Evaluation Resources

1:1 Computing Evaluation Toolkit

Evaluation Framework: Introduction and Overview

Module 0
One to One Framework and Overview

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Introduction

PURPOSE

This toolkit is designed to provide guidance for local evaluators and implementers of 1:1 computing solutions in K-12 settings across the globe. The premise of the toolkit is that evaluation is an important element in the design and implementation of effective 1:1 computing and ICT programs—a means of understanding the progress, outcomes, and impact of these initiatives. Evaluation can help program staff ensure that their strategies are explicit and realistic, and it can provide feedback on implementation fidelity, which is useful in realigning strategies for efficient use of limited resources. Evaluation can also help program staff target key outcomes and capture meaningful data on their program's impact.

The 1:1 Computing Evaluation Toolkit includes a series of evaluation modules and instruments that, used individually or together, can help educational organizations:

- Assess the impact of 1:1 computing solutions on students, teachers, and classrooms;
- Monitor the implementation of 1:1 computing programs and provide feedback for realignment of resources and program improvement; and
- Provide data for decision-making and sustainability of 1:1 computing programs.

This toolkit should be viewed as a dynamic document. As stakeholders use it and provide feedback about its functionality, the toolkit will evolve to include additional resources that reflect both users' needs and best practices in evaluating 1:1 computing and ICT programs. The online version of this toolkit is available upon request by contacting the Intel K-12 Education Research & Evaluation Manager at Jon.K.Price@Intel.com

TARGET AUDIENCE

The 1:1 Computing Evaluation Toolkit is meant for those involved in the development, implementation, and evaluation of 1:1 computing solutions and e-learning initiatives. Our hope is that decision-makers and staff from government agencies, local education staff, development practitioners from international and non-governmental organizations (NGOs), private sector groups involved with 1:1 computing programs, and school and district level implementers of 1:1 programs will be among the readers and users of these materials.

EVALUATION FRAMEWORK

To focus evaluation on the primary goals of the Intel® Education programs, this toolkit includes an outcome indicator model that can be used across programs. The model, developed from established program goals and outcomes identified through evaluation efforts, portrays primary outcomes as ones that can be measured or observed. Working within this framework, evaluation teams can select tools and protocols that directly address these primary goals and indicators and answer relevant questions about program performance.

How does one decide which program effects are primary indicators? In the toolkit itself, we provide guidance in the form of modules—which are based on specific indicators and purposes. Evaluators can use the indicators identified in each module to form the basis of their studies, and can add and adapt indicators as necessary for their own local contexts. These indicators have been identified as the primary ones of interest in 1:1 computing programs.

Second, why is focusing on these primary indicators crucial to the usefulness of the results? The two most important reasons for focusing program evaluation are to:

- Optimize available evaluation resources—which are often very limited.
- Ensure that claims about program effects reflect the data collected and do not go beyond what the data can demonstrate.

With unlimited resources, it would be possible, for example, to conduct a rigorous study to determine whether a professional development program for teachers affected students' standardized test scores in all subjects. The experimental design for the hypothetical study would include control groups of students who differ from the experimental groups only in that their teachers did not have the benefit of the training. Such a design might ensure that other variables in the school environment, which could have far more direct effects on student test achievement than the training, did not confound the results. The staff, time, money, and logistical challenges involved in gathering rigorous evidence could, however, make this a very costly study.

By focusing on primary indicators, international evaluation teams can target the key outcomes and use effective quasi-experimental designs, while still taking certain logistical limitations into account. These designs, which do, in fact, require a significant investment in and commitment to evaluation standards, include such tools and methods as participant surveys, site observations, interviews, case studies, focus groups, and, when applicable, reviews of student work.

As you review the outcome indicators in the logic model in **Figure A**, note that only the primary indicators are identified. Please also note that this does not mean that your programs will not impact other areas omitted from the model, only that we have selected those specific areas where we might realistically expect to see an impact in a limited amount of time.

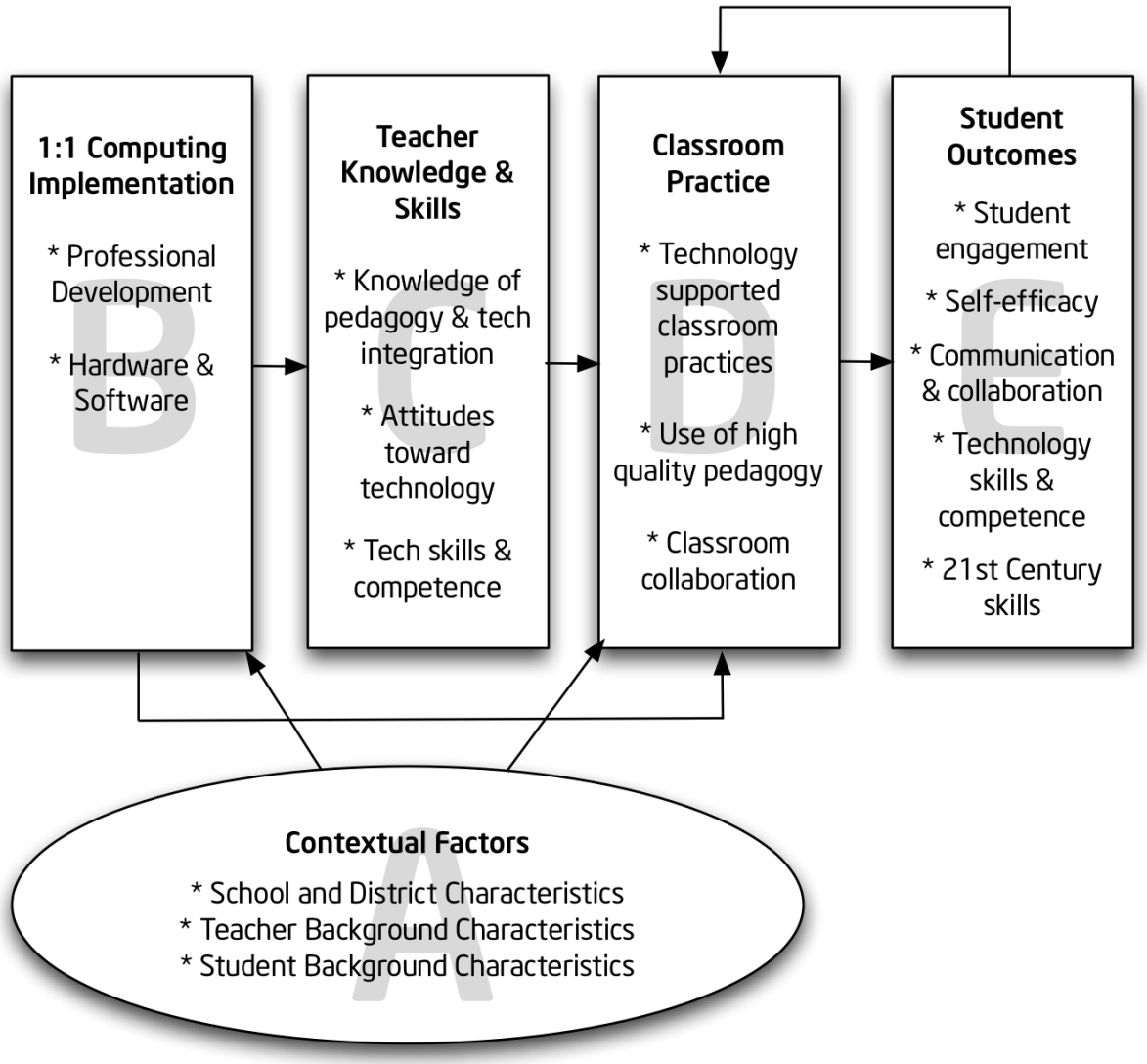
Those other areas that very well could be affected by effective program implementation might include adequate 1:1 computer access and infrastructure, constructivist curriculum, and funding or policy support to facilitate or sustain effective technology integration in the classroom.

The framework guiding the evaluation of 1:1 computing solutions and other similar ICT initiatives is based on constructs and indicators that reflect the core elements of the 1:1 computing solution: contextual factors, implementation factors, and expected outcomes for students, teachers, and classrooms. The figure on the following page shows the general concepts, and the links that one might expect between inputs and outcomes of an effective 1:1 program.

Figure A: Logic Model Constructs for Evaluating Effectiveness of 1:1 Computing Programs

Intel Evaluation Toolkit
Logic Model

Overall 1:1 Computing Program



The logic model above is based on what is currently known about 1:1 computing program implementation and outcomes. The effectiveness of 1:1 programs can best be understood as a system of interactions between various elements of implementation: the technology (e.g., the hardware, training, and software provided), the teachers (e.g., their skills, attitudes, and

experience), the classrooms (e.g., the quality of facility, resources, and pedagogy), and the students (e.g., their attitudes, skills, and knowledge). Some links or relationships may be direct; others may be indirect, and linked through a series of cycles or interactions. For example, according to the logic model, we would expect that the implementation of 1:1 computing would have a direct relationship to teacher behaviors, knowledge, and skills, which would in turn influence classroom practices. The implementation of 1:1 computing solutions might also have a direct relationship to classroom features, such as the number of computers available, or student outcomes, such as increased access to computers and greater knowledge of computer software.

The context of a 1:1 implementation can also affect the outcomes. Contextual factors can be individual, such as student or teacher background characteristics, or more global and institutional, such as the policies, procedures, and resources available to the school or the commitment to technology integration by governments or regions. **Appendix A** shows a variety of contextual issues that may influence the relationships depicted in the logic model. These contextual factors are divided into three levels—the school/district level, where the impact would likely be most immediate; and the government level and corporate level, where the impact would be more gradual or further removed. For the purposes of this toolkit, the contextual factors of concern are only those related to schools and districts—the other factors may be important in other evaluation initiatives.

POSSIBLE EVALUATION DESIGNS

Several evaluation designs might be appropriate for evaluating 1:1 computing programs in the schools. Below is a brief description of a few, along with the potential benefits of each:

- Pre-post assessment of changes in outcomes. In this design, outcomes are compared before and after an intervention to assess impact. Inferential statistics, including t-tests, ANOVAs, and chi-square tests, are used to determine if pre-post differences are the result of chance. This design may compare pre-post outcomes with a group that is receiving the intervention to a similar group that is not, or participants may be randomly assigned to a treatment and non-treatment condition. A pre-post design can provide rigorous, scientifically-based evidence of impact.

- Quasi-experimental comparison to other groups. A quasi-experimental design compares outcomes from two groups that have been matched on a predetermined set of characteristics, such as location, gender distribution, student test scores, or years of teacher experience. This design is not as rigorous as a randomized study, but can identify initial evidence of impact that leads to additional research.

- Non-experimental methods. In a non-experimental study, researchers compare variables within a single sample. For instance, researchers may correlate student attitudes toward technology with engagement in classroom activities. Non-experimental studies can identify the kinds of variables that may influence the impact of 1:1 computing programs. They can also confirm the expected paths to impact that are described in the logic model.

- Qualitative methods. Qualitative studies tend to be more descriptive in nature, collecting more in-depth data to understand what is happening within specific contexts. The goal of qualitative studies is not so much to generalize to other settings, but rather to gain a rich understanding of what is being studied. The studies use interviews, observations, and other descriptive data to look at the implementation of a program and its impact. Case studies are a common format. While quantitative and experimental studies tend to describe *what* changed as a consequence of a program, qualitative methods describe the process, or *how* and *why* the changes take place in the way that they do.

CHOOSING STUDY SAMPLES

For sites that are implementing the Intel 1:1 computing initiative as a proof of concept, the samples for the evaluation will consist of the schools, teachers, and students who are in the proof-of-concept sites. For evaluations of 1:1 initiatives beyond the initial proof of concept, other sample considerations should be taken into account.

There are two main issues to consider when selecting a sample: size and representation. Quantitative analyses often involve larger samples and require a minimum number of participants to make legitimate inferences. If a sample has too few participants, an evaluator

may not be able to detect any effects of the program. Quantitative analyses (e.g., regression-based procedures) can require samples in the hundreds of participants. With qualitative analyses, it is possible to find trends with ten or fewer interviews.

Likewise, to be representative, the sample should look like the larger population from which it is drawn. If all students at a school will be using classroom computers, for instance, students should be sampled from every grade. Sometimes getting the right sample requires the use of purposive sampling to recruit the right participants. In purposive sampling, researchers sample with a specific purpose or criteria for respondents in mind, such as:

- responses from one or more specific predefined groups,
- responses from a targeted sample quickly,
- responses where sampling for proportionality is not the primary concern,
- sampling the "typical" case,
- sampling of persons with known experience in a specific area,
- sampling to represent the major characteristics of the population,
- sampling for diversity—geographic, age, experience, subject matter.

OTHER EVALUATION ISSUES TO CONSIDER

Other important issues to consider when designing evaluations of 1:1 computing initiatives include:

Age-appropriateness of measures. When selecting, adapting, developing, or administering measures, it is essential to consider students' cognitive abilities and motivation. It may be useful to read surveys out loud to younger students so that their performance is not affected by their reading skills. Younger students may also require extra instruction on how to complete Likert-scale survey responses (where respondents are asked to indicate their level of agreement to a statement). Evaluators may want to provide a few practice examples that the class completes together (e.g., "I like puppies," "I like spiders") to show (a) that it is possible to agree or disagree a lot or a little with a statement, and (b) that it is okay if students answer differently—there are no right or wrong responses.

Older students may not necessarily be motivated to complete surveys and standardized tests, especially if they have been exposed to many similar tests in the past. As students age, they are less likely to believe that standardized tests measure what they really know, and say that they put less effort into those tests (Paris. Lawton, Turner, & Roth, 1991[1]). Low motivation compromises the validity of an assessment in the sense that it may not measure what students really know and can do. To counteract this, researchers can take several steps: (a) be aware of unusual, repeating patterns of data that suggest a student was not taking the measure seriously, (b) keep the number of questions on a measure to a minimum to prevent students

[1] Paris, S. G., Lawton, T. A., Turner, J. C., & Roth, J. L. (1991). A developmental perspective on standardized achievement tests. *Educational Researcher, 20*(5), 12-20.

from losing interest, and (c) use multiple measures that can be looked at together to provide evidence of the program impact, beyond what can be seen with any one instrument.

Evaluating group performance. When observing a student in a group, it can be difficult to observe only that individual without observing the others around him or her. A person's knowledge, actions, and skills will be influenced by the group, so it can be hard to know what that person is individually capable of doing. Evaluators therefore have to decide if they will report findings for groups of students or use multiple measures to collect data on individuals and groups. For example, a single observation may assess the entire classroom or a single student. To be able to assess the individual and group at the same time, different observations may be needed.

Minimizing data collection & maximizing participation. Evaluations can take away valuable class time from instruction. If there are too many measures, teachers and parents may not want their children to participate in the evaluation. One solution is to take an embedded evaluation approach in which evaluators create instruments that are tied directly to program activities. For example, students can be asked about their reactions to a particular piece of technology as part of a writing assignment they already are completing. In this manner, instruction and evaluation are seamless, and the measures are informative to evaluators, instructors, and participants.

