The Impact of the Maine Learning Technology Initiative on Teachers, Students, and Learning

Maine’s Middle School 1-to-1 Laptop Program

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The Maine Learning Technology Initiative (MLTI) has provided all 7th and 8th grade students and their teachers with laptop computers, and provided schools and teachers technical assistance and professional development for integrating laptop technology into their curriculum and instruction.
Research and Evaluation Strategies: Mixed Methods Approach

1. Longitudinal survey studies with teachers, students, and principals.
2. Interviews with stratified samples of school personnel.
3. Selected site visits and observations.
4. Analysis of documents.
5. Controlled experimental study in a statewide sample of mathematics classrooms.
Primary Data Sources

1. Surveys: Teachers (n = 4,980)
   Students (n = 42,575)
   Principals (n = 500)
   Superintendents (n = 117)
2. Interviews: (n = 635)
3. Site Visits: (n = 54)
4. Classroom Observations: (n = 60)
5. Document Analysis
Core Research and Evaluation Questions

How are the laptops being used by teachers and students?

What are the impacts of the laptops on instruction and learning?
How are the laptops being used by teachers and students?
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*Teachers* are using the laptops to:

- **Creating & Providing Instruction**
  - Conduct research for lesson plans: 57.6%
  - Develop instructional materials: 63.7%
  - Using presentation software: 57.6%
  - Providing classroom instruction: 63.7%
  - Produce homework assignments: 48.6%

- **Assessment & Monitoring**
  - Assess student work: 26.9%
  - Manage student information: 56.6%

- **Communication**
  - Communicate with colleagues: 74.0%
  - Communicate with parents: 54.2%
Students use the laptops to:

Use in Learning Context*

- Use laptop to write first drafts and edit papers: 44.2%
- Use laptop to work with spreadsheet/databases: 18.2%
- Use laptop to take notes: 42.4%
- Use laptop to organize information: 41.4%
- Use laptop to research info on Internet or World Book: 78.9%

* Frequency: Range = at least once a week to several times daily.
Students use the laptops to:

**Use in Learning 21st Century Skills**

- Gather data from multiple sources to solve problem: 60.5%
- Gather data about real-life problem: 41.2%
- Learn by using laptop to interact with world outside school: 37.5%
- Evaluate info obtained on the internet: 51.2%
- Learn things from more than one subject at once: 58.3%
- Critically analyze data or graphs from the media: 39.8%
- Solve complex problems by analyzing and evaluating info: 35.9%
- Explain problem-solving process or thinking: 35.7%
- Visually represent or investigate concepts: 33.9%

*Frequency: Range = at least once a week to several times daily.*
What are the impacts of the laptops on instruction and learning?
What are the impacts of the laptops on instruction & learning?

Teacher Responses

- I can individualize curriculum to fit student needs with laptop
- Having a laptop has helped me access more up-to-date info
- I can better access diverse teaching materials and resources
- I can cover more material in class when we use laptops
- I can explore topics in greater depth with my students
- Use of laptops helps me create materials which better meet state learning standards

Somewhat Agree  Agree  Strongly Agree
What are the impacts of the laptops on instruction & learning?

Teacher Responses: Impact on Student Learning

The quality of my students' work increases when we use the laptops.
Somewhat Agree: 0%  Agree: 20%  Strongly Agree: 80%

My students are better able to understand when we use laptops.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%

My students are more engaged when we use laptops.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%

Laptops have facilitated students' ability to integrate information from multiple sources.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%

Students learning to critically assess quality of info they obtained from Internet.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%

Students are able to express ideas more effectively when using laptops.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%

Students better able to study real-life issues/problems using laptops than without them.
Somewhat Agree: 20%  Agree: 40%  Strongly Agree: 40%
What are the impacts of the laptops on instruction & learning?

Teachers: Improvements in students’ engagement and learning in the following areas:
Has the laptop program improved student learning on standardized achievement tests?

- Generally still unknown at this time.

