The Role of Technology in Enhancing Learning

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Quality & Effective Learning: A Systemic Approach

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Presentation Outlines

- **Background:** worldwide challenges facing education in the 21st century.

- **Drivers for paradigm shift.**

- **Barriers facing technology integration.**

- **Using technology to enhance learning.**

- **Conclusion**
Background

Worldwide challenges facing education in the 21st century
Background

Worldwide challenges facing education in the 21\textsuperscript{st} century:

- Providing equal & quality educational opportunities for all citizens.
- Meeting new societal demands for well skilled workforce.
- Transforming education from industrial school model to 21\textsuperscript{st} century learning school.
- Achieving balance between direct and indirect instruction.
Background

Worldwide challenges facing education in the 21\textsuperscript{st} century:

- Integrating technology in a way that is responsive to the new styles of the 21\textsuperscript{st} century learning.
- Leveraging the learning sciences and modern technology to create engaging, relevant, and personalized learning experiences for all learners that mirror students daily lives and the reality of their futures.
- The world has changed, the students have changed, & education system has not changed.
Drivers for Paradigm Shift in Education
Drivers for Paradigm Shift in Education

Drivers for Paradigm Shift in Education

McBeath & Mortimore (2001):

We have entered a new millennium with sophisticated science and spectacular technology but still without the knowledge of how to educate all our children.

Education Crises

Parons Grienfeld:

Education system is in a crises as it strives to respond to the changing ways by which people learn

http://www.21stcenturyskills.org/route21/.
Knowledge:
- Inert
- Naive
- Missing

Recitation
- Discrete
- Irrelevant

Low Motivation for learning
- Learning Transfer Problem

Fragile Knowledge

Education Crises

David Perkins (Smart Schools, 1995)
John Taylor Gatto*:  
- Public high-school graduates cannot function as adults.  
- Our schools are virtual factories of childishness.  
- Instead of getting students smart, modern schooling teaches is dumbness.”

* A New York state Teacher-of-the-Year
Education Crises

Daniel T. Willingham (2009, p. 3):

- People are naturally curious, but we are not naturally good thinkers; unless the cognitive conditions are right, we will avoid thinking.

- Provide solvable problems.

- Consider cognitive limits.
Education Crises

- Learning Transfer Problem
- Low Motivation for Learning
Drivers for Paradigm Shift in Education

Human Learning Research: new knowledge about how human learning happens is at our disposal. Learning theories such as:

- Motivation,
- Constructivism,
- Brain-based research learning,
- Connectivism,
- Cognitive flexibility,
- Cognitive apprenticeship,
- Information processing, etc.

have significant implications for learning but we make little use of their findings to inform our ed. Decision.
Brain-based Research learning

What we know about how the brain functions has a significant impact on curriculum, instruction and assessment.

- The brain is a complex adaptive system (VARK).
- The brain is a social brain (collaborative learning).
- The search for meaning is innate (learning goals).
- The search for meaning occurs via patterning (activating prior knowledge).
- Emotions are critical to patterning.
- The brain is a parallel processor (Integrated approach to learning).
- Learning involves both focused and peripheral attention.

[Image: Edutopia: http://www.edutopia.org/brain-based-learning-research-resources#graph2]
Learning Research

Key Implications of Learning Research:

- Authentic Learning
- Authentic evaluation
- Mental Models
- Internal Motivation
- Multiple Intelligences
- Social Learning

Trilling & Fadel 21st Century Skills, 2009
Drivers for Paradigm Shift in Education

Technology Affordances

- Provides access to expensive laboratories and facilities.
- Provides tools for collaborative learning.
- Support 21st century learning styles that is project-based, cooperative, visual, customized, interactive, etc.
- Make distance e-learning a normal & every day activity.
- Support on the job training: e.g. EPSS.
- Providing powerful resources that support various learning tasks: augmented reality, second life, computerized labs, etc.
Drivers for Paradigm Shift in Education

21st Century Skills
Top 5 Needs of Employers

- Critical Thinking and Problem Solving
- Information Technology Application
- Teamwork/Collaboration
- Creativity/Innovation
- Diversity

Education Technology Expert Alan November has included Empathy as Number One In His Surveys

Are They Really Ready To Work: (Employer’s Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce)

21 century ed tech web site provides total ranking
21st Century Skills Learning Framework

- Life and Career Skills
- Learning and Innovation Skills
- Core Subjects and 21st Century Themes
- Information, Media, and Technology Skills

- Standards and Assessments
- Curriculum and Instruction
- Professional Development
- Learning Environment

Drivers for Paradigm Shift in Education

21st Century Learning

Project Tomorrow: Students need:

- Social-based learning
- Un–tethered learning
- Digitally–rich learning Interactive resources
- Relative materials
- Collaborative learning tools
- Personalized learning
Barriers facing technology integration

http://ged578.pbworks.com/w/page/25547795/Barriers%20for%20teachers%20to%20use%20technology
Barriers facing technology integration

Old barriers still exist:
Teacher – level (Internal) barriers:
- Lack of confidence
- Lack of competence
- Resistance to change

School- level (External) barriers:
- Lack of time
- Limited accessibility
- Lack of effective training
- Lack of technology Leadership
- Lack of long term commitment
- Poor administrative support
- Curriculum integration difficulties

http://ged578.pbworks.com/w/page/25547795/Barriers%20for%20teachers%20to%20use%20technology
Barriers facing technology integration:

The major barrier facing technology integration is using technology to improve out-dated educational school system.

Serving old candy in a new can!
Using Technology To Enhance Learning.
Using Technology To Enhance Learning.