Direct vs. indirect outcome measures. Evaluators will have more success with instruments that are most directly related to the intervention. For example, student learning is often best assessed using tasks that are tied to the specific activities that students are engaged with in class, rather than large-scale standardized tests that may be too far removed from the specific learning content or learning episode to show meaningful change. Large-scale standardized test scores may not necessarily show change because they are generally not intended to be sensitive to differences in curriculum. These types of tests are instead designed to cover a broad range of topics and skills that all or most students will have had the opportunity to learn.

Evaluation Resources

1:1 Computing Evaluation Toolkit

Evaluation Framework: Structure and Methodology

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STRUCTURE AND METHODOLOGY OF THE TOOLKIT

The toolkit can be seen as a collection of stand-alone modules that provide step-by-step guides and indicators, questions, and tools to monitor and evaluate 1:1 computing implementations. Evaluators may choose to focus on a single module or any combination of the four, and may adapt the tools and approaches to their own objectives and needs. Along with the four modules that make up the toolkit, a final section provides more general resources and links.

The modules address the following components of the logic model (**Figure A in the Introduction, p. 5**):

- ***Module I: Pre-implementation assessment of capacity, resources, and context***. This module contains strategies for assessing the context of the 1:1 computing implementation (**Box A** of the logic model--see **Figure A in the Introduction**), and tools for conducting needs assessments of local, regional, and national sites. These tools include: (a) technology readiness checklists; and (b) assessments of local context, values, and the potential for sustainability of 1:1 computing in the classroom. This module also provides guidance for setting up local evaluations—from working with local sites to connecting with funders and implementers.

- ***Module II: Implementation fidelity and formative feedback for 1:1 computing programs***. Module II provides the resources needed to conduct an implementation study of 1:1 classroom computing programs. The module contains tools to assess how well the deployment of the solution is working (through usability and feasibility studies), observe elements of the 1:1 approach in the classroom, and identify successes and challenges in rolling out and scaling up a 1:1 program at a local site. Module II also provides resources for collecting and disseminating formative feedback for continuous program improvement to stakeholders. Module II focuses on **Boxes A**, **B**, and **D** of the logic model (see **Figure A in the Introduction**).

- ***Module III: Emerging teacher skills and classroom practices.*** This module offers a model for assessing emerging changes in teachers' knowledge, skills, and behaviors, and assessing changes in classroom practices, especially those related to technology integration in a 1:1 computing classroom and effective technology-assisted practices. Other outcomes addressed in Module III include classroom climate and norms related to technology integration; changes in instructional practices that add rigor, inquiry, and challenge; and the development of classroom community. Module III addresses **Boxes B**, **C**, and **D** in the logic model (see **Figure A in the Introduction**).

- ***Module IV: Emerging student 21st century skills and competencies.*** Module IV focuses on the skills and knowledge that students develop in classrooms where 1:1 computing is

implemented. It also focuses on the relationships between teacher and classroom outcomes and outcomes for students. The student outcomes include the development of (a) technology and information competencies, (b) collaboration and teamwork skills, (c) presentation and communication skills, and (d) academic learning. Module IV also provides strategies for linking classroom and teacher outcomes to student outcomes. Module IV focuses on **Boxes B**, **D**, and **E** in the logic model (see **Figure A in the Introduction**).

Each module follows the same general format, beginning with a brief description of the content and purpose of the module, and then addressing the three major aspects of the evaluation:

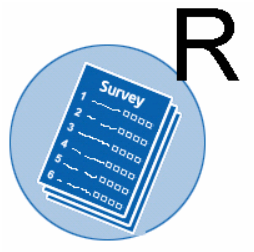
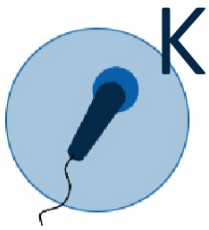
Identify relevant constructs and indicators from the logic model to provide a foundation for the evaluation. The appropriate components of the logic model are highlighted for each module.

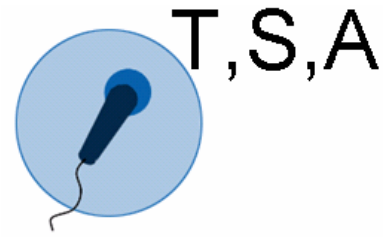
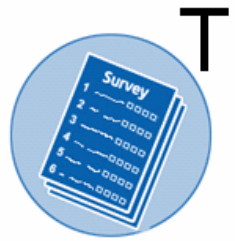
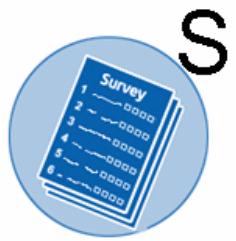
Determine the evaluation questions to be answered in the evaluation study. Each module includes examples of evaluation questions related to the constructs identified in Step 1.

Select data collection methods. A table provides examples of indicators that might be associated with each construct identified in Step 1, as well as corresponding data collection tools.

The tables found in each module can be used to find resources. For example, if local evaluators are interested in assessing capacity for technology implementation and integration, they can click on the tool icons associated with the different data collection tools and jump (hyperlink) to the relevant section. The tools themselves have been formatted so that evaluators can either use the entire tool or select only the sections of the tool related to specific constructs and modules. Exhibit A shows which tools are included in each module.

Exhibit A
List of Tools and Modules

Icon	Description	Modules Tool is Used
	*Resource Capacity Assessment* The resource and capacity assessment contains a set of profile questionnaires to be completed by different stakeholders at the school or district level. The assessments are designed to collect information on resources, infrastructure, and equipment available, as well as on attitudes and values toward 1:1 computing and technology integration. The profile questionnaires can be used separately or together depending upon the needs of the evaluator and program.	*MODULE I*
	*1:1 Computing Environment Rubric* This rubric is used to assess the level of infrastructure and resources available and utilized by the school to support 1:1 computing programs. Each indicator is rated on a three-point scale, from entry-level to advanced, which represents the targeted standard.	*MODULE I* *MODULE II*
	*Stakeholder Interview* This interview is designed to gather data from stakeholders (e.g., parents, technology specialists) about the introduction of technology in the schools, pre-post implementation of the 1:1 computing program, strategic planning, and future scale-up of the 1:1 computing program's implementation. Responses can be coordinated with surveys and school administrator interviews to understand the processes of implementing 1:1 computing programs.	*MODULE I* *MODULE II*

	*Teacher/Stakeholder/Administrator Interview* Interviews with teachers can be used to collect more in-depth data about their knowledge and skills. Interviews conducted in connection with observations can help evaluators understand teachers' intent and gauge how successfully teachers have translated training into classroom practice. Interviews with school administrators can document changes they see in teachers' knowledge and skills, in their technology integration, and in their execution of high-quality instructional activities.	*MODULE I* *MODULE II* *MODULE III*
	*Teacher Survey* The teacher surveys are designed to gather baseline data on teachers' prior knowledge and training in technology integration. A baseline-data survey could be administered once participating teachers are identified. A second survey, administered toward the end of the study, would record data on changes in teachers' incorporation of pedagogy learned during training, attitudes toward technology, and technology skills and competence.	*MODULE II* *MODULE III*
	*Student Survey* Teachers' instructional strategies and practices have an impact on how students' use and respond to technology. One way to understand that impact is to ask the students what they do or have done in their classes. In some cases, students may not see practices the way teachers do. A student survey therefore allows them to participate in the evaluation process.	*MODULE II* *MODULE III* *MODULE IV*

	*Classroom observation of instructional strategies and classroom practices.* The purpose of conducting observations of classrooms is to capture evidence about teachers' pedagogy and technology integration (in addition to the classroom practices documented in Module II as part of the implementation study). Observations document what types of learning activities occur in the classroom, who is using technology, and how they are using it. Observations can capture the range and sequence of teachers' and students' behaviors and technology use, classroom interactions, learning activities, and student engagement. Observations should be conducted at the beginning of the school year (or when the 1:1 computing is first introduced in the classroom) to assess baseline levels of teachers' instructional strategies, and at the end of the two-month period scheduled for the study, to assess any changes in the quality or quantity of these strategies.	*MODULE II* *MODULE III* *MODULE IV*
	*Anecdotal Teacher Data* This instrument can be used to gather qualitative data about the process of integrating technology into classrooms. Evaluators may want to use the existing teacher and classroom outcome constructs to code the information in the anecdotes. Evaluators could also incorporate relevant data into a case study.	*MODULE III*
	*Students Reflections/Narratives* A reflection is a writing activity, typically brief, in which students discuss something they have done or learned. Reflections can be open-ended or structured, and can reveal information about students' motivation for learning, their thoughts on what they have learned, or their ideas about what they could do to improve their learning. This document provides guidelines for constructing reflection	*MODULE IV*

	activities. It also includes sample questions.	
	*Assessing Student Work* Student work can be tracked from the beginning to the end of the project to determine changes in implementation and impact. It can also be collected to supplement classroom observations. This document provides guidelines for collecting student work and using rubrics to rate its quality.	*MODULE IV*
	*School and District Data and Documents* It can be useful to analyze existing data, such as test scores, as evidence of impact. Be careful to use only those items that are (a) directly related to the intervention, (b) related to the targeted population (individuals, classes, schools, states) and (c) have been normed on the types of students being studied.	*MODULE I*
	*Student Focus Group* The purpose of the focus group protocol is to gather data from students about their experiences with integration of 1:1 computing into their learning activities. Questions probe students' satisfaction with technology, their sense of its usefulness, changes in their classroom activities, and expectations for future computing work. Responses can be coordinated with the student survey and teacher interviews.	*MODULE IV*

Evaluation Resources

1:1 Computing Toolkit

Education Technology Evaluation Considerations

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Contextual Factors To Consider in Evaluation Studies

This protocol is to be used to look at an educational ecosystem within its entire context. The purpose of the protocol is to illustrate the multiple factors associated with technology assisted educational reform, the types of learning activities that occur, who is using technology, how technology is being used, and key stakeholders involved in the efforts. It also informs the policy maker or administrator of the complex interplay between the actors, design and support necessary to effectively integrate educational technology.

Appendix A:

The context of a 1:1 implementation can also affect the outcomes. Contextual factors can be individual, such as student or teacher background characteristics, or more global and institutional, such as the policies, procedures, and resources available to the school or the commitment to technology integration by governments or regions. **Appendix A** shows a variety of contextual issues that may influence the relationships depicted in the logic model. These contextual factors are divided into three levels—the school/district level, where the impact would likely be most immediate; and the government level and corporate level, where the impact would be more gradual or further removed. For the purposes of this toolkit, the contextual factors of concern are only those related to schools and districts—the other factors may be important in other evaluation initiatives.

Appendix A: Contextual Factors To Consider in Evaluation Studies

System Inputs and Factors	Program Design	Implementation	Intermediate Outcomes	Long-Term Outcomes
Government				
▪ Government mandates, strategic plan, and policies ▪ Educational curriculum and philosophy ▪ Cultural values and norms ▪ Technology investment/ priority	***Deployment Strategies*** ▪ Number of sites/schools for deployment ▪ Deployment schedule ▪ Accountability strategies ▪ Communication and recruitment	***Deployment and Distribution*** ▪ Number of systems deployed ▪ Technical assistance provided	***Program Improvement*** ▪ Usability ▪ Hardware/software ▪ Management	***Sustainability of Program*** ▪ Funding ▪ Government policies and mandates ▪ Cultural values and norms ▪ Scaled-up deployment
Corporate (Intel) **(*Factors will depend on individual Memoranda of Understanding between Intel and government agencies or Ministries of Education)**				
▪ Vision and educational strategies ▪ Technical support and assistance ▪ Evaluation model/framework resources ▪ Product marketing and placement ▪ Communication and recruitment strategies	***1:1 Computing Solution*** ▪ Hardware and software solution (teacher computers, student stations, server) ▪ Teacher training ▪ Student training	***Deployment and Distribution*** ▪ Number of systems deployed ▪ Technical assistance provided ***Training*** ▪ Pedagogy ▪ Lesson planning ▪ Assessment ▪ Student-centered learning ▪ Higher-order thinking skills ▪ Utility of training	***Product Improvement*** ▪ Usability ▪ Hardware/software ▪ Market share ***Training Effectiveness*** ▪ Participant satisfaction ▪ Utility of training	***Sustainability of Product*** ▪ Long-range market share
Local Schools and/or Districts				
▪ Policies and procedures ▪ Needs and goals ▪ Capacity for technology implementation ▪ Classroom configurations/capacity ▪ Resources—funding/staffing ▪ Commitment/buy-in to technology in education ▪ Curricular goals	***Deployment Strategies*** ▪ Number of students/ classrooms for deployment ▪ Deployment schedule ▪ Accountability strategies ▪ Professional development and supports for teachers ▪ Technology infrastructure	***Hardware/Software*** ▪ Integration ▪ Usability ▪ Connectivity ▪ Resources ***Training*** ▪ Pedagogy ▪ Lesson planning ▪ Assessment ▪ Student-centered learning ▪ Higher-order thinking skills	***Technology Resources*** ▪ Availability of hardware/ software ▪ Capacity (e.g., connectivity, infrastructure) ▪ Local capacity for technology support ***Practices and Policies*** ▪ Values and norms about technology use ▪ Local professional development for teachers	**Sustainability of Program** ▪ Funding ▪ District/school policies and mandates ▪ Models for scaled-up deployment

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Literature Review

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1:1 Computing Research and Evaluation Reports

1:1 Computing Research and Evaluation Reports and Additional Resources on 1:1 Computing International Initiatives.

Rockman et al. (1997). *Report of a laptop program pilot: A project for Anytime Anywhere Learning by Microsoft Corporation Notebooks for Schools by Toshiba America Information Systems.* San Francisco, CA: Rockman et al.
http://www.microsoft.com/Education/aalresearch1.mspx

Rockman et al. (1998). *Powerful tools for schooling: Second year study of the laptop program – A project for Anytime Anywhere Learning by Microsoft Corporation Notebooks for Schools by Toshiba America Information Systems.* San Francisco, CA: Rockman et al.
http://www.microsoft.com/Education/aalresearch2.mspx

Rockman et al. (2000*). A more complex picture: Laptop use and impact in the context of changing home and school access – the third in a series of research studies on Microsoft's Anytime Anywhere Learning program.* San Francisco, CA: Rockman et al.
http://www.microsoft.com/Education/aalresearch3.mspx

Inter American Development Bank website.
The resources found on this website will provide you with information on 1:1 computing initiatives in Latin America and the Caribbean.
http://www.iadb.org/sds/SCI/site_7455_e.htm

One-to-One Institute website.
Additional information on 1:1 computing initiatives in the United States.
http://www.k12one2one.org/index.cfm

Bonifaz, A. and Zucker, A. (2004). *Lessons Learned About Providing Laptops for All Students.* This paper identifies some of the essential conditions needed to successfully implement a laptop initiative, such as professional development for teachers and administrators and ongoing program monitoring and evaluation. Developed by NEIRTEC: a collaboration of Education Development Center, Inc. (EDC), TERC, Learning Innovations at WestEd, and the Education Alliance at Brown University.
http://64.233.167.104/search?q=cache:obeW9M3aUpgJ:www.neirtec.org/laptop/LaptopLessonsRprt.pdf+Bonifaz+%26+Zucker,+(2004)&hl=en&ct=clnk&cd=2&gl=us

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Module I: Pre-implementation Assessment of Contextual Factors, Capacity, and Resources

Module 1
Contextual Factors

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Module I

PRE-IMPLEMENTATION ASSESSMENT OF CONTEXTUAL FACTORS, CAPACITY, AND RESOURCES FOR SUPPORTING AND SUSTAINING 1:1 COMPUTING INITIATIVES

Module I is a critical phase in the process of evaluating 1:1 computing initiatives. It is during this phase that evaluators can collect information about contextual factors that may have a substantial impact on a program's effectiveness. The purpose of Module I is two-fold: 1) to alert evaluators to the myriad of factors they might consider in planning an evaluation of a 1:1 computing program's implementation and impact, and 2) to provide tools for assessing capacity, resources, and context. This assessment is critical for two reasons. First, it provides a baseline description of the context that could inform implementers as they roll out the 1:1 computing strategies in different local sites. Second, the assessment provides valuable context for understanding the impacts and outcomes measured in subsequent modules.

