Barriers to Successful Implementation of Technology Integration in Educational Settings

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Summary

When addressing the topic of barriers that confront the integration of ICT into educational settings, two issues arise. First, can “barriers” be better understood against the backdrop of essential conditions? If so, is there a universal set of essential conditions across international and regional settings? Second, some are uncomfortable using the term “barriers” and would prefer alternates such as “opportunities” or “challenges.” Participants in the 2011 EDUSummitT addressed these issues, and others, as they relate to the role that barriers and essential conditions play in the successful implementation of ICT in educational settings.

While identification of “essential conditions” can be somewhat contextualized, varying from region to region and country to country, some more encompassing conditions have emerged. For example, in 2009, the International Society for Technology in Education (ISTE, 2009, see below) listed fourteen essential conditions, which serve as standards to varying degrees depending for local, national, and regional contexts. Hence, the EDUSummitT 2011 leadership found value in encouraging participants to develop and disseminate a list of essential conditions that need to be in place to maximize benefit from technology investments from their perspectives.

Introduction

Optimal learning environments should meet essential conditions that support the integration of ICT as education tools. To develop and disseminate a list of essential conditions that need to be in place to ensure benefit from technology investments is the task at hand for those who seek successful implementation of technology integration in educational settings. This paper suggests that one could begin with the “essential conditions” established by ISTE (2009), with a focus on educational technology, while keeping in mind that innovation within educational technology (Ely, 1999; Turcotte & Hamel, 2008) is an issue that is broader than implementation alone.
Research update

ISTE (2009) identified fourteen conditions, described as “necessary... to effectively leverage technology for learning.” They are

**Shared Vision.** Proactive leadership in developing a shared vision for educational technology among all education stakeholders including teachers and support staff, school and district administrators, teacher educators, students, parents, and the community

**Empowered Leaders.** Stakeholders at every level empowered to be leaders in effecting change **Implementation Planning.** A systemic plan aligned with a shared vision for school effectiveness and student learning through the infusion of information and communication technologies (ICT) and digital learning resources

**Consistent and Adequate Funding.** Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development **Equitable Access.** Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders

**Skilled Personnel.** Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources

**Ongoing Professional Learning.** Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas

**Technical Support.** Consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources **Curriculum Framework.** Content standards and related digital curriculum resources that are aligned with [state or other official curricula, and especially those supporting] digital-age learning and work

**Student-Centered Learning.** Planning, teaching, and assessment center around the needs and abilities of students **Assessment and Evaluation.** Continuous assessment, both of learning and for learning, and evaluation of the use of ICT and digital resources

**Engaged Communities.** Partnerships and collaboration within communities to support and fund the use of ICT and digital learning resources **Support Policies.** Policies, financial plans, accountability measures, and incentive structures to support the use of ICT and other digital resources for learning and in district school operations

**Supportive External Context.** Policies and initiatives at the national, regional, and local levels to support schools and teacher preparation programs in the effective implementation of technology for achieving curriculum and learning technology (ICT) standards.

At the EDUSummit 2011 Call to Action, two groups from Thematic Working Group 7 (TWG 7) focused on barriers and conditions, and suggested that a *shared vision*, in particular, is a key factor in the discussion on barriers and essential conditions, as related to successful implementation of ICT in educational settings. They concluded that
In order to achieve sustainable successful outcomes, a shared vision has to be a belief that technology is beneficial, as defined by different communities of users or practice and educational models, and to be embraced with an open mind by all involved.

Another area of focus for the EDUsummIT TWG 7 was student technology experiences, where it is recommended that a shared vision would “recognize the importance of informal learning through ICT in the 21st Century.”

As difficult as it may be to reach a consensus on a global shared vision, it seems that it is a necessary step in any context. For instance, the Global eSchools and Communities Initiative (Hooker and Wachira, 2009), drew from the ISTE model, addressing the question, ”What are the essential conditions that must be in place to begin moving forward?” From the original set of ISTE essential conditions, it focused on six, as prioritized by roundtable participants, with the first three—a shared vision, empowered leaders and implementation planning—the same as ISTE’s. For a shared vision, it identified three "challenges”:

- A lack of understanding of the benefits of ICT as a concept in Education
- Lack of a policy framework
- Resistance to change

Ely’s (1999) eight conditions to ICT integration (listed below) constitute the framework used by Turcotte, Laferrière, Hamel & Breuleux (2010) in an eight-year long innovation process with ICTs with many school districts in Quebec, Canada.

- Dissatisfaction with the status quo
- Sufficient knowledge and skills
- Availability of resources
- Availability of time
- Reward or incentives
- Participation
- Commitment, and
- Leadership

Others have distilled the ISTE set of essential conditions even further. For example, in a study of Malaysian Smart Schools, Ali, Not, and Alwi (2009) made a distinction among “emerging,” “essential,” and “supporting” conditions. They conclude that essential conditions can be reduced to “availability of ICT resources” and “acquisition of ICT knowledge.” One gets a sense of a focused shared vision guiding Malaysian leaders in implementation planning.