- Reasons:
  - Local autonomy in laptop implementation.
  - Limitation of state standardized tests.
## Example of Writing Achievement Results

<table>
<thead>
<tr>
<th>Use laptops in writing.</th>
<th>MEA Writing Scale Score</th>
<th>t=</th>
<th>p=</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For Drafts and Final Copy</strong></td>
<td><strong>Not At All</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almost Every Day</td>
<td>Rarely or Never</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.2</td>
<td>531.9</td>
<td>17.13</td>
<td>&lt;.001</td>
<td>0.656</td>
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<tr>
<td>(n=11593)</td>
<td>(n=642)</td>
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</table>

<table>
<thead>
<tr>
<th>How often use laptops in writing.</th>
<th>MEA Writing Scale Score</th>
<th>t=</th>
<th>p=</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Almost Every Day</strong></td>
<td><strong>Rarely or Never</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>537.9</td>
<td>533.9</td>
<td>14.27</td>
<td>&lt;.001</td>
<td>0.421</td>
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<tr>
<td>(n=5861)</td>
<td>(n=1464)</td>
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</table>

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Example of Mathematics Achievement Results

Maine Impact Study of Technology Mathematics (MISTM)

- Randomized field trial using experimental research design.
- Approximately 240 Experimental and Comparative (control) classrooms in 45 Maine middle schools.
- A two-year technology-infused professional development intervention.

Final results:

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
<th>t=</th>
<th>p=</th>
<th>Effect Size</th>
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</thead>
<tbody>
<tr>
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<td>(n=281)</td>
<td>(n=692)</td>
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<tr>
<td>A1</td>
<td>0.560, (n=1969)</td>
<td>0.515, (n=2581)</td>
<td>3.110</td>
<td>&lt; .002</td>
<td>0.22</td>
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<td>G1</td>
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<td>0.448, (n=2054)</td>
<td>6.837</td>
<td>&lt; .001</td>
<td>0.49</td>
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</table>

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Summary:

There is a growing body of evidence that Maine’s Learning Technology Initiative (middle school laptop program) is impacting teachers, students, and learning in many positive ways:

- Teachers are more effectively helping children achieve Maine’s state learning standards.
- Students are more motivated to learn, are learning more, and learning it more deeply.
- Students are acquiring 21st Century skills.
- The one-to-one laptop program is bringing about positive change in the acquisition of knowledge.
It is changing the acquisition of knowledge because it:

1. Increases access to up-to-date information.
2. Increases speed and type of learning.
3. Increases customizing and individualizing student learning.
4. Optimizes teachable moments.
5. Levels the learning playing field.
6. Transforms role of teacher from gatekeeper to provider of gateways to learning and knowledge.
1. **What are some of the characteristics of teachers who are early adopters?**
Teacher Technology Skill Level and Use of Laptops

- Conduct Research for Lessons
- Provide Classroom Instruction
- Assess Student Work
- Communicate with Parents/Students

Skill Levels:
- Novice/Beginner
- Advanced/Expert

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Teachers’ Philosophy and Use of Laptops

- Conduct Research for Lessons
- Provide Classroom Instruction
- Assess Student Work
- Communicate with Parents/Students

Traditionalist vs. Constructivist

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2. What increases sustainability of implementation?
   a. Encouragement and Support for Integrating Laptops.
Technology Coordinator Support and Teacher Laptop Use

- Conundrums
- Provide Classroom Instruction
- Assess Student Work
- Communicate with Parents/Students

Teacher Feels Supported
Teacher Does Not Feel Supported

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Teacher Leader Support and Teacher Laptop Use

- Conduct Research for Lessons
- Provide Classroom Instruction
- Assess Student Work
- Communicate with Parents/Students

Teacher Feels Supported
Teacher Does Not Feel Supported

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Administrative Support and Teacher Laptop Use

- Conduct Research for Lessons
- Provide Classroom Instruction
- Assess Student Work
- Communicate with Parents/Students

Teacher Feels Supported Teacher Does Not Feel Supported

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2. What increases sustainability of implementation?
   a. Encouragement and support for integrating laptops.
   b. Participation in ongoing professional development activities.
Using the laptops:

- **a.** Increases ability to individualize.
- **b.** Increases ability to explore topics in greater depth.
- **c.** Increases ability to create interdisciplinary activities.
- **d.** Increases ability to create higher level thinking skills activities.
- **e.** Helps in better meeting learning standards.

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Copies of MLTI research and evaluation reports available on the following website:

http://www.usm.maine.edu/cepare

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