Identify Relevant Constructs and Indicators from the Logic Model

The tools included in Module I can be used to collect data to understand the background factors that may influence 1:1 computing program implementation and impact. The constructs that reflect these, shown in **Box A** of the **Logic Model (Figure I.A)** below, are:

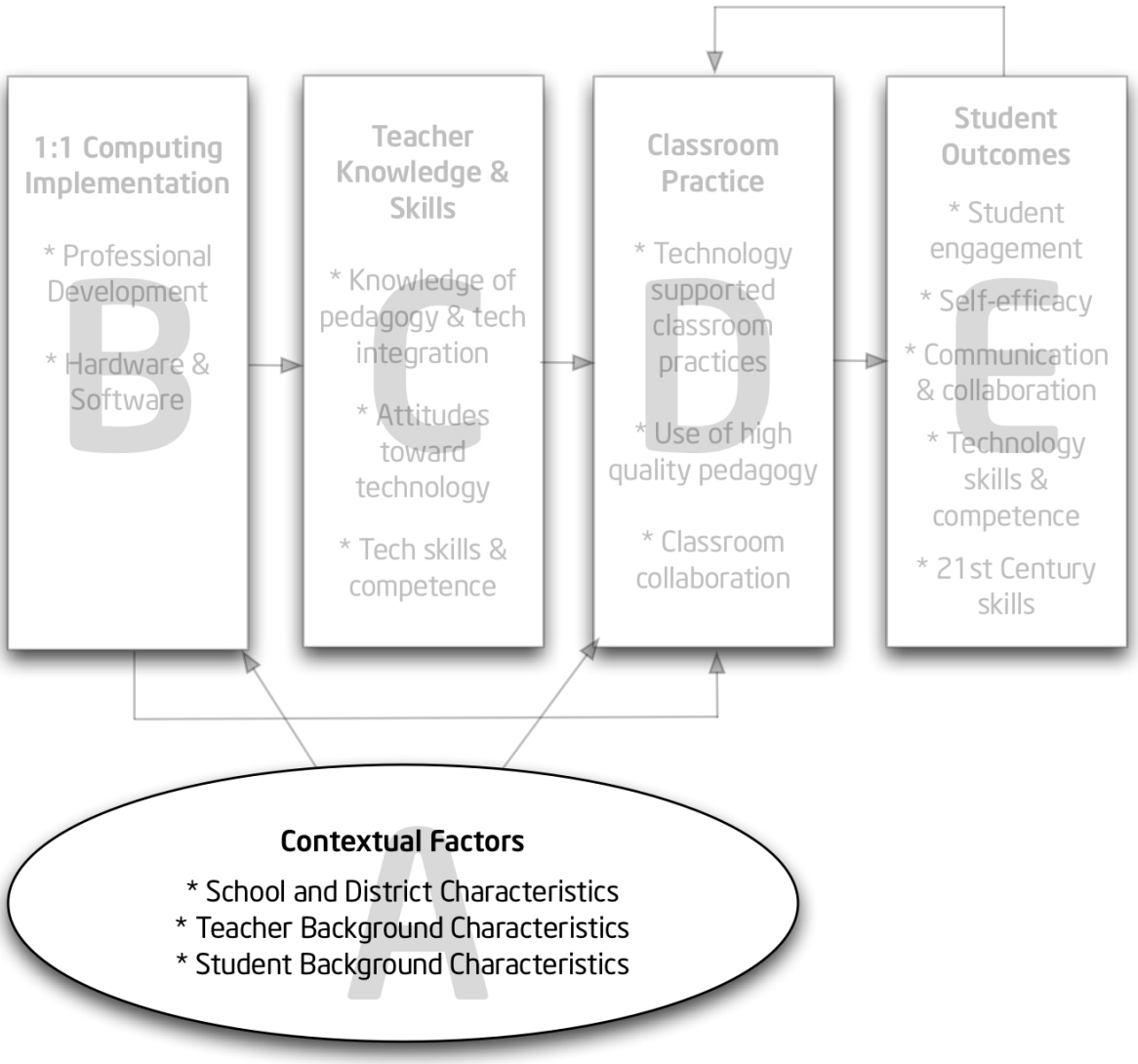
(1) Profile of the important contextual factors that may influence the implementation of a 1:1 computing program—at the school/district, governmental, and corporate support levels.

(2) Capacity of governments, educational agencies, and other groups to implement 1:1 computing programs, including their commitment, philosophy, and attitudes toward education and 1:1 computing and technology integration;

(3) Inventory of resources that will potentially be used to sustain 1:1 computing program implementation locally; and

In 1:1 computing, the school or district is the focus of pre-implementation assessment. Although **Appendix A** shows factors at other levels that may influence the effectiveness of the 1:1 implementation, Module I focuses on the school/district level.

Figure I.A: Logic Model Constructs for Assessing Contextual Factors, Capacity, and Resources



Determine Evaluation Questions To Be Answered

It is important to pose evaluation questions that can guide the data collection process and the interpretation of data from multiple sources. **Exhibit I.A** shows some questions that might be used to guide the process of understanding the background and context of the school and/or district, as well as the capacity and resources available for effective implementation.

Exhibit I.A: Sample Evaluation Questions To Guide Pre-Implementation Assessment of Contextual Factors, Capacity, and Resources

1. Capacity of local schools/districts to implement and sustain technology integration programs
a. Do school personnel buy in to using 1:1 computing as an instructional tool and approach? b. What is the level of knowledge in the school/district about 1:1 computing and technology integration? c. Are classroom structures, school processes, and schedules conducive to the implementation of 1:1 computing?
2. Resources available for effective technology integration
a. Does the school/district have adequate infrastructure to support effective implementation of 1:1 computing and other technology initiatives (e.g., electrical power, connectivity, hardware, support personnel)? b. What is the level of funding and school/district resources that are allocated to implementing and sustaining 1:1 computing and other technology initiatives? c. Are professional development experiences provided to teachers about how to effectively implement 1:1 computing in the classroom?

3. School and district context and characteristics
a. What is the make-up of the school staff and students? b. What community and cultural norms and values may influence the effectiveness of implementing 1:1 computing in this particular school/district? c. What are the schools'/districts' strategic plans and action steps for implementing 1:1 computing and other technology solutions? d. Do curricular and technology goals align with one another?

Define Indicators and Choose Data Collection Tools

To initiate the pre-implementation assessment, evaluators should (a) define the indicators that are associated with the constructs identified in Step 1, and (b) choose data collection methods that are appropriate for assessing those indicators and answering the evaluation questions identified in Step 2.

As a first step in the pre-implementation assessment, evaluators should define the indicators for particular constructs operationally so they can then choose appropriate assessments. The table (**Exhibit I.B**) below shows the indicators of interest for the constructs in a typical Module I study. The table also shows when each indicator might initially occur, and the likely interval or length of time before subsequent changes emerge. This table shows whether, from the baseline or before the 1:1 implementation, one might see changes within two months (particularly important for proof-of-concept evaluations) or whether change will take longer. These longer-term changes may occur within a year, or may take more than a year to emerge.

In addition, **Exhibit I.B** shows the alignment between the constructs and indicators and the measures (see below) suggested for assessing them. For Module I, we recommend four different data collection tools for needs assessment and documentation of school and district technology capacity, resources, and school and district context. The tools can be used separately or in combination. These four measures include:

- Resource and Capacity Survey
- 1:1 Computing Environment Rubric
- Stakeholder Interviews
- Existing school and district data and documents

More complete descriptions of these tools can be found on the cover sheet of each tool.

Exhibit I.B can be used to find resources for measuring specific indicators. For example, if local evaluators are interested in assessing capacity for technology implementation and integration, they can click on the tool icons associated with the different data collection tools and jump (hyperlink) to the relevant section. The tools have been formatted so that evaluators can use the entire tool or only those sections related to specific constructs and modules.

Exhibit I.B: Module I Constructs and Indicators Alignment with Suggested Data Collection Tools

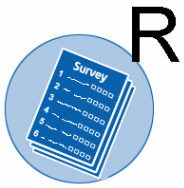
Logic Model Construct and Indicators	Time Observable	Data collection Measures
	KEY: **B Baseline** **2- Expected in 2 months** **2+ Expected in 2+ Months**	**KEY:** **R Resource & Capacity Assessment** **E 1:1 Computing Environment Rubric** **K Stakeholder Interviews** **D Existing School/ District Data** **A Administrator Interview**
Capacity for technology implementation and integration		
Classroom configurations/capacity (numbers of classrooms)/scheduling	B 2+	R K D
Commitment/buy-in to technology in education	B 2+	R K D A
Knowledge of technology use in education	B 2+	R K D
Resources	B 2+	
Funding for deployment, support, and sustainability/growth	B 2+	R E K D A
Staffing for implementation and support	B 2+	R E K D A
Existing infrastructure, connectivity, and technology equipment	B 2+	R E K D

Context and Characteristics of School and District	B 2+	
Curriculum goals (alignment with technology needs and student performance goals)	B 2+	R D A
Student body characteristics (demographics, mobility, attendance patterns)	B	D
Policies and procedures regarding technology use and integration	B 2+	R D A
Technology needs and goals (strategic plan)	B 2+	R D A

Evaluation Resources

1:1 Computing Evaluation Toolkit Instruments

Resource and Capacity Assessments



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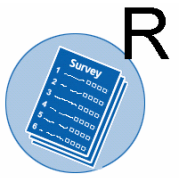

Resource and Capacity Assessments

Purpose: To assess the school and district capacity for implementing 1:1 computing programs, the resources available, and the context in which the 1:1 computing program will be nested.

Rationale: Numerous contextual factors may have an impact on the effectiveness of a 1:1 computing program. These include:

(1) Capacity of governments, educational agencies, and other groups to implement 1:1 computing initiatives, including their educational philosophy and commitment to and attitudes toward technology integration;

(2) Resources that could be used to sustain 1:1 computing program implementation in the local context; and

(3) Organization and makeup of the different systems—at the school/district, governmental, and corporate levels—that may influence the implementation of 1:1 computing programs.

Constructs measured:

- ***Capacity for technology implementation and integration***
  - Classroom configurations and capacity (numbers of classrooms), and scheduling
  - Commitment/buy-in to technology in education
  - Knowledge of technology use in education

- ***Resources***
  - Funding for deployment, support for sustainability and growth
  - Staffing for implementation and support
  - Existing infrastructure, connectivity, and technology equipment

Organization:
The resource and capacity assessment contains a set of profile questionnaires for different stakeholders at the school or district level. The assessments are designed to collect information on resources, infrastructure and equipment available, as well as attitudes and values toward 1:1 computing and technology integration. The profile questionnaires can be used separately or together depending upon the needs of the evaluator and program. Two questionnaires are included in the resource and capacity assessment:

***Administrator profile*.** This form asks school administrators/principals about their knowledge and attitudes towards 1:1 computing. It also asks about obstacles to an effective 1:1 computing program, which involves teachers' and students' use of computers, technology integration in the curriculum, and adequate equipment, access, connectivity, training, and support.

Infrastructure profile. Apart from basic infrastructure, this form also asks for information about the school's ICT-related infrastructure. We define ICTs as radio, cassette tape recorders,

television (video tapes, video disks, and cable programming), computers, and the Internet. We define instructional uses of ICTs as the subject area content delivery; computer-based learning activities such as games and simulations; ICT-mediated interactions among students and between students and teachers; ICT-supported research, as in the use of the Internet to learn about subject matter; and ICT-mediated assessments such as exams, quizzes, and projects. We define non-instructional uses of ICTs as administrative or classroom management tasks such as accounting, record-keeping, school communications, and lesson plan preparation.

Format: Oral interview or survey, ratings and checklist items

Approximate completion time: One hour

Administration times: Evaluators should administer the assessment prior to implementation, and re-administer it on a semi-annual or annual basis to track changes in resources.

Administration directions: The data collection person may ask key administrators or stakeholders to complete the profile questionnaires on their own, or take part in an oral interview about the technology infrastructure and capacity at the school and/or district.

Implementation: Responses to this instrument are tracked at the beginning and during the implementation of the 1:1 initiative to provide contextual information and track changes in infrastructure and resources.

