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?
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Teachers are using the laptops to:

- 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%
- Assess student work: 26.9%
- Manage student information: 56.6%
- Communicate with colleagues: 74.0%
- Communicate with parents: 54.2%
Students use the laptops to:

<table>
<thead>
<tr>
<th>Use in Learning Context*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use laptop to write first drafts and edit papers</td>
<td>44.2%</td>
</tr>
<tr>
<td>Use laptop to work with spreadsheet/databases</td>
<td>18.2%</td>
</tr>
<tr>
<td>Use laptop to take notes</td>
<td>42.4%</td>
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<tr>
<td>Use laptop to organize information</td>
<td>41.4%</td>
</tr>
<tr>
<td>Use laptop to research info on Internet or World Book</td>
<td>78.9%</td>
</tr>
</tbody>
</table>

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

**Gathering Information**
- Gather data from multiple sources to solve problem.
- Gather data about real-life problem.
- Learn by using laptop to interact with world outside school.
- Evaluate info obtained on the internet.
- Learn things from more than one subject at once.

**Analyzing Information**
- Critically analyze data or graphs from the media.
- Solve complex problems by analyzing and evaluating info.
- Explain problem-solving process or thinking.
- Visually represent or investigate concepts.

*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 Facilitating Learning

- Students more actively involved with learning when use laptops.
- Students do more work when using laptops.
- Students more apt to revise/edit work when done on laptops.
- Laptops allow my students to get work done more quickly.
- My students are more organized when we use laptops.
- Laptops make it easier for students to gather information from different sources.

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 40%, Agree 60%, Strongly Agree 0%
- My students are better able to understand when we use laptops: Somewhat Agree 0%, Agree 80%, Strongly Agree 20%
- My students are more engaged when we use laptops: Somewhat Agree 80%, Agree 20%, Strongly Agree 0%
- Laptops have facilitated students’ ability to integrate information from multiple sources: Somewhat Agree 0%, Agree 20%, Strongly Agree 80%
- Students learning to critically assess quality of info they obtained from Internet: Somewhat Agree 40%, Agree 60%, Strongly Agree 0%
- Students are able to express ideas more effectively when using laptops: Somewhat Agree 80%, Agree 20%, Strongly Agree 0%
- Students better able to study real-life issues/problems using laptops than without them: Somewhat Agree 20%, Agree 80%, Strongly Agree 0%
What are the impacts of the laptops on instruction & learning?

**Student Responses: Impact on Work and Learning**

- I am more likely to edit my work when it is done on the laptop. [40% Somewhat Agree, 60% Agree]
- I get my work done more quickly now that I have my laptop. [60% Somewhat Agree, 40% Agree]
- I do more work when I use my laptop. [80% Somewhat Agree, 20% Agree]
- I am better able to understand my school work when we use laptops. [50% Somewhat Agree, 50% Agree]
- The quality of my work has improved since I received my laptop. [70% Somewhat Agree, 30% Agree]
- I am more interested in school when we use the laptops. [90% Somewhat Agree, 10% Agree]
What are the impacts of the laptops on instruction & learning?

Student Responses: Students Capable of doing these 21st Century Skills Effectively:

- Use Search engines: 96.2%
- Use Multimedia software: 65%
- Use Online discussions to gather info: 70%
- Use Database to sort info/create reports: 64%
- Use Spreadsheet to create graphs: 73%
- Use Spreadsheet to calculate: 71%
- Use Word Processor: 96%
What are the impacts of the laptops on instruction & learning?

Teachers: Improvements in students’ engagement and learning in the following areas:
What are the impacts of the laptops on instruction & learning?

Teacher Responses: Overall Impact on Learning & Skill Development

Data indicate that technology is positively affecting student engagement.
Data indicate technology is positively affecting student technology literacy.
Data indicate a positive effect on 21st Century skills.
Data indicate technology is positively affecting student achievement.
What do principal’s report as the impacts of the laptops on learning?
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 Achievement Results

Comparison of Online and Paper MEA Writing Samples

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Writing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Online</td>
<td>Paper</td>
</tr>
<tr>
<td>Average</td>
<td>539.6*</td>
<td>536.6</td>
</tr>
<tr>
<td>SD</td>
<td>9.9</td>
<td>9.2</td>
</tr>
<tr>
<td>n</td>
<td>1,816</td>
<td>14,870</td>
</tr>
</tbody>
</table>

* Statistically significant difference (p<.05); Effect Size = .326

Related Research Evidence:

> In higher performing schools, students use their laptops more often for composing, drafting, and creating final written reports.

> Students using their laptops for writing have greater probability of success in achieving proficiency on state standards.
Example of 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 are participating in the study.
- A two-year technology-infused professional development intervention is provided.
- Standardized tests were developed and validated for measuring State of Maine mathematics achievement standards.

Year One Preliminary results:

- Teachers in Experimental classrooms report they are more competent in teaching mathematics using technology.
- Students in Experimental classrooms are performing significantly (p<.05) better than students in Comparative classrooms on standardized tests measuring Maine mathematics standards.
Two Keys to Successful Program
Research Evidence

- **Administrative Support**
  Teachers who report strong school administrative support:
  - Use laptops more in developing lessons, providing instruction, and individualizing the curriculum.
  - Report greater student engagement and higher student achievement.

- **Professional Development**
  Teachers who report more participation in effective professional development activities:
  - Spend more time creating lessons and delivering instruction using the technology.
  - Are better able to customize their lessons and instructions to meet individual student needs.
  - Report higher quality student work and more, and deeper student understanding of content.
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 nature of acquiring knowledge because it:

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

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

http://www.mistm-maine.us

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