The Successful Use of Technology in Education

January 25-26, 2018
Erin Wilcox, EdD
Assistant Vice President
Academic Services ACSI

Current state of technology

<table>
<thead>
<tr>
<th>Technology in the Classroom Statistics</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of schools that have one computer per student</td>
<td>3.9%</td>
</tr>
<tr>
<td>Percent of schools that have a wireless network</td>
<td>94.2%</td>
</tr>
<tr>
<td>Percent of schools that have blended learning available</td>
<td>19.1%</td>
</tr>
<tr>
<td>Percent of schools that have laptops available</td>
<td>59.7%</td>
</tr>
<tr>
<td>Percent of schools that have high-speed internet</td>
<td>64.5%</td>
</tr>
<tr>
<td>Percent of schools that have video streaming</td>
<td>43.4%</td>
</tr>
<tr>
<td>Percent of schools that have one or more computers in the classroom</td>
<td>68%</td>
</tr>
<tr>
<td>Percent of teachers that use the internet for instruction</td>
<td>77%</td>
</tr>
<tr>
<td>Percent of schools that lend laptops to students</td>
<td>12%</td>
</tr>
<tr>
<td>Percent of teachers who reported students used computers during instructional time in the classroom</td>
<td>40%</td>
</tr>
</tbody>
</table>

Current state of technology

- Every day, 30,000 new Chromebooks are activated in schools
- More than 50 million students are using Google’s Apps for Education
  2016
  - #1 – Chromebooks (58%)
  - #2 - Windows devices
  - #3 – Apple, teacher training and analytics

Agenda

- What is the current state of technology in education?
- What does the research say about the effectiveness of technology in education?
- How can we ensure technology improves instruction?
- What do the teachers need?
- What are the “right” questions about our current program and future purchases?
- How can we best prepare for the future?

ACCESS

Far More Schools Have High-Speed Internet Connections

In 2016, 48 percent of the nation’s school districts met the FCC’s minimum internet connectivity target of 1 Mbps per student, that’s up from just 1 percent of districts in 2010, but there are still geographic disparities. In five states, all districts meet federal connectivity targets. In Florida and Maryland, fewer than 10 percent of districts meet the FCC target.

More technology, less training

- Number of laptops, tablets, netbooks rose 363%
- 4th graders’ reading teachers dropped 3% in training
- Most teachers are not using the technology for significantly different types of uses even though they have more now than they used to
Has access made a difference?

- 1987 the ratio was 25 to 1
- 1997 the ratio was 7 to 1
- 2007 the ratio was 3 to 1
- 2017 the ratio is maybe 2 to 1?

(more than 50% of classrooms report 1-to-1 ratios. Other classrooms have access to labs, carts, or districts have decided to use BYOD.)

What does the research say?

- 1:1 programs, students were more likely to use the computers for critical thinking, problem solving.
- Students in classes with 1-2 computers per classroom reported lower levels of computer usage
- Studies conflict in results by subject (math, science, and English) depending on level, skills tested, design of software, short-term/long-term
- Some showed increased scores for girls but not boys
- Other studies showed decreases in scores
- Academic gains (modest), motivation, engagement
- Many studies yielded no significant findings

Research, cont.

- 40 years of data shows overall small but positive results (not necessarily causal)
- Increasing variety of digital technologies and diversity of contexts make it more difficult
- More effective schools/teachers are likely to use digital technologies more effectively
- Technology engages and motivates
- Alignment of technology with learning outcomes is most important
- Technology alternatives don’t always make the difference but it is how they are used that matter

Research, secondary effects

1. Immediate, specific, encouraging feedback
2. Student motivation
   a) Additional resources
   b) Students able to monitor/structure their own learning (choices, progress monitoring)
3. Collaboration in higher level, hands-on problem solving activities enhanced by technology such as simulations, interschool exchanges, audiences outside the school, real-world problems
4. Change in learning method (flipped learning, Kahn Academy, ELL support) that support mastery learning

Conclusions

It is therefore the pedagogy of use of technology which is important: the how rather than the what.

Technology is best used as a supplement to normal teaching rather than as a replacement for it.

It is not the technology that makes the difference.
Implications

- Collaborative use of technology (in pairs or small groups) is usually more effective
- Can be used very effectively as a short but focused intervention to improve specific learning
- Remedial and tutorial use of technology can be particularly effective for lower attaining pupils or those with special educational needs
- Tested gains in attainment tend to be greater in mathematics and science
- Training and professional development for teachers is important

21st Century Learning Areas

1. Content Areas and 21st Century Themes
   - Academic areas
   - Themes (Global Awareness, Financial, Environment, Civic, and Health Literacy)
2. Learning and Innovation Skills
   - Creativity, Problem Solving, Communication, Collaboration
3. Information, Media, and Technology Skills
   - Information, Media, and ICT Literacy
4. Life and Career Skills
   - Flexibility, Adaptability, Accountability, Initiative, Self-Direction, Social, Cross-Cultural Skills

21st Century Learning and Innovation Skills

- personal and social responsibility
- creativity and innovation
- collaboration
- planning, critical thinking, reasoning, and problem solving
- strong communication skills, both for interpersonal and presentation needs
- visualizing and decision making
- knowing how and when to use technology and choosing the most appropriate tool for the task

Is technology improving our instruction?

1. Empower teachers to spend less time on the basics, enabling them to provide more focused, personalized instruction
2. Provide space for social and emotional learning
3. Provide assessments to figure out what is working with each child
4. Reach more students in more places with quality instruction

How are we measuring its impact?

- Test scores
- Grades
- Criterion/mastery learning/benchmarks
- Portfolios/projects
- Experimental/quasi-experimental studies
- Time on task
- Surveys/inventories of softer skills
- Satisfaction/motivation
- Longitudinal data/measures of success

What do teachers need?

On a national level,
- planning time with colleagues
- professional development
  - technology skills/tools
  - how to integrate effectively
  - how to differentiate for students
- create meaningful formative assessments are top vote-getters each year in the national Speak Up research study.
Transforming Lessons

- **Substitution** – tool, results in no substantial change
- **Augmentation** – results in functional improvements
- **Modification** – allows for a significant way the task is accomplished (task is still the same)
- **Redefinition** – allows for the creation of a new task

What are the “right” questions to ask?

Clear rationale for using technology –

1. Will learners work more efficiently, intensively, deeper, longer? Higher level thinking?
2. Access to more learning content, from other people?
3. Access to feedback?
4. Support collaboration, discussion, interaction?
5. Skills training and beyond? Training on how to get the most from the application, not just how to use it at a low skill-based level? (Scope and sequence for the technology skills?)
6. What will students and teachers stop doing? What will the technology replace or make more efficient?

How can we prepare for the future?

- What tools are most flexible?
- Which tools are adaptable to multiple products (not proprietary)?
- Which tools can apply to multiple areas of content?
- Which tools allow students to be creative, work on projects they design, pursue areas of interest not be well-resourced currently?
- Which tools encourage collaboration, online interactions, communication, and other 21st Century Skills?

Topics for discussion

1. **Purchases/Planning** – philosophy, hardware, software, access, policies (1-to-1)
2. **Professional Development** – training or sharing of best practice
3. **Teacher Evaluations** – implementation of school initiatives, best practices
4. **Classroom Implications** – teaching, learning, or assessment (scope and sequence of integrated skills)

Come up with 3-5 principles to share with the large group.