Administrator Profile

A. ADMINISTRATOR BACKGROUND

1. Name: _____
2. Designation: _____
3. School Name: _____
4. Age: _____
5. Gender: θ_1 Male θ_2 Female
6. How many years have you been working in education? (*Please check one*.)
   - θ_1 Less than 5 years
   - θ_2 5-9 years
   - θ_3 10-14 years
   - θ_4 15-19 years
   - θ_5 20 years or over
7. Do you have access to a computer in your school?
   - θ_0 No
   - θ_1 Yes
8. Do you have access to a computer at home?
   - θ_0 No
   - θ_1 Yes
9. Do you have access to a computer outside of school or home?
   - θ_0 No
   - θ_1 Yes
10. Outside of school or home, where do you access a computer?
    - θ_1 Friend's / Relative's / Colleague's home
    - θ_2 Internet Café
    - θ_3 Others: _____
11. What is your primary purpose for using the computer? (*Please check all that apply.)*
    - θ_1 Writing correspondences
    - θ_2 Completing administrative paperwork
    - θ_3 Research
    - θ_4 Personal/Recreational
    - θ_5 Others: _____

B. ADMINSTRATOR ATTITUDES TOWARD 1:1 COMPUTING

Indicate your level of agreement by checking the appropriate box	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Technology helps me do things that I would not be able to do otherwise.	θ_1	θ_2	θ_3	θ_4	θ_5
2. I am comfortable using technology.	θ_1	θ_2	θ_3	θ_4	θ_5
3. I have access to 1:1 computing training opportunities.	θ_1	θ_2	θ_3	θ_4	θ_5
4. 1:1 computing training opportunities generally meet my needs.	θ_1	θ_2	θ_3	θ_4	θ_5
5. I keep abreast with developments in using 1:1 computing for teaching and learning.	θ_1	θ_2	θ_3	θ_4	θ_5
6. The schools division administration encourages me to use technology in my work.	θ_1	θ_2	θ_3	θ_4	θ_5
7. I take personal time to learn new technology-related skills.	θ_1	θ_2	θ_3	θ_4	θ_5
8. All teachers and staff should know how to use 1:1 computing strategies effectively in their work.	θ_1	θ_2	θ_3	θ_4	θ_5
9. Teachers and staff will be encouraged to use 1:1 computing if they see their administrators use 1:1 computing.	θ_1	θ_2	θ_3	θ_4	θ_5

C: PLANNING AND PROVIDING FOR 1:1 COMPUTING

Check the appropriate box to indicate plans/provisions your school/organization has made for 1:1 computing.	No	Yes
1. Our school has a written policy statement regarding the use of 1:1 computing for teaching and learning.	θ_0	θ_1
2. Our school has a written plan for the acquisition of 1:1 computers for teaching and learning.	θ_0	θ_1
3. We have a regular budget item for ICT and 1:1 computing purchases.	θ_0	θ_1
4. We have a regular budget item for ICT and 1:1 computing maintenance.	θ_0	θ_1
5. I can effectively promote the use of 1:1 computing in my school without knowing how to use 1:1 computing strategies myself.	θ_0	θ_1
6. The school's administrators meet regularly to plan 1:1 computing purchases.	θ_0	θ_1
7. The faculty meets regularly to plan instructional use of 1:1 computing equipment and resources.	θ_0	θ_1

8. The school administration has a system of rewards for teachers who use 1:1 computing strategies and resources for teaching.	θ_0	θ_1
9. The school provides for teacher training in effective use of 1:1 computing strategies.	θ_0	θ_1
10. The school provides for training of non-teaching staff in 1:1 computing strategies.	θ_0	θ_1
11. The school has technical staff who provide support for 1:1 computing use during school hours. (This may be one full-time staff member or several part-time staff members.)	θ_0	θ_1
12. The school provides for technical support staff training.	θ_0	θ_1

D. ADMINISTRATOR INSTRUCTIONAL AND NON-INSTRUCTIONAL TECHNOLOGY USE

For each of the following **devices**, please mark the appropriate box to indicate your level of access and proficiency, and frequency of use.

Devices	**A.** I am not familiar with this device.	**B. How do you access these devices? *(Check one.)*** I have no access to this device.	I can access this device from school.	I can access this device from home.	I can access this device from school and from home.	**C. How proficient are you at using these devices? *(Check one.)*** I cannot use this device.	I can use this device with coaching.	I can use this device independently.	**D. How frequently do you use these devices? *(Check one.)*** Never	Sometimes	Often	Always
1. Radio	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
2. Cassette tape recorder	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
3. Television	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
4. VHS, VCD, DVD	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
5. Computer	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
6. CD ROM drive	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
7. Computer speakers	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
8. Printer	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
9. Scanner	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
10. Digital camera	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
11. Telephone	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
12. Overhead projector	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
13. LCD projector	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
14. CD writer	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3

For each of the following **generic tools and applications**, please mark the appropriate box to indicate your level of access and proficiency, and frequency of use.

Generic tools and applications	**A.** I am not familiar with this tool or application.	**B. How do you access these tools and applications? *(Check one.)*** I have no access to this tool or applica-tion.	I can access this tool or applica-tion from school.	I can access this tool or applica-tion from home.	I can access this tool or applica-tion from school and from home.	**C. How proficient are you at using these tools and applications? *(Check one.)*** I cannot use this tool or applica-tion.	I can use this tool or application with coaching.	I can use this tool or application independently.	**D. How frequently do you use these tools and applications? *(Check one.)*** Never	Sometimes	Often	Always
15. Word processors (e.g., MS Word)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
16. Presentation software (e.g., MS PowerPoint)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
17. Desktop publishing software (e.g., Printshop)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
18. Schedule planner (e.g., MS Outlook)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
19. Spreadsheet, (e.g., MS Excel)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
20. Email	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
21. Web Browser (e.g., Internet Explorer, Netscape)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
22. Search Engine (e.g., Yahoo!, Google)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
23. Any programming language (e.g., C, Pascal, Java)	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3

For each of the following **resources** that you use for your own administrative work and/or for your own in-service training, or higher education, please mark the appropriate box to indicate your level of access and proficiency, and frequency of use.

Resources	**A.** I am not familiar with this resource.	**B. How do you access these resources?** ***(Check one.)*** I have no access to these resources.	I can access these resources from school.	I can access these resources from home.	I can access these resources from school and from home.	**C. How proficient are you at using these resources?** ***(Check one.)*** I cannot use these resources.	I can use these resources with coaching.	I can use these resources independently.	**D. How frequently do you use these resources?** ***(Check one.)*** Never	Sometimes	Often	Always
24. Resources on radio, audio cassette, TV, videotape, VCD, or DVD	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
25. Resources on floppy disk or CD ROM	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3
26. Resources on the Internet	θ_0	θ_1	θ_2	θ_3	θ_4	θ_1	θ_2	θ_3	θ_0	θ_1	θ_2	θ_3

E. Obstacles to ICT Use

Please put a check mark in the appropriate box to indicate your level of agreement with the following statements.	Strongly Disagree (This is a major barrier.)	Disagree	Neutral	Agree	Strongly Agree (This is not at all a barrier.)
1. There is enough 1:1 computing equipment for the students to use (e.g., radio, TV, computers, printers, etc.)	θ_1	θ_2	θ_3	θ_4	θ_5
2. There is enough 1:1 computing equipment for the teachers to use (e.g., radio, TV, computers, printers, etc.)	θ_1	θ_2	θ_3	θ_4	θ_5
3. There is enough 1:1 computing equipment for administrators and non-teaching staff to use (e.g., radio, TV, computers, printers, etc.)	θ_1	θ_2	θ_3	θ_4	θ_5
4. There is enough educational software for teachers and students to use.	θ_1	θ_2	θ_3	θ_4	θ_5
5. Computer hardware functions properly.	θ_1	θ_2	θ_3	θ_4	θ_5
6. The division/district administration encourages the use of 1:1 computing strategies.	θ_1	θ_2	θ_3	θ_4	θ_5
7. The division/district administration gives recognition or rewards to school administrators for using 1:1 computing in the school.	θ_1	θ_2	θ_3	θ_4	θ_5
8. Teachers in my school know how to use 1:1 computing to teach their subjects.	θ_1	θ_2	θ_3	θ_4	θ_5
9. There are enough staff to supervise the use of 1:1 computing strategies either in class or in the admin office.	θ_1	θ_2	θ_3	θ_4	θ_5
10. There is enough space to store and use 1:1 computing resources properly.	θ_1	θ_2	θ_3	θ_4	θ_5
11. I know how to use 1:1 computing strategies.	θ_1	θ_2	θ_3	θ_4	θ_5
12. There is enough time to explore opportunities for using 1:1 computing strategies.	θ_1	θ_2	θ_3	θ_4	θ_5
13. Manuals and materials on using 1:1 computing in my work are adequate or helpful.	θ_1	θ_2	θ_3	θ_4	θ_5
14. There are enough training opportunities for administrators to acquire new 1:1 computing knowledge and skills.	θ_1	θ_2	θ_3	θ_4	θ_5
15. The school has enough money to support the use of 1:1 computing for teaching and learning.	θ_1	θ_2	θ_3	θ_4	θ_5

This is the end of the questionnaire. Thank you very much for your cooperation.

Infrastructure Profile

School information

1. School Name:_____
2. School Address: _____
3. Contact Person: _____
4. Contact Number(s): _____

A. BASIC UTILITIES

5. Does your school have electricity?

   θ_0 No - *Proceed to question #9.*
   θ_1 Yes.

6. Which electrical company provides your school's electricity? _____

7. For how many hours per day does your school have electricity? _____ hours

8. Within the last 12 months, how often did you experience power outages/brownouts in your school?

   θ_0 Never
   θ_1 One to two times
   θ_2 Three to five times
   θ_3 Every two months
   θ_4 Every month
   θ_5 Every two weeks
   θ_6 At least once a week

9. Does your school have a telephone?

   θ_0 No - *Proceed to question #12.*
   θ_1 Yes

10. How many telephone lines does your school have? _____

11. Are the telephone lines…

    θ_1 Landlines? _____
    θ_2 Wireless? _____

B. ICT EQUIPMENT, HARDWARE & PERIPHERALS

1. How many ***working*** units of the following ICTs does your school have? How are these used?

ICTs	A. Total No. of units	B. Usage *(Check one.)*					
		Not used at all	Used for instructional purposes only	Used mostly for instructional purposes	Used for instructional and non-instructional purposes equally	Used mostly for non-instructional purposes	Used for non-instructional purposes only
a. Radios		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5
b. Cassette tape recorders		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5
c. Televisions		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5
d. VHS recorders/players		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5
e. VCD/DVD players		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5
f. Computers		θ_0	θ_1	θ_2	θ_3	θ_4	θ_5

2. How many ***non-working*** units of the following does your school have?

ICTs	Total No. of units
a. Radios	
b. Cassette tape recorders	
c. Televisions	
d. VHS recorders/players	
e. VCD/DVD players	
f. Computers	

3. How many of the ***working*** computers indicated in #12 are in the following locations:

Location	No. of computers
a. Computer laboratory	
b. Classroom	
c. Library	
d. Administrative offices (e.g., Principal's office, Registrar, Accounting, Clinic, Faculty Room)	
e. No fixed location (e.g., computers are on trolleys and may be moved from room to room)	
f. Other: _____	

4. How many of the ***working*** computers indicated in #12 have the following processors:

Processor	No. of computers
a. M processor (for wireless connectivity) or higher	
b. Pentium 3, 4, or equivalent	
c. Celeron, Celeron D, or equivalent	
d. Pentium 1, 2, or equivalent	
e. 486 or 386	
f. Other: _____	

5. How many of the ***working*** computers indicated in #12 have the following operating systems:

Operating system	No. of computers
a. Windows XP	
b. Linux	
c. Windows 2000	
d. Windows 95/98	
e. Other: _____	

6. How many of the ***working*** computers indicated in #12 have the following multimedia devices:

Multimedia devices	No. of computers
a. CD ROM drive	
b. Speakers	

7. How many of the following peripherals does your school own?

Peripheral devices	Brand and model	No. of units
a. Dot matrix printer		
b. Inkjet or laser printer		
c. Scanner		
d. Digital camera		
e. LCD projector or other projection device		
f. CD Writer		

C. NETWORKING

1. Does your school have a Local Area Network (LAN)?

   θ_0 No
   θ_1 Yes

2. How many of the *working* computers indicated in #12 are on a LAN? _____

3. For what purposes are the networked computers used? (*Please check one.)*

   θ_0 Not used at all
   θ_1 Used for instructional purposes only
   θ_2 Used mostly for instructional purposes
   θ_3 Used for instructional and non-instructional purposes equally
   θ_4 Used mostly for non-instructional purposes
   θ_5 Used for non-instructional purposes only

4. Does your school have Internet access?

   θ_0 No
   θ_1 Yes

5. What is the name of your Internet Service Provider? _____

6. What kind of an Internet connection do you have?

   θ_1 Dial-up
   θ_2 Broadband fixed network (e.g., DSL, cable, etc.)
   θ_3 Broadband wireless network (e.g., wireless DSL, VSAT)

7. How do you pay for your Internet access?

   θ_1 Prepaid
   θ_2 Postpaid
   θ_3 Free/sponsored

8. How many of the *working* computers listed in #12 are connected to the Internet? _____

9. For what purposes is the Internet used? (*Please check one.)*

   θ_0 Not used at all
   θ_1 Used for instructional purposes only
   θ_2 Used mostly for instructional purposes
   θ_3 Used for instructional and non-instructional purposes equally
   θ_4 Used mostly for non-instructional purposes
   θ_5 Used for non-instructional purposes only

D. EDUCATIONAL CONTENT & SOFTWARE

1. Do you have access to educational radio programs?

   θ_0 No - *Proceed to #30.*
   θ_1 Yes

2. What educational radio programs can you access, how frequently are these aired, and to what subject areas can these be applied?

Name of educational radio program	**Frequency of airing** (daily, weekly, monthly, etc.)	**Subject area(s) applicable**

3. Do you have access to educational TV programs?

   θ_0 No - *Proceed to #32.*
   θ_1 Yes.

4. What educational TV programs can you access, how frequently are these aired, and to what subject areas can these be applied?

Name of educational TV program	**Frequency of airing** (daily, weekly, monthly, etc.)	**Subject area(s) applicable**

5. Which of the following software tools and applications are available in your school for instructional and non-instructional use?

Tools and applications	**Available for instructional use**	**Available for non-instructional use**

6. Do you have multimedia resources (e.g., Betamax tapes, VHS tapes, audio cassettes, VCDs, DVDs, CD ROMs) for any of the following subject areas? (*Check all that apply*.)

Subject area	No	Yes	Multimedia resource type
a. English	θ_0	θ_1	
b. Math	θ_0	θ_1	
c. Science	θ_0	θ_1	
d. Other:	θ_0	θ_1	
e. Other:	θ_0	θ_1	
f. Other:	θ_0	θ_1	
g. Other:	θ_0	θ_1	
h. Other:	θ_0	θ_1	

7. Do you have educational resources from the Internet for the following subject areas?

Subject area	No	Yes
a. English	θ_0	θ_1
b. Math	θ_0	θ_1
c. Science	θ_0	θ_1
d. Other:	θ_0	θ_1
e. Other:	θ_0	θ_1
f. Other:	θ_0	θ_1
g. Other:	θ_0	θ_1
h. Other:	θ_0	θ_1

This is the end of the questionnaire. Thank you very much for your cooperation.

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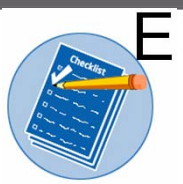
Evaluation Resources

1:1 Computing Evaluation Toolkit Instruments

1:1 Computing Environment Rubric



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1:1 Computing Environment Rubrics

Purpose: To assess the school and district capacity for implementing 1:1 computing programs, the resources available, and the context in which the 1:1 computing program will be implemented.

Rationale: Numerous of contextual factors may have an impact on the effectiveness of a 1:1 computing program. They include:

(1) Capacity of governments, educational agencies, and other groups to implement 1:1 computing initiatives, including their educational philosophy and commitment to and attitudes toward technology integration;

(2) Resources available to sustain 1:1 computing program implementation in the local context; and

(3) Organization and makeup of the different system—at the school/district, governmental, and corporate support levels—that may influence the implementation of 1:1 computing programs.

Constructs measured:

Capacity and level of technology implementation and integration
Classroom configurations/capacity (numbers of classrooms) and scheduling
Commitment/buy-in to technology in education
Knowledge of technology use in education

Resources
Funding for deployment, support and sustainability/growth
Staffing for implementation and support
Existing infrastructure, connectivity, and technology equipment

Organization: The rubric is used to assess the level of infrastructure and school resources available to support 1:1 computing programs. Each indicator is rated on a three-point scale, from entry-level to intermediate to advanced, which represents the target standard (in column 1).

Format: Rubric with entry, intermediate, and advanced ratings

Approximate completion time: 30 minutes

Administration times: Assessment should be administered pre-implementation and can be re-administered annually or semi-annually to track changes in resources.

Administration directions: The data collection person may ask key administrators or stakeholders to complete the rubric on their own as a self-assessment, or the rubric may provide the foundation for a discussion with key stakeholders about the technology infrastructure and capacity at the school and/or district.

Implementation: Responses to this instrument are tracked at the beginning and during the implementation of the 1:1 initiative to provide contextual information and track changes in infrastructure and resources.

1:1 Computing Environment Rubric

Resources and Background

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Technology Planning The school's administration, teachers, and staff actively support technology planning. The technology plan focuses on student success. Planned technology use is based on needs, research, proven teaching, and learning principles. Plan is revised annually.	Planned technology use mainly for administrative tasks, such as word processing, budgeting, and attendance	Planned technology use for internal planning, budgeting, and direct instruction; some student use	Educational technology is integrated into overall school planning. A collaboratively developed technology plan guides policy and practice. Planned technology use addresses higher order teaching and learning for all students, and is regularly updated.
Technical Support School-based technical support with additional staff as needed (including faculty) Acceptable technical support response time	Technical support comes from outside the school. Technical support response time hinders 1:1 use for teaching and learning	Some school-based technical support Technical support within reasonable period of time	School-based technical support capable of troubleshooting basic network and hardware repair Acceptable technical support response time
Instructional Technology Support School-based instructional technology support, and additional staff as needed (including faculty) with expertise in specialized areas of integration	Instructional technology support comes from outside the school.	Some school-based instructional technology specialist	School-based instructional technology specialist
Budget Budget also addresses facilities and investigation of new technologies Budget reflects the goals identified in technology plan	Budget for hardware and software purchases and professional development	Budget for hardware and software that is accessible to all students, professional development, and some ongoing costs	Budget for hardware and software that is accessible to all students, professional development, and ongoing costs
Funding Successfully obtains funding from sources other than their allotments	District, state and federal technology allotments only	District, state and federal technology allotments only with in-kind donations	Successfully obtains funding from a source other than their allotment

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Professional Development Budget A portion of money spent on technology for your school is devoted to professional development in technology-related training	At least a small % money spent on technology for your school is devoted to professional development in technology-related training	A modest % of money spent on technology for your school is devoted to professional development in technology-related training	Adequate % of money spent on technology for your school is devoted to professional development in technology-related training
Models of Professional Development Instructional staff can provide coaching, modeling of best practices, and school-based mentoring to promote individual growth Additional professional development available through a variety of delivery systems	Leader presents information to group of teachers Training provided by school or district staff	Teachers participate in hands-on instruction with follow-up to activity Additional training provided by outside instructors brought to the school	Majority of instructional staff participate in coaching, modeling of best practices, scaffolding, and school-based mentoring Educators participate in workshops, conferences, and seminars outside the school/district
Content of Professional Development Teachers learn about emerging technologies and their uses with curriculum/students (e.g., creation and communication of new technology-supported, student-centered projects).	Teachers become acquainted with technology (i.e., basic computer skills).	Teachers learn to use technology in the classroom (i.e., administration, management, and or presentation software; Internet as a research tool; vendor-specific training).	Teachers learn to use technology with curriculum/students (i.e., integration skills for creating learner-centered technology projects using Internet, applications, multimedia presentations, data collection, etc.).
Student Technology Standards Technology standards for students are established.	A core group of teachers address the technology standards.	Specific student technology standards adopted	A method for monitoring and evaluating student progress established Technology integrated into curriculum areas; grade level and subject-area expectations for technology established
Teacher Technology Standards A significant group of teachers meet set technology proficiencies and utilize them in the classroom	A core group of teachers meet acceptable technology proficiencies and utilize them in the classroom	Increasing percentages of teachers meet acceptable technology proficiencies and utilize them in the classroom	Most teachers meet acceptable technology proficiencies and utilize them in the classroom

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
School Administrators Promotes exemplary use of technology in instruction for all students; advocates and encourages parental and communal involvement in the training and integration of technology and education Maintains awareness of emerging technologies; participates in job-related professional learning using technology resources	Recognizes benefits of technology in instruction Limited use of technology	Recognizes benefits of technology in instruction for all students and supports use of technology in instruction Routinely uses technology in some aspects of daily work	Recognizes and identifies exemplary use of technology in instruction for all students Models use in daily work including communications, presentations, on-line collaborative projects and management tasks

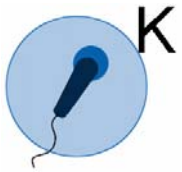
Technology Capacity

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Student Computer Access One computer per student	One computer per student	One computer per student	One computer per student; consideration of refresh cycle
Teacher Computer Access One dedicated modern computer per teacher	One dedicated teacher computer per 2 or more teachers	One dedicated computer per teacher;	One dedicated modern computer per teacher; consideration of refresh cycle
Internet Connectivity Adequate access to the Internet for any desired application. Bandwidth supports multiple web-based applications	Some connectivity to the Internet available to support web-based applications only on a few computers	Direct connectivity to the Internet at the school and accessible in some rooms Adequate distribution of bandwidth to the school to avoid most delays	Direct connectivity to the Internet at the school and all instructional areas. Adequate bandwidth to each instructional area over the LAN to avoid most delays
Construct and Targeted Indicator of Capacity and Readiness	**Entry**	**Intermediate**	**Advanced**
Curriculum-based Tools Adequately equipped instructional areas with all the technology that is available to enhance student instruction including all forms of software, digital cameras, scanners, other devices specific to content areas resources for students and teachers including some wireless connectivity and off campus access	Limited access to some instructional equipment (i.e., televisions, VCRs, digital cameras, scanners, programmable calculators, etc.) Tool-based software limited to word processing and spreadsheets	Shared use of instructional equipment among groups of teachers Tool-based software includes presentation, some graphics and concept mapping	Instructional equipment assigned to each teacher/ instructional area including at least a computer with projection device, TV, and VCR or DVD Tool-based software includes some multimedia authoring and video editing

Evaluation Resources

1:1 Computing Evaluation Toolkit

Stakeholder Interview



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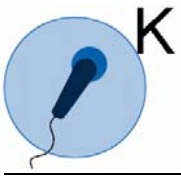

Stakeholder Interview

Purpose: To gather data from stakeholders about the introduction of technology in the schools, pre-post implementation of the 1:1 computing program, strategic planning, and future scale-up of 1:1 computing in their schools.

Constructs measured:

- *Goals and purpose of program*
- *Technology planning, both current and future*
- *Value of technology integration*
- *Development and implementation process*
- *Barriers/challenges to potential implementation success*
- *Supports and resources available*
- *How well technology fits with philosophy of learning*

Format: Open-ended questions

Approximate completion time: 30 to 45 minutes

Administration times: At the end of the study

Implementation: Responses to this instrument are coordinated with surveys and school administrator interviews to understand the processes of implementing 1:1 computing.

Stakeholder Interview

1. Goals and purpose of program

   - How did you envision the use of technology in your school/school district?
   - How well did the implementation match your vision?
   - How well does the 1:1 computing program match the goals of your curriculum?
   - How well does the 1:1 computing program meet the needs of your school/ district?
   - What new ideas do you have for using the technology for instruction in the future?
   - What new ideas do you have about using the technology for non-instructional purposes (e.g., administration, communication)?

2. Technology planning, both current and future

   - How well has the technology addressed the current needs of your school district? How well do you think it will address future needs?
   - In your view, what needs to be done in order to take advantage of the full potential offered by the 1:1 computing in your school/school district?
   - In your opinion, what needs to be done in order to sustain the 1:1 computing program in your school/school district?
   - In what ways do you see 1:1 computing implemented in the future?
   - What is the role and importance of 1:1 computing in your school/district's strategic planning?

3. Level of buy-in and value of technology integration

   - Regarding 1:1 computing, what was the level of buy-in from school administrators, teachers, and the school community in general?
   - How receptive was the school community to the idea of introducing 1:1 computing? What were the primary concerns, if any?
   - What do school administrators value about 1:1 computing?
   - What have teachers found most valuable?
   - What is the value added for students? What evidence do you have that this has been valuable for them?

4. Development and implementation process

   - How would you characterize the development of the 1:1 computing program?
   - If you could do it again, what might you do differently to scale-up the implementation?

5. Barriers/challenges to potential implementation success

   - What do you think are the factors that have supported the use of technology in your school or school district? What factors have hindered technology use?
   - What were the major concerns of school administrators and/or teachers before the implementation of the 1:1 computing program? How were concerns addressed or resolved?
   - What kind of barriers or constraints did you face in implementing 1:1 computing in your school district?
   - Can you describe three main challenges in implementing 1:1 computing in your school or school district?

6. Supports and resources available

   - What kinds of support have been provided to schools and teachers to integrate 1:1 computing into instruction? What has been most helpful?
   - What type of support would the schools and teachers need to scale up technology integration in your school?
   - What type of resources would you need to scale-up technology integration in your school or school district?

7. Technology and philosophy of learning

   - How well does 1:1 computing fit with your philosophy of learning?
   - Have there been any changes in how the school or school district thinks about learning?

Evaluation Resources

1:1 Computing Evaluation Toolkit

School Data and Documents

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Data and Documents

Purpose: To provide a baseline description of government, district, and school context prior to the implementation of a 1:1 computing environment.

Constructs measured:
May include the following:

- ***Capacity for technology implementation and integration***
  - Classroom configurations/capacity (numbers of classrooms) and scheduling
  - Commitment and buy-in to technology in education
  - Knowledge of technology use in education

- ***Resources***
  - Funding for deployment, support, and sustainability/growth
  - Staffing for implementation and support
  - Existing infrastructure, connectivity, and technology equipment

- ***Context and characteristics of school and district***
  - Curricular goals (alignment with technology needs and student performance goals)
  - Student body characteristics (demographics, mobility, attendance patterns)
  - Policies and procedures regarding technology use and integration
  - Technology needs and goals (strategic plan)

Format: Varies

Implementation: Work samples can inform the development or refinement of survey and interview measures. Alternatively, they might be used to clarify details from surveys and interviews.

School Data and Documents

What are school data and documents?

We define school data and documents as any existing data or documentation that can provide information about the context for a 1:1 computing environment. This documentation can include but is not limited to:

- Technology integration plans
- School or district improvement plans
- Records of meetings about technology integration
- Government educational standards (e.g., student and teacher technology standards)
- Grade-level curricula
- Budgets and funding plans
- School or district-level data
    - Test scores
    - Attendance records
    - Disciplinary action records
    - Average spending per student
    - Faculty-student ratio
    - Demographics by gender, ethnicity, socio-economic status, parent education

Where do I find this information?

First talk to the point of contact in the school(s) where you'll be collecting data. This person may be able to provide you with the school data and documents you need, or direct you to where to find it. Another alternative is to locate information online. In the United States, for example, the National Center for Education Statistics (http://nces.ed.gov/) is a good resource for data on schools and districts.

What are the limitations of work samples?

- *Age of data collected.* The most recent educational data may actually be from a few years prior to the intervention. You'll have to judge whether that data is current enough to be of use. For example, if a new school was built between the 1:1 computing intervention and the latest available data, that could affect the ratio of students to teachers.
- *Level of data available.* You should try to get data that as closely as possible describes the population you're studying. District-level data will not tell you as much as school-level data, for instance.
- *Amount of detail.* Some school documents may not be free-standing documents; you may need to acquire other information in order to interpret them. Technology or school improvement plans may reference previous plans, meeting notes may refer to previous

conversations, and test scores may lack supporting documentation. It's best to review the data when you first obtain it to determine whether you can understand it in its entirety.

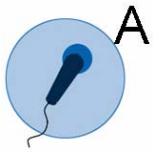
How can I use school data and documents?

You can collect school data and documents before, during, or after you collect other data about context and capacity. You may want to collect school data and documents first and construct interviews and surveys based on the samples (e.g., How did you select the number of computers for your program? Have you hired the technology specialist you'd planned on having this year?). Alternatively, your interviews may guide you to school data and documents you'd like to collect. A superintendent may talk about standards, or a teacher may mention a school improvement plan. If time and resources permit, you may want to collect school-level documents and data at various points during your evaluation

Evaluation Resources

1:1 Computing Evaluation Toolkit

Administrator Interview



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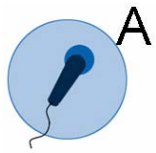

Administrator Interview

Purpose: To gather data from school administrators about the introduction of technology in the schools, pre-post implementation of 1:1 computing, feedback and support, and future scale-up of the 1:1 computing program implementation.

Constructs measured:

- Professional development for teachers
- Support for teachers and students
- Technology infrastructure
- Technology integration readiness
- Commitment to technology in education
- Capacity for technology implementation and support
- School needs and goals
- Curriculum goals and instructional approaches

Format: Open-ended questions

Approximate completion time: 30 to 45 minutes

Administration times: At the end of the study

Implementation: Responses to this instrument are coordinated with surveys and teacher interviews to understand the processes of implementing the 1:1 computing.

Administrator Interview

1. **Readiness**
   - 1.1. How well equipped was your school to integrate 1:1 computing?
   - 1.2. What adaptations did you have to make to prepare for the 1:1 computing integration (e.g., classroom configuration, connectivity, schedule, resources, etc.)?

2. **Pre-implementation**
   - 2.1. How does the 1:1 computing match up to the curriculum goals?
   - 2.2. How does the 1:1 computing program meet the needs of your school?

3. **Satisfaction**
   - 3.1. Overall, how satisfied are you with the implementation of the 1:1 computing?
   - 3.2. How satisfied are you with teachers' training and preparation to integrate the 1:1 computing into classroom practices?

4. **Support**
   - 4.1. In what ways do participating teachers receive support to integrate 1:1 computing into teaching practices?
   - 4.2. Describe how teachers are encouraged to integrate technology into their teaching practices?
   - 4.3. What type of support would you need to scale up technology integration in your school?

5. **Challenges**
   - 5.1. What kind of barriers/constraints/challenges did you face in introducing 1:1 computing in your school?
   - 5.2. What have been the main challenges in implementing 1:1 computing in your school?

6. **Feedback**
   - 6.1. What type of feedback have you received from parents?
   - 6.2. What are the students' reactions to the integration of 1:1 computing?

7. **School culture**
   - 7.1. How (if) has the integration of 1:1 computing influenced or changed your district or school culture, or your organizational culture?

8. **Planning**
   - 8.1. What resources would you need to scale-up technology integration in your school?
   - 8.2. How would you improve the implementation of 1:1 computing?
   - 8.3. What do you foresee in the future implementation of 1:1 computing in your school?

Evaluation Resources

1:1 Computing Evaluation Toolkit

Module II: 1:1 Computing Implementation

Module 2
Implementation

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Module II

1:1 COMPUTING IMPLEMENTATION

Module II provides evaluators and program managers with guidance on how to assess the fidelity of the implementation, or whether they are implementing their 1:1 computing program as it was designed. Using formative feedback and data collected in an implementation study can be crucial in providing information to program staff on how to improve their program implementation strategies. These data can help staff see how closely their implementation follows the original plan and where it deviates. Evaluators and program managers can use formative feedback to revise strategies, thus allowing schools to direct scarce resources to program elements and strategies that are most effective and most likely to produce results.

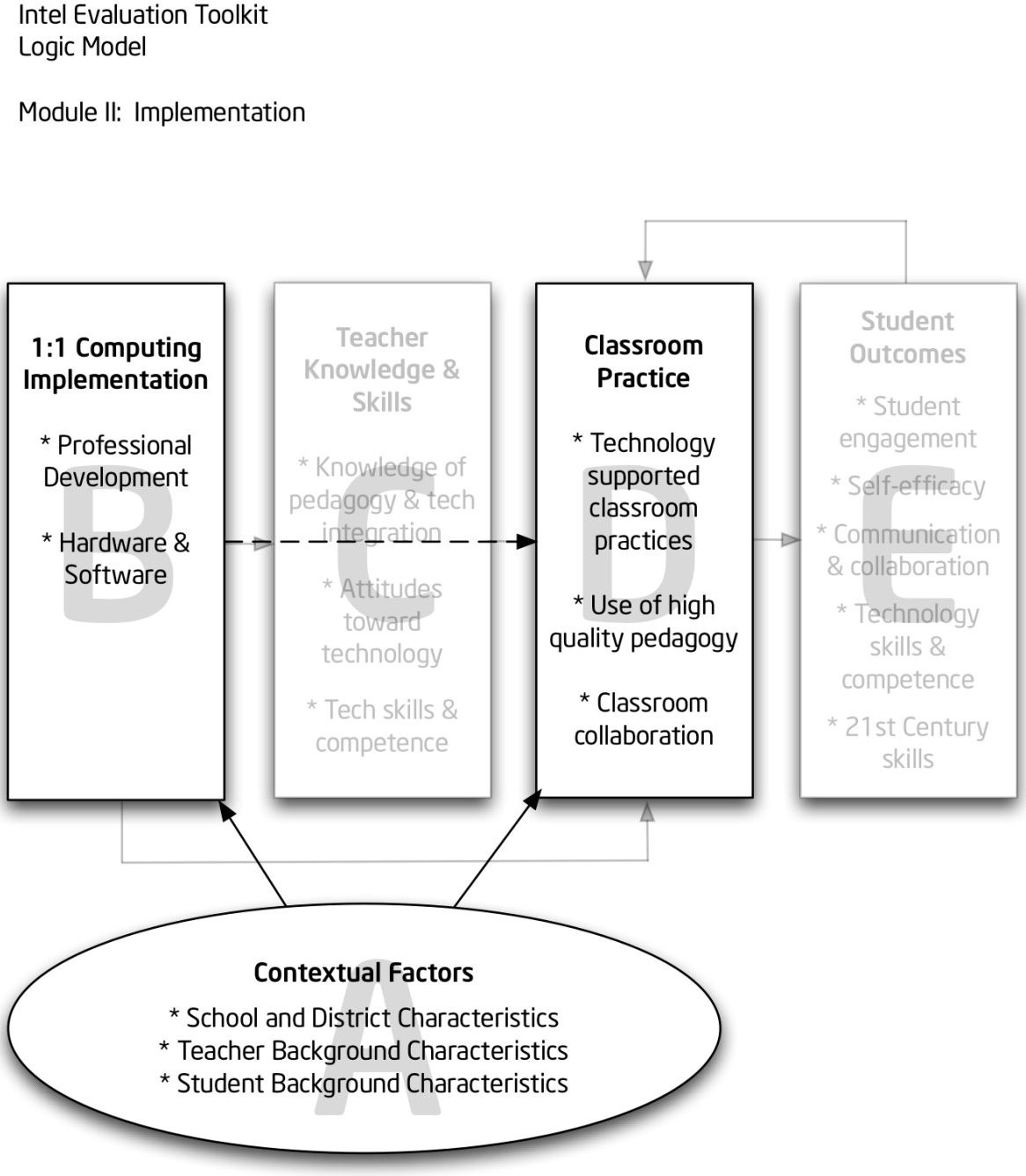
Identify Relevant Constructs and Indicators from the Logic Model

The tools in Module II can be used to collect data on how well 1:1 computing strategies are being implemented as they are intended, and the level of satisfaction among key stakeholders (school personnel and students). Training provided to teachers, classroom practices that emerge with technology integration, and the usability and functionality of the hardware and software resources—all can influence the implementation of the 1:1 initiative. These constructs of interest are highlighted in **Boxes A**, **B**, and **D** the **Logic Model (Figure II.A)** below.

The components of 1:1 computing programs that are external to the classroom include teacher professional development on using 1:1 computers in their classrooms, support for teachers using 1:1 computers, and support for schools for the maintenance of hardware and software used in the 1:1 solution. Within the classroom, implementation of the 1:1 solution focuses on the amount of classroom technology integration and the functionality of the software and hardware.

Teachers' ability to integrate technology in the 1:1 classroom is heavily influenced by the functionality of the classroom hardware and software, the training provided, and the ongoing support for implementation. These factors facilitate teachers' use of new strategies, and for a 1:1 program to be effective, all these components need to be implemented and integrated well.

Figure II.A: Logic Model Constructs for Examining Implementation Fidelity



Determine Evaluation Questions To Be Answered

It is important to pose questions that can guide the data collection process and the interpretation of data from multiple sources. Questions focus on how well the equipment and training support and maintain effective 1:1 classroom environments, the degree to which technology-assisted classroom practices are taking place, and the general level of satisfaction of the students and teachers with the 1:1 environment. **Exhibit II.A** shows some evaluation questions that might be used to frame an evaluation of 1:1 computing implementation.

Exhibit II.A: Sample Evaluation Questions To Guide an Implementation Study of 1:1 Computing

1. Professional development and training
a. What kinds of training are provided to teachers in the use of 1:1 computing strategies and technology use? b. How effective is the professional development in improving teachers' ability to use 1:1 computing strategies? c. What kinds of technology training are provided to students?
2. 1:1 Computing hardware and software
a. Are the computers and other infrastructure functioning as intended? b. Are school/district resources sufficient for sustaining the 1:1 infrastructure? c. How well do technology resources work together? d. What issues or challenges are related to the functionality of the computers and infrastructure?
3. Technology assistance and support
a. What types of support within the school/district are available for maintaining the computers and infrastructure? b. What vendor start-up support was provided at the initiation of the 1:1 computing program? c. How satisfied are teachers and administrators with the type and amount of support provided?

4. Technology-assisted classroom practices

a. What types of technology-assisted practices are occurring in the classroom?
b. How often are students and teachers using technology for classroom learning?
c. How often is technology used for collaboration and communication?
d. How often is technology used to assess student learning?

Define Indicators and Choose Data Collection Tools

To begin the study of 1:1 implementation, evaluators must (a) clearly define the indicators that are associated with the constructs identified in Step 1, and (b) choose appropriate data collection methods for assessing those indicators and answering the evaluation questions identified in Step 2. These activities will help you assess the degree to which 1:1 computing initiatives are implemented as intended and provide formative feedback to decision-makers about the improvements in program implementation.

First, the indicators for particular constructs should be operationally defined so that appropriate assessments can be chosen. The table (**Exhibit II.B**) below shows the indicators of interest for the constructs in a typical Module II study. The table also shows when each indicator might initially occur, and the likely interval or length of time before subsequent changes emerge. This table shows whether, from the baseline or before the 1:1 implementation, one might see changes within two months (particularly important for proof-of-concept evaluations) or whether change will take longer. These longer-term changes may occur within a year, or may take more than a year to emerge.

Exhibit II.B also shows the alignment between the constructs and indicators and the measures suggested for assessing them (see below). Six different data collection tools—rubric ratings, surveys, observations, interviews—are recommended for assessing the constructs in Module II studies.The six tools, which can be used separately or in combination, are:

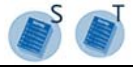
- 1:1 Computing Environment Rubric
- Teacher surveys of implementation satisfaction, success, and challenge
- Student surveys of implementation satisfaction, success, and challenge
- Observation of technology integration in the classroom
- Inteviews with key stakeholders on implementation success and challenge
- Administrator interviews

More complete descriptions of these tools can be found on the cover sheet of each tool.

Exhibit II.B can be used to find evaluation tools. For example, if local evaluators are interested in assessing how satisfied teachers and students are with their 1:1 experiences, they can click on the tool icons associated with the different data collection tools and jump (hyperlink) to the section of the tools for that construct. The tools have been formatted so that evaluators can use the entire tool or only those sections related to specific constructs and modules.

Exhibit II.B: Module II Constructs and Indicators Alignment with Suggested Data Collection Tools

Logic Model Construct and Indicators	Time Observable	Data Collection Measures
	KEY: **B Baseline** **2- Expected in 2 months** **2+ Expected in 2+ Months**	**KEY:** **Classroom Observation** **1:1 Computing Environment Rubric** **Teacher Survey** **Student Survey** **Stakeholder Interviews**
Professional Development		
Amount of professional development related to technology-assisted pedagogy (e.g., questioning, inquiry-based and project-based tasks)	B 2- 2+	E T K
Amount of professional development (hours/days) on technology for administrative purposes/tasks (productivity tools)	B 2- 2+	E T K
Amount of professional development related to technology use	B 2- 2+	E T K
Satisfaction and usefulness of professional development related to technology-assisted pedagogy and technology use	2- 2+	T K

Logic Model Construct and Indicators	Time Observable	Data Collection Measures
1:1 Computing Hardware and Software		
Functionality (e.g., observed problems, usability) of teacher computer		
Functionality of student computers		
Functionality of communication and management software		
Functionality of learning software (web browsers, office suites, etc.)		
Integration of 1:1 components (degree to which components work well together)		
Technical and Administrative Support		
Support provided by district/school for technology functioning, administration, and trouble-shooting		
Support provided by vendor in set		
Technology-Assisted Classroom Practices		
Frequency of use of 1:1 technology tools for learning (how much and how often used)		
Distribution of technology-assisted and non-technology-assisted instructional activities		
Frequency and diversity of student participation in activities (types of activities)		
Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)		
Technology-assisted assessment activities		
Technology-assisted collaboration and communication		

Evaluation Resources

1:1 Computing Evaluation Toolkit

Classroom Observation

* Modules 2, 3, & 4

IN COOPERATION WITH

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in partnership with Intel Corporation
for the Intel Education Initiative

Classroom Observation

Purpose: To capture evidence about the types of learning activities that occur in the classroom, who is using technology, and how technology is being used, and what type of resources are used for instructional purposes.

Rationale: Direct observations allow evaluators to see technology integration and project-based learning firsthand. Using a time-sampling procedure, observers can track the frequency of indicators related to teacher actions, student reactions, and technology use.

Constructs measured:

- ***Teacher outcomes***
  - Knowledge and use of pedagogy and technology integration
    - Technology-supported instruction delivery
    - Online resources to support students' work
    - Web-based tools for class presentations
    - Project-based learning
    - Inquiry-based learning

- ***Student outcomes***
  - Technology-supported classroom practices
    - Frequency of use of 1:1 computing technology tools for learning (how much and how often used)
    - Ratio of technology-supported and non-technology-supported instructional activities
    - Frequency and diversity of student participation in activities (types of activities)
    - Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
    - Technology-supported assessment activities
    - Technology-supported collaboration and communication
    - Technology-supported feedback to students

  - Use of effective pedagogy
    - Use of open-ended activities that require students to actively engage in the learning process
    - Use of activities that promote problem-solving and critical thinking
    - Grouping strategies (amount of individual, small, and whole-group instruction)
    - Number and types of connection to real-world experience
    - Number and types of connection across subject areas
    - Level of challenge of activities
    - Level of scaffolding/instructional support provided
    - Contingent feedback and communication provided with students

  - Classroom Collaboration
    - Team work/group support
    - Community-building strategies

Organization:
Each page of the protocol is organized around a construct.

Section A: Background (p. 1) is intended to provide a general context for interpreting the observations. Observers are asked to describe the activity, classroom setting, school/class background (e.g., location of school, grade, subject) and resources used.

Section B: Instructional approach and technology integration (p. 2) will help you track the duration and frequency of teacher approach (e.g., facilitator, hands-off manager), instructional approach (e.g., teacher-led lecture, hands-on activities), and project-based teaching strategies. You will use a time-sampling technique where you check all of the items that are relevant every five minutes of the class. Definitions of select observable indicators follow.

Section C: Technology-supported classroom practices (p. 4) allow you to track the frequency and duration of technology and software use. You can also record who is using the technology at a given point in time.

Section D: Use of high-quality pedagogy (p. 5) lets you document grouping strategies, classroom activities, and characteristics of project-based instruction that directly involve students and/or student-teacher interactions. It will also help you describe students, including their approximate level of engagement and demonstration of cognitive skills. Definitions of select observable indicators follow.

Section E: Classroom collaboration (p. 6) helps you describe students' actions in small groups, including their use of roles and frequency of conflict and conflict resolution. Definitions of select observable indicators are provided.

Section F: Post observation notes (p. 8) gives you space to record information about what you've observed that isn't captured on the protocol forms. This information could include additional observations that did not have codes in the protocol, or details about the kinds of observations that you considered evidence of certain indicators.

Section G: Teachers' follow-up interview (p. 9) will inform observation data. These questions allow you to expand on instructional strategies and use of computers during the observation.

Format: Pencil and paper, time-interval protocol

Approximate completion time: One hour

Administration times: Observations should be conducted at the beginning of the school year (or when the 1:1 computing is first introduced in the classroom) and at the end of the two-month period scheduled for the study.

Administration directions: This protocol is not necessarily meant to be used by one person in its entirety. It can instead be adapted for a variety of uses, such as:

- *Two observers may use different pages of the protocol for the same observation session* (gathers a wide breadth of observations)
- *Two observers may use the same pages of the protocol for the same observation session* (considers the reliability of observations, and reduces error from a single source)
- *One observer may use different pages of the protocol on different days in the same classroom* (samples a range of classroom practices over the course of an intervention. For instance, an

observer may want to collect data one day about general classroom management or the introduction of 1:1 computing, then return to study an inquiry activity in more depth)
- *One observer may use the same pages of the protocol on different days in the same classroom* (allows the observer to track changes over time or determine the consistency of classroom practices)

Implementation: Responses to this instrument are tracked at the beginning and end of the project to determine changes in implementation and impact.