Without a shared vision to guide ICT implementation, effective technology integration can become disjointed. For example, Turcotte and Hamel (2008) reported that the lack of dissatisfaction with the status quo had been a major constraint to the implementation of new practices at the different levels of the school systems. This situation led to a lack of consensus within the school districts regarding a shared vision and impacted all stakeholders seeking to effectively implement educational technology integration.
Therefore, the lack of a shared vision, especially when rooted in a specific context, becomes a key barrier to be overcome for many stakeholders, leads to a lack of coherence in action plans, and challenges another ISTE essential condition—empowered stakeholders.

Some have pointed out just how critical the role of empowered leaders is for successful technology integration. As suggested by Eickelmann (2011) empowered leaders “take account supportive factors of sustainable ICT implementation to respond to the rapid development of ICT and education.” She goes further to say

Leaders of successful organisations should leverage their power to promote ICT-use underpinned by a sound understanding of the potentials of ICT to enhance learning. Strategize to cope with new digital trends, e.g. staff development schemes, private- public partnerships, increase technical support staff. Closely link ICT-use to existing and prospective pedagogical aims, e.g. language support for student migrants to enhance compulsory curricula.

EDUSummit TWG 7 participants insisted that all stakeholders—in addition to empowered leaders—must be involved. Moreover, they argued that a shared vision should be at the center of any stakeholder’s ICT integration strategy, from teachers to teacher educators to teacher candidates, across universities, policy makers, parents, parents, communities, municipalities, NGOs or SMEs (open-source software, venture capitalists) or other industry leaders in this area. And, in all cases, learners should always be central to such work.

Curriculum framework, student-centered learning and assessment and evaluation are the three other conditions shared jointly by ISTE and the Global eSchools and Communities Initiative. Preferably, they would be aligned with a shared vision focused on 21st skills (see EDUsummit 2011 TWG 6). Through their practices, educational policymakers, teacher educators, teachers and candidate teachers are in best position to provide such alignment. However, barriers that could thwart such efforts include: 1) disagreement in values, theoretical models, practices; 2) teachers fear that they will lose control over the learning process; and 3) authoritarian and dogmatic approaches to knowledge transfer.

EDUsummit 2011 TWG 7 participants focused on two additional ISTE essential conditions—“skilled personnel” and “ongoing professional learning”—to help teachers’ understanding and develop their capability to engage actively and collaboratively with learners, ensuring that the learning process would continually enhance shared curriculum goals. This could be accomplished by focusing teacher education and professional development that focuses on learning outcomes, when using ICT, so that teachers gain confidence in a “communities of practice” approach to technology integration. The deployment of technology to support onsite/online programs for teachers and students would incorporate processes such as coaching, modeling, and the building of online professional learning communities (teacher educators, in-service and pre-service teachers).

Two caveats were formulated: 1) the use of technology in the curriculum must prevent overstimulation and understimulation of the learner, which could otherwise serve as a barrier to effective learning, and 2) a clear alignment between resources allocated to technology integration and a demonstration of effective integration that positively impacts...
learning. Other essential conditions should be galvanized to support these objectives to ensure that effective technology integration is fully realized.

EDUsummIT 2011 TWG 7 participants took the position that the status of educators who successfully integrate technology—especially toward developing 21st century, global citizens—should be elevated. The present lack of teacher status in this area was identified, along with other critical barriers, such as the lack of infrastructure support. Collectively, these barriers undermine the development of a 21st century workforce. Here again, the importance of regional perspectives on "barriers" and "essential conditions" is reaffirmed. While barriers to successful implementation of ICT in schools is an issue for all communities, it is more critical in developing countries where access to emergent technologies and the Internet may be severely limited in the home and local communities, posing a greater challenges to educators attempting to meaningfully integrate technology as a tool for learning.

Essential conditions listed above could be complemented with an additional and more focused agenda. No factor can be considered a barrier in and of itself. EDUsummIT 2011 TWG 7 participants pointed to the following specific actions for helping policy makers and experts at different levels understand the benefits of technology in learning, and the importance of involving key stakeholders, including learners, in policy, strategy and implementation:

1) the conduct of top-level conferences and opportunities for informing decision makers by key stakeholders, particularly learners;
2) the creation of communities of practice focusing on particular issues to bring together decision makers and stakeholders;
3) the involvement of powerful international backers and agencies (e.g., UNESCO) to support global shared activity;
4) the proactive engagement of users of learning technologies with producers of learning materials and software content to have the needs of learners and teachers met as well as developers' aspirations; and
5) the gathering of a range of funders and educational technology stakeholders so they could better understand their varying perspectives, and move toward the development of user-led materials.

Conclusion

In short, the literature supports the notion of some type of continuum of barriers and essential conditions. Conditions that do not support integration of technology could be considered barriers to optimal learning conditions. Most EDUsummIT 2011 TWG 7 participants also supported this approach. Experience, expertise and knowledge of Summit participants could be leveraged by administering a survey to identify barriers to successful technology integration, with an eye toward providing solutions and finally realize the goal of robust technology integration for all learners across the globe.
References


