. The massive infusion of computers in schools is of little use if they are not being used to their best possible advantage.

### **A final word**

As negotiated with GeSci, this report offers an in-depth review of targeted literature on ICT and education. Valuable ancillary information, however, may be gleaned from public reports on policy and global development. One such report is the *2009 Prosperity Index* from the Legatum Institute. This index compares the relative prosperity of 104 nations based on a variety of factors such as education and social capital. Underlying narrative supporting these comparisons is provided on a country-by-country basis. In these narratives, information about such things as gender equity, educational investment, human capital offer context for the findings indexed in this report. The *2009 Prosperity Index* may be found at <http://www.prosperity.com/rankings.aspx>. This resource was brought to our attention by Dr. Seppo Tella, Professor of Foreign Language and First Vice Dean of Education at Finland's University of Helsinki.

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