CLASSROOM OBSERVATION

Section A: Background

Date:	**Teacher:**	**Grade level:**
School:	**Type of school: (public/private, rural/urban)**	**Observer:**
Duration of observation:		**# of students present:**

Attach a printout of or describe today's lesson plan. Housekeeping (before activities begin):	
Activity 1. Describe the lesson and activities observed, and subject being taught in this class.	
Activity 2. Describe the lesson and activities observed, and subject being taught in this class.	
Classroom Setting/Map:	Classroom Resources Checklist (include number and/or brief description in space) ___Books _____ ___ Computers _____ ___ Other technology_____ ___Dictionaries _____ ___CDs/Videos _____ ___Print materials _____

Section B: Instructional Approach and Technology Integration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Teacher Approach										
① Non-interactive leading approach	①	①	①	①	①	①	①	①	①	①
② Facilitator assisting individual students or groups	②	②	②	②	②	②	②	②	②	②
③ Hands-off approach observing students as they work	③	③	③	③	③	③	③	③	③	③
④ Classroom manager in control of processes	④	④	④	④	④	④	④	④	④	④
⑤ Co-learner	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
Instructional approach										
① Teacher led lecture/presentation	①	①	①	①	①	①	①	①	①	①
② Teacher led lecture with discussion	②	②	②	②	②	②	②	②	②	②
③ Demonstration by teacher	③	③	③	③	③	③	③	③	③	③
④ Student work presentations	④	④	④	④	④	④	④	④	④	④
⑤ Student reading	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Cooperative learning	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher interacting with students	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Hands-on activities	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Administrative tasks	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Interruption or break	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based teaching strategies										
① Teacher refers to/reflects on essential question of unit	①	①	①	①	①	①	①	①	①	①
② Teacher discusses/uses rubric to assess work products	②	②	②	②	②	②	②	②	②	②
③ Teacher provides feedback in ways besides using a rubric	③	③	③	③	③	③	③	③	③	③
④ Non-project based strategies are used	④	④	④	④	④	④	④	④	④	④

Category	Definition	Examples
Instructional approach		
Teacher-led lecture/presentation	Distinguished by lack of student-teacher interaction	• Teacher gives a presentation about whales
Teacher-led lecture with discussion	Student-teacher interaction, including teacher or student questioning, providing examples, explanations, discussion of concepts.	• Teacher and students discuss an article they have just read about whales.
Demonstration by teacher	Teacher provides a visual demonstration of concept, experiment, procedure, etc.	• Teacher demonstrates how to enter data into a spreadsheet
Student presentation of work	Student presents and explains work done as part of individual or group activity. Typically student stands and addresses the class.	• Students present information they have learned about whales
Student reading	Individual or group reading.	• Students take turns reading an article about whales out loud
Cooperative learning	Students divided into groups, with individual members fulfilling specific roles in the group (e.g., scribe, spokesperson, artist, etc)	• Students work in small groups to gather information about whales and present it to the class
Teacher interacting with student(s):	May be exhibited in conjunction with a hands-on activity, students presentation, or student reading where teacher provides hints, prompts, feedback to student(s).	• Teacher answers questions from groups and gives feedback on what to do next.
Hands-on activity	Individual or group activity work.	• Students measure different parts of their body to compare them with parts of a whale.
Administrative task	Taking role, signing-in, assigning homework, completing surveys	• Teacher collects permission slips for a trip to the museum.
Project-based learning strategies		
Teacher refers to/reflects on essential question of unit	Teacher incorporates the essential question of the unit into whole class, small group, and/or individual instruction	• Teacher helps students relate a science project idea back to the main question of the unit. • Teacher records what students have learned about the unit's main question on a chart.
Teacher discusses/uses rubric to assess work products	Teacher uses a list of criteria to look at what students do in the classroom or for homework.	• Teacher has students rate each other's presentations using a rubric
Teacher provides feedback in ways besides using a rubric	Teacher gives feedback without evidence of a rubric – feedback that could include but is not limited to informal comments about student work.	• Teacher tells a small group they need more research for their report.
Teacher scaffolds activities	Teacher provides structure or guidance to help students complete activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should answer when looking at data

Section C: Technology-Supported Classroom Practices

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Technology resources										
① Computer (1:1 computing)	①	①	①	①	①	①	①	①	①	①
② Printer	②	②	②	②	②	②	②	②	②	②
③ Scanner	③	③	③	③	③	③	③	③	③	③
④ TV	④	④	④	④	④	④	④	④	④	④
⑤ VCR	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Digital Camera	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Video Camera	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Projector	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Handheld computer	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ No technology used	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Software/Applications used										
① Word processor	①	①	①	①	①	①	①	①	①	①
② Presentation (e.g., PowerPoint)	②	②	②	②	②	②	②	②	②	②
③ Desk-top publishing (e.g., Publisher)	③	③	③	③	③	③	③	③	③	③
④ Web programming	④	④	④	④	④	④	④	④	④	④
⑤ Internet/WWW	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Intel® Teach to the Future website	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Intel® Teach to the Future CD-ROM	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ IIE Web-based thinking tools	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Spreadsheet	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Flowchart/concept mapping	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
⑪ Graphic software (i.e., Photoshop or KidPix)	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪
⑫ Educational software package	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫
Use of technology										
① As part of a lab, activity or assignment	①	①	①	①	①	①	①	①	①	①
② Students research to present information	②	②	②	②	②	②	②	②	②	②
③ Teacher lesson delivery	③	③	③	③	③	③	③	③	③	③
④ Teaching technology skills	④	④	④	④	④	④	④	④	④	④
⑤ Teaching application/software	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Student presentation via technology	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Technology supported group work	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Only the teacher uses the technology	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ No technology used	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨

Section D: Use of High-Quality Pedagogy

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Grouping strategy										
① Students working independently/ alone	①	①	①	①	①	①	①	①	①	①
② Pairs of students	②	②	②	②	②	②	②	②	②	②
③ Small groups (3 + students)	③	③	③	③	③	③	③	③	③	③
④ Students interacting with teachers	④	④	④	④	④	④	④	④	④	④
⑤ Whole class/working as a large group	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students listening to teacher, TV or other media.	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
Classroom activity										
① Students working actively on a project	①	①	①	①	①	①	①	①	①	①
② Students presenting their work	②	②	②	②	②	②	②	②	②	②
③ Questions and answer activity	③	③	③	③	③	③	③	③	③	③
④ Teacher led class/interaction w/students	④	④	④	④	④	④	④	④	④	④
⑤ Teacher lecture/non-interactive class	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students practicing skills on the computer	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Students completing worksheets	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Students working on an assessment	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Class supported by technology (CD, video).	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Class supported by a computer program.	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based instruction										
① Students develop or pursue their own project ideas	①	①	①	①	①	①	①	①	①	①
② Students work in collaborative groups on projects	②	②	②	②	②	②	②	②	②	②
③ Students present work to peers	③	③	③	③	③	③	③	③	③	③
④ Students conduct independent research	④	④	④	④	④	④	④	④	④	④
⑤ Teacher makes connections to real-world experiences	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Teacher makes connections across subject areas	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher scaffolds activities	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Non-project based strategies are used	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Project-based instruction		
Teacher makes connections to real-world experiences	Teacher relates classroom instruction to activities outside of the classroom.	• Teacher has students create a budget for a class field trip.
Teacher makes connections across subject areas	Teacher uses activities that incorporate knowledge and skills from more than one subject.	• Before reading a novel set during World War 2, students do research on the Internet about the time period.
Teacher scaffolds activities	Teacher provides structure for activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should

		answer when looking at data.

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Level of challenge of activities										
① Too easy for most of the students	①	①	①	①	①	①	①	①	①	①
② Appropriate for most of the students	②	②	②	②	②	②	②	②	②	②
③ Too hard for most of the students	③	③	③	③	③	③	③	③	③	③
Student engagement										
① Low engagement (< 20% of students on task)	①	①	①	①	①	①	①	①	①	①
② Moderate engagement (50% of students on task)	②	②	②	②	②	②	②	②	②	②
③ High engagement (> 80% of students on task)	③	③	③	③	③	③	③	③	③	③
Cognitive abilities (see definitions)										
① Receipt of knowledge	①	①	①	①	①	①	①	①	①	①
② Applied procedural knowledge	②	②	②	②	②	②	②	②	②	②
③ Knowledge representation	③	③	③	③	③	③	③	③	③	③
④ Knowledge construction	④	④	④	④	④	④	④	④	④	④
⑤ Other (specify)	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤

Category	Definition	Examples
Student engagement		
Low engagement (<20% of students on task)	Most of the students are not focused on the learning tasks. They may be doing things unrelated to the learning or confused about what they should do.	Not applicable
Moderate engagement (50% of students on task)	At least half of the students are focused on the learning tasks, but some are easily distracted or confused and a minority may not be on task.	Not applicable
High engagement (> 80% of students on task)	Nearly all of the students are focused on the learning tasks. Most of the activity in the classroom is relevant to the tasks.	Not applicable
Cognitive abilities		
Receipt of knowledge	May include listening, repetition, answering simple / closed-ended questions, or reading. Knowledge gained can be found in external sources; no original or creative thinking involved.	• Students listen to a lecture from the teacher. • Students watch an audio-visual presentation.
Applied procedural knowledge	Involves following step-by-step procedures for completing a task or activity or arriving at a solution. The procedural steps can be provided by the teacher or found in the student guide.	• Students enter data into a spreadsheet. • Students use a worksheet to conduct a Web Quest.
Knowledge representation	Students may present and explain their original work. May also include students explaining their understanding of concepts in a way that helps others understand.	• Students make a graph from data they have entered on a spreadsheet. • Students summarize an article they have read online.
Knowledge construction	Students are involved in activities or tasks that call for original or creative thinking to produce a product, arrive at a solution, or develop an understanding that they	• Students interpret a graph they have made. • Students explain why there may be differences in

	would not find elsewhere.	information they have read online (e.g., different sources of bias)

Section E: Classroom Collaboration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Classroom collaboration *Number of members engaged in the task*										
① None	①	①	①	①	①	①	①	①	①	①
② One	②	②	②	②	②	②	②	②	②	②
③ About half	③	③	③	③	③	③	③	③	③	③
④ All or almost all	④	④	④	④	④	④	④	④	④	④
Group work (see definitions)										
① Discussion of goals or strategies	①	①	①	①	①	①	①	①	①	①
② Asking questions	②	②	②	②	②	②	②	②	②	②
③ Showing respect for group members	③	③	③	③	③	③	③	③	③	③
④ Role-taking	④	④	④	④	④	④	④	④	④	④
⑤ Turn-taking	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Conflict	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Conflict resolution	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Shared meaning-making	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Group work		
Discussion of goals or strategies	Students identify what they are supposed to do and how they will do it.	• "Okay, where do you think we can find the answer?" • "No, we're supposed to take the temperature inside and outside before we calculate the averages!"
Asking questions	Students regularly ask one another questions while working on their activities and project.	• "Where am I supposed to enter the temperatures?" • "Wow! How'd you find that website?"
Showing respect for group members	Students consistently show respect for group members' contributions and perspectives.	• "Great idea. I like it!" • "What if we take your idea about the color of the website and add my design?"
Role-taking	Students take specific roles on the project.	• "I'll get information about what whales eat if you find something about where they live." • "I'll draw the pictures!"
Turn-taking	Students do the same activities at different times on the project.	• "My turn to type!" • "I'm tired of this (using the keyboard). You do it for a while."
Conflict	Students disagree on their work.	• "No fair! You've been typing all this time!" • "Yuck. That's a stupid idea."
Conflict resolution	Students resolve their disagreements.	• "Sorry. I didn't mean it was stupid. It's just not what the teacher told us to do." • "Okay, how about you type for five minutes and then I'll do it and we'll switch."

Shared meaning-making	Students come to a mutual understanding of information together.	• "Wait, the graph went down and then up." "Maybe the water was cold while the ice was melting."

Section F: Post Observation

Notes:

- Pacing/Transitions:

- Interactions (teacher-student, student-student)

- Teacher-led/ Student-led Activities

- Instructional Resources used

- Other comments

Section G: Teachers' Follow-Up Interview.

These additional follow-up interview questions ask teachers about their use of new technology, instructional approach and activities, and project-based and inquiry-based instructional approaches used during the observation. This discussion is intended to help evaluators understand the context for the observation; b) obtain information about the teacher's thinking about the lesson plan; c) gather background data for interpretation of study results; d) and gather qualitative data about the teachers' general use of the laptops and other technology.

Evaluation Questions:

1. Briefly describe the purpose of today's lesson, including whether it was part of a longer unit.

2. What were the learning goals or objectives for students?

3. How do you decide when to use the computers (or other technology)?

4. How do you think the computers supported students to reach the learning goals of this assignment?

5. What other ways have you used the computers with your students this year?

6. Describe how what you are doing this year with technology is different than what you've done in previous years.

7. What do you think has been most challenging about the 1:1 computing program?

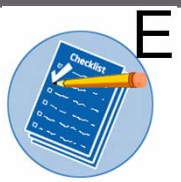
8. What do you see as the biggest benefits of the 1:1 computing program?

9. Other comments?

Evaluation Resources

1:1 Computing Evaluation Toolkit Instruments

1:1 Computing Environment Rubric E



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E

1:1 Computing Environment Rubrics

Purpose: To assess the school and district capacity for implementing 1:1 computing programs, the resources available, and the context in which the 1:1 computing program will be implemented.

Rationale: Numerous of contextual factors may have an impact on the effectiveness of a 1:1 computing program. They include:

(1) Capacity of governments, educational agencies, and other groups to implement 1:1 computing initiatives, including their educational philosophy and commitment to and attitudes toward technology integration;

(2) Resources available to sustain 1:1 computing program implementation in the local context; and

(3) Organization and makeup of the different system—at the school/district, governmental, and corporate support levels—that may influence the implementation of 1:1 computing programs.

Constructs measured:

Capacity and level of technology implementation and integration
Classroom configurations/capacity (numbers of classrooms) and scheduling
Commitment/buy-in to technology in education
Knowledge of technology use in education

Resources
Funding for deployment, support and sustainability/growth
Staffing for implementation and support
Existing infrastructure, connectivity, and technology equipment

Organization: The rubric is used to assess the level of infrastructure and school resources available to support 1:1 computing programs. Each indicator is rated on a three-point scale, from entry-level to intermediate to advanced, which represents the target standard (in column 1).

Format: Rubric with entry, intermediate, and advanced ratings

Approximate completion time: 30 minutes

Administration times: Assessment should be administered pre-implementation and can be re-administered annually or semi-annually to track changes in resources.

Administration directions: The data collection person may ask key administrators or stakeholders to complete the rubric on their own as a self-assessment, or the rubric may provide the foundation for a discussion with key stakeholders about the technology infrastructure and capacity at the school and/or district.

Implementation: Responses to this instrument are tracked at the beginning and during the implementation of the 1:1 initiative to provide contextual information and track changes in infrastructure and resources.