Enhancing learning by technology requires:

- Restructuring the whole school system.
- Helping students turn information into knowledge, generating knowledge & creating a “culture of inquiry.
- Maintaining student interest, instill curiosity & use flexible teaching methods.
- Interdisciplinary, project-based, and research-driven curriculum.
- Integrating technology into the whole school system.

Using Technology To Enhance Learning.

Using technology to support equity and quality Education:

- Access to up-to-date, primary source materials.
- Methods of collecting/recording data.
- Ways to collaborate with students, teachers, and experts around the world.
- Opportunities for expressing understanding via multimedia.
- Learning that is relevant and assessment that is authentic.
- Training for publishing and presenting their new knowledge.

Using Technology To Enhance Learning.

Using technology to support five essential areas:

- **Learning**: Engage and Empower
- **Teaching**: Prepare and Connect
- **Assessment**: Measure What Matters
- **Infrastructure**: Access and Enable
- **Productivity**: Redesign and Transform

Office of Educational Technology
Using Technology To Enhance Learning.

Focusing teaching to match:

- what students need to know,
- how they learn,
- where and when they will learn, and
- who needs to learn.

Using technology to:

- Enable, motivate, and inspire all students, regardless of background, languages, or disabilities, to achieve.

- Leverage the power of technology to provide personalized learning and to enable continuous and lifelong learning.

Using Technology To Enhance Learning

David, Jonassen (1995)

Learn *with* technology not *from* technology!

Technology Integration: The Tools
Technology Integration: The Tools

TPACK is a framework to understand and describe the kinds of knowledge needed by a teacher for effective pedagogical practice in a technology enhanced learning environment.
# Technology Integration: The Tools

## The Technology Integration Matrix (TIM)

### Levels of Technology Integration Into the Curriculum

<table>
<thead>
<tr>
<th>Technology Integration</th>
<th>Entry</th>
<th>Adoption</th>
<th>Adaptation</th>
<th>Infusion</th>
<th>Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of the Learning Environment</td>
<td>The teacher uses technology to deliver curriculum content to students.</td>
<td>The teacher directs students in the conventional use of tool-based software. If such software is available, this level is recommended.</td>
<td>The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.</td>
<td>The teacher consistently provides for the infusion of technology tools with understanding, applying, analyzing, and evaluating learning tasks.</td>
<td>The teacher cultivates a rich learning environment, where blending choice of technology tools with student-initiated investigations, discussions, compositions, or projects, across any content area, is promoted.</td>
</tr>
<tr>
<td><strong>Active</strong></td>
<td>Active: Entry</td>
<td>Active: Adoption</td>
<td>Active: Adaptation</td>
<td>Active: Infusion</td>
<td>Active: Transformation</td>
</tr>
<tr>
<td><strong>Collaborative</strong></td>
<td>Collaborative: Entry</td>
<td>Collaborative: Adoption</td>
<td>Collaborative: Adaptation</td>
<td>Collaborative: Infusion</td>
<td>Collaborative: Transformation</td>
</tr>
<tr>
<td><strong>Constructive</strong></td>
<td>Constructive: Entry</td>
<td>Constructive: Adoption</td>
<td>Constructive: Adaptation</td>
<td>Constructive: Infusion</td>
<td>Constructive: Transformation</td>
</tr>
<tr>
<td><strong>Authentic</strong></td>
<td>Authentic: Entry</td>
<td>Authentic: Adoption</td>
<td>Authentic: Adaptation</td>
<td>Authentic: Infusion</td>
<td>Authentic: Transformation</td>
</tr>
<tr>
<td><strong>Goal Directed</strong></td>
<td>Goal Directed: Entry</td>
<td>Goal Directed: Adoption</td>
<td>Goal Directed: Adaptation</td>
<td>Goal Directed: Infusion</td>
<td>Goal Directed: Transformation</td>
</tr>
</tbody>
</table>

*12/04/2015*
Technology Integration: The Tools

The traditional perspective of educational technology focuses on either the technology itself or a teacher's instruction and is limited to the first three phases.

The contemporary perspective of educational technology focuses on a learner's active construction of knowledge and can reach all the way to the Evolution phase.

"Idea" and "Product" Technologies

Technology Integration: The Tools (LOTI)

Levels of Technology Implementation

- No Use
- Awareness
- Exploration
- Infusion (Mechanical)
- Integration (Routine)
- Expansion
- Refinement

Stages of Implementation

12/04/2015 Chris Moersch (1994)
Education problem is complex, hence, the solution ought to be at the same level of complexity

Applying systemic Thinking

Jeff Borden (Dec. 2013):

Neuroscience + Learning Psychology + Education Technology = Education 3.0

Director of the Center for Learning, Pearson, USA
Integrating Technology Into the School's System

Key Questions to Consider

- Dose the school mission & goals include 21st century outputs?
- How should we teach to achieve 21st century outputs?
- How can we design curriculum & evaluation system appropriate for 21st century outputs?
- How can we use technology achieve 21st century outputs?

McTighe & Seif, 2010, p. 150
Key Questions to Consider

- Are our schools managed by change Leadership?
- What learning principles should guide education practices in the 21\textsuperscript{st} century?
- What policies, infrastructure\& resources needed to support 21\textsuperscript{st} century outputs?
- What is the best design for the school of the 21\textsuperscript{st} century?

McTighe & Seif, 2010, p. 150
Conclusion

We have:

- plenty of principles derived from relevant theories & research
- plenty of tools,
- technology plans, and
- technology standards, that can inform our journey toward fully integration of technology into education.

Are we going to use them wisely? The choice is ours!
شكراً لكم جميعاً

Thank You All

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