1:1 Computing Environment Rubric

Resources and Background

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Technology Planning The school's administration, teachers, and staff actively support technology planning. The technology plan focuses on student success. Planned technology use is based on needs, research, proven teaching, and learning principles. Plan is revised annually.	Planned technology use mainly for administrative tasks, such as word processing, budgeting, and attendance	Planned technology use for internal planning, budgeting, and direct instruction; some student use	Educational technology is integrated into overall school planning. A collaboratively developed technology plan guides policy and practice. Planned technology use addresses higher order teaching and learning for all students, and is regularly updated.
Technical Support School-based technical support with additional staff as needed (including faculty) Acceptable technical support response time	Technical support comes from outside the school. Technical support response time hinders 1:1 use for teaching and learning	Some school-based technical support Technical support within reasonable period of time	School-based technical support capable of troubleshooting basic network and hardware repair Acceptable technical support response time
Instructional Technology Support School-based instructional technology support, and additional staff as needed (including faculty) with expertise in specialized areas of integration	Instructional technology support comes from outside the school.	Some school-based instructional technology specialist	School-based instructional technology specialist
Budget Budget also addresses facilities and investigation of new technologies Budget reflects the goals identified in technology plan	Budget for hardware and software purchases and professional development	Budget for hardware and software that is accessible to all students, professional development, and some ongoing costs	Budget for hardware and software that is accessible to all students, professional development, and ongoing costs
Funding Successfully obtains funding from sources other than their allotments	District, state and federal technology allotments only	District, state and federal technology allotments only with in-kind donations	Successfully obtains funding from a source other than their allotment

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Professional Development Budget A portion of money spent on technology for your school is devoted to professional development in technology-related training	At least a small % money spent on technology for your school is devoted to professional development in technology-related training	A modest % of money spent on technology for your school is devoted to professional development in technology-related training	Adequate % of money spent on technology for your school is devoted to professional development in technology-related training
Models of Professional Development Instructional staff can provide coaching, modeling of best practices, and school-based mentoring to promote individual growth Additional professional development available through a variety of delivery systems	Leader presents information to group of teachers Training provided by school or district staff	Teachers participate in hands-on instruction with follow-up to activity Additional training provided by outside instructors brought to the school	Majority of instructional staff participate in coaching, modeling of best practices, scaffolding, and school-based mentoring Educators participate in workshops, conferences, and seminars outside the school/district
Content of Professional Development Teachers learn about emerging technologies and their uses with curriculum/students (e.g., creation and communication of new technology-supported, student-centered projects).	Teachers become acquainted with technology (i.e., basic computer skills).	Teachers learn to use technology in the classroom (i.e., administration, management, and or presentation software; Internet as a research tool; vendor-specific training).	Teachers learn to use technology with curriculum/students (i.e., integration skills for creating learner-centered technology projects using Internet, applications, multimedia presentations, data collection, etc.).
Student Technology Standards Technology standards for students are established.	A core group of teachers address the technology standards.	Specific student technology standards adopted	A method for monitoring and evaluating student progress established Technology integrated into curriculum areas; grade level and subject-area expectations for technology established
Teacher Technology Standards A significant group of teachers meet set technology proficiencies and utilize them in the classroom	A core group of teachers meet acceptable technology proficiencies and utilize them in the classroom	Increasing percentages of teachers meet acceptable technology proficiencies and utilize them in the classroom	Most teachers meet acceptable technology proficiencies and utilize them in the classroom

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
School Administrators Promotes exemplary use of technology in instruction for all students; advocates and encourages parental and communal involvement in the training and integration of technology and education Maintains awareness of emerging technologies; participates in job-related professional learning using technology resources	Recognizes benefits of technology in instruction Limited use of technology	Recognizes benefits of technology in instruction for all students and supports use of technology in instruction Routinely uses technology in some aspects of daily work	Recognizes and identifies exemplary use of technology in instruction for all students Models use in daily work including communications, presentations, on-line collaborative projects and management tasks

Technology Capacity

Construct and Targeted Indicator of Capacity and Readiness	Entry	Intermediate	Advanced
Student Computer Access One computer per student	One computer per student	One computer per student	One computer per student; consideration of refresh cycle
Teacher Computer Access One dedicated modern computer per teacher	One dedicated teacher computer per 2 or more teachers	One dedicated computer per teacher;	One dedicated modern computer per teacher; consideration of refresh cycle
Internet Connectivity Adequate access to the Internet for any desired application. Bandwidth supports multiple web-based applications	Some connectivity to the Internet available to support web-based applications only on a few computers	Direct connectivity to the Internet at the school and accessible in some rooms Adequate distribution of bandwidth to the school to avoid most delays	Direct connectivity to the Internet at the school and all instructional areas. Adequate bandwidth to each instructional area over the LAN to avoid most delays
Construct and Targeted Indicator of Capacity and Readiness	**Entry**	**Intermediate**	**Advanced**
Curriculum-based Tools Adequately equipped instructional areas with all the technology that is available to enhance student instruction including all forms of software, digital cameras, scanners, other devices specific to content areas resources for students and teachers including some wireless connectivity and off campus access	Limited access to some instructional equipment (i.e., televisions, VCRs, digital cameras, scanners, programmable calculators, etc.) Tool-based software limited to word processing and spreadsheets	Shared use of instructional equipment among groups of teachers Tool-based software includes presentation, some graphics and concept mapping	Instructional equipment assigned to each teacher/ instructional area including at least a computer with projection device, TV, and VCR or DVD Tool-based software includes some multimedia authoring and video editing

Evaluation Resources

1:1 Computing Evaluation Toolkit

Teacher Survey

* Modules 2 &3

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Teacher Survey

Purpose: To evaluate 1:1 computing programs in K-12 school classrooms in several countries.

Rationale: Teachers' instructional practices can be affected by a number of background characteristics, including years of experience, training on 1:1 computing strategies and technology integration, and attitudes toward technology. This survey is designed to measure indicators that can influence technology integration as well as teachers' perceptions of how they have changed their practices as a result of their classroom implementation of 1:1 computing.

Constructs measured:

- ***Teacher background characteristics***
  - Prior experience with technology integration
  - Teaching experience and preparation
- ***Commitment to technology in education***
- ***Professional development***
  - Satisfaction and usefulness of professional development related to technology-assisted pedagogy and technology use
- ***Knowledge and practices of effective pedagogy and technology integration***
  - Technology-supported instruction delivery
  - Online resources to support students' work
  - Web-based tools for class presentations
  - Project-based learning
  - Inquiry-based learning
  - Technology-supported classroom communication and feedback
- ***Attitudes toward technology***
  - Value of technology in schools
- ***Comfort/skill with technology***
- ***Technology-supported classroom practice***
- ***Student outcomes***

Organization: This survey is divided into eight sections.

Section A: Teacher background characteristics (p. 3). These questions will help you collect data on teachers' educational background and experience with and interest in technology integration.

Section B: Professional development (p. 4). These questions help you measure one aspect of 1:1 computing implementation and teachers' reactions to the training.

Section C**: **Knowledge and practices of effective pedagogy and technology integration (p. 6) This section gives you items to assess changes in teachers' technology integration and to document the frequency and range of technology use.

Section D: Attitudes toward technology (p. 8). These questions will allow you to measure teachers' enthusiasm for technology and their perceptions of its value in schools.

Section E: Comfort/skill with technology (p. 9). These questions will help you evaluate teachers' perceptions of their level of comfort and skill with computers and integration of 1:1 computing into teaching.

***Section F: Technology-supported classroom practice (p. 10**)* lets teachers reflect on their enthusiasm about 1:1 computing before and after the program, rate the extent to which they agree about statements describing the program's impact on their interactions with others, and identify the benefits and drawbacks to participating in the program.

Section G: Student outcomes (p. 11). In this section, teachers are asked to rate the program's effect on their students. Effect is divided into several constructs including student engagement, classroom collaboration, and problem-solving skills.

Section H**: **Additional information (p. 12) allows teachers to record other information about their experience with the 1:1 computing program.

Format: Mostly multiple or fixed-choice items, with some open-ended responses.

Administration times: At the end of the study.

Implementation: Responses to this instrument are analyzed to determine changes in knowledge and skill over the scope of the project and to document the implementation process.

Dear Teachers,

We are evaluating the effect of the 1:1 computing program in your classroom and school.

You are an integral part of this evaluation! Please share candid feedback about your general impressions of this solution and the use of technology in your classroom. This survey will take approximately 20 minutes to complete.

Please know that all the data we collect will be kept completely confidential. *We will not be using any names or identifying information in our analyses or reports.*

Thank you for your participation and support!

Teacher Survey

Section A: Teacher Background Characteristics

1. Name (optional):_____
   Last First
2. Email address (optional):_____

3. What grades have you taught this year?
   - o_1 Elementary
   - o_2 Middle
   - o_3 Secondary
   - o_4 Other:_____

4. What subject(s) have you taught this year?_____

5. What is your level of education and major area of study? List major areas of study for each degree attained.
   a. Bachelor's Degree _____
   b. Graduate Degree _____

6. Have you participated in the Intel Teach Program: No θ_0 Yes θ_1

7. If yes, which version of the Intel Teach Program:

   a. Essentials version 5.4 θ_1
   b. Essentials version 10 θ_2
   c. Essentials Online θ_3

8. How many years have you taught? _____ Years

9. Age Group: θ_1 20-29 θ_2 30-39 θ_3 40-49 θ_4 50+

10. How important was each of the following to your decision to introduce the 1:1 computing in your classroom:

	Not at all important	Somewhat important	No opinion	Important	Very important
a. I wanted to use computers in my classroom.	θ_1	θ_2	θ_3	θ_4	θ_5
b. I wanted to learn new ways to teach my students to use higher-order thinking skills.	θ_1	θ_2	θ_3	θ_4	θ_5
c. It is part of my job to provide professional development opportunities to others.	θ_1	θ_2	θ_3	θ_4	θ_5
d. Attending the training was one way to fulfill a professional development	θ_1	θ_2	θ_3	θ_4	θ_5

requirement.					
e. Someone at my school or district recommended I attend the training.	θ_1	θ_2	θ_3	θ_4	θ_5
f. I wanted to learn about integrating new technologies into my teaching.	θ_1	θ_2	θ_3	θ_4	θ_5

11. How enthusiastic were you about the classroom computing before using it? (Check the box underneath your answer.)

Very unenthusiastic	Unenthusiastic	Neutral	Enthusiastic	Very enthusiastic
θ_1	θ_2	θ_3	θ_4	θ_5

Section B: Professional development

12. Please rate the following statements about the 1:1 Computing Program:

	Strongly disagree	Disagree	Agree	Strongly agree
a. There was adequate professional development before I started using the 1:1 computing my classroom.	θ_1	θ_2	θ_3	θ_4
b. There has been adequate ongoing professional development throughout the school year.	θ_1	θ_2	θ_3	θ_4
c. There has been adequate ongoing technical support since the 1:1 computing was introduced.	θ_1	θ_2	θ_3	θ_4
d. There has been sufficient planning time for integrating 1:1 computing into the curriculum.	θ_1	θ_2	θ_3	θ_4
e. There has been sufficient time to discuss strategies for effective uses of the computers with colleagues.	θ_1	θ_2	θ_3	θ_4

f. Please explain your ratings. Specifically: What training was *most effective*? What *additional* technical training or professional development do you need?_____

_____

_____

_____

_____

_____

13. After having a chance to implement what you learned in the training in your classrooms, how well prepared were you to do the following?

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Technology Skills					
a. Facilitate students' open exploration of new technology tools.	θ_1	θ_2	θ_3	θ_4	θ_5
b. Support students' use of varied resources (e.g., peers, *Help Guide*) to learn new skills.	θ_1	θ_2	θ_3	θ_4	θ_5
c. Encourage students to try new skills for each activity and new activities for each technology area.	θ_1	θ_2	θ_3	θ_4	θ_5

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Critical thinking					
d. Help students follow the process of planning, doing, reviewing, and sharing their work.	θ_1	θ_2	θ_3	θ_4	θ_5
e. Support students in creating original work products that reflect their own unique ideas.	θ_1	θ_2	θ_3	θ_4	θ_5
f. Help students create products that communicate clear messages and match intended purposes.	θ_1	θ_2	θ_3	θ_4	θ_5
g. Facilitate groups of students in managing open-ended, complex projects.	θ_1	θ_2	θ_3	θ_4	θ_5

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Collaboration					
h. Help students ensure that all members are active participants in group activities (e.g., project work, presentations).	θ_1	θ_2	θ_3	θ_4	θ_5
i. Support students in sharing goals, strategies, and ideas.	θ_1	θ_2	θ_3	θ_4	θ_5
j. Support students in asking one another questions and helping one another as they work on their product.	θ_1	θ_2	θ_3	θ_4	θ_5
k. Promote peer-to-peer review and constructive feedback for improvements and further development.	θ_1	θ_2	θ_3	θ_4	θ_5

Section C: Knowledge of Pedagogy and Technology Integration

14. Before the introduction of the 1:1 computing, which of the following ways did you use a computer for your job? (*Check all that apply.)*

- o1 for planning or management (grading, attendance, calendar, lessons)
- o2 for student instruction
- o3 for classroom presentations
- o4 for online research
- o5 as a communication tool (e.g., email to parents or colleagues)
- o6 other:_____

15. Since integrating the 1:1 computing into your classroom practices, which of the following do you regularly use a computer for your job? (*Check all that apply.*)

- o1 for planning or management (grading, attendance, calendar, lessons)
- o2 for student instruction
- o3 for classroom presentations
- o4 for online research
- o5 communication tool (e.g., email to parents or colleagues)
- o6 none

16. Since the introduction of the 1:1 computing, have you integrated technology into lessons that you previously taught without the use of computers?

o1 no, never o2 yes, a few times o3 yes, sometimes o4 yes, all the time

17. Please explain your response:

_____

_____

18. How has the 1:1 Computing Program influenced how you teach? *For instance:*

a. Do your students do more research on the Internet? o0 No o1 Yes

b. Do your students do more group work? o0 No o1 Yes

c. Do your students do more presentations? o0 No o1 Yes

d. Do your students do more writing? o0 No o1 Yes

e. Do your students do more editing? o0 No o1 Yes

f. Do your students do more project-based activities? o0 No o1 Yes

g. Do your students do more inquiry-based activities? o0 No o1 Yes

h. Do you give more feedback to students? o0 No o1 Yes

g. Please add comments on how the 1:1 computing has influenced how you teach. C*onsider instructional practices such as hands-on activities, portfolios, presentations, writing projects, student-centered learning activities, and small group work.* _____

_____

_____

19. Please rate the following statements based on your experience with the 1:1 computing.

Because of the 1:1 computing…	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
a. I find it easier to complete my teaching tasks (grading, lesson preparation, communications)	θ_1	θ_2	θ_3	θ_4
b. I am better prepared to create lessons that integrate student use of computers.	θ_1	θ_2	θ_3	θ_4
c. I have created a more student-centered classroom.	θ_1	θ_2	θ_3	θ_4
d. My interactions and communications with students have increased.	θ_1	θ_2	θ_3	θ_4
e. My interactions and communications with parents have increased.	θ_1	θ_2	θ_3	θ_4
f. My interactions and communications with colleagues have increased.	θ_1	θ_2	θ_3	θ_4
g. I have increased the frequency of or emphasis on critical thinking in my classroom instruction.	θ_1	θ_2	θ_3	θ_4

20. What suggestions do you have for improving the integration of the 1:1 computing in classroom activities? _____

_____

_____

Section D: Attitudes toward technology

21. How enthusiastic are you about the 1:1 computing now? (Check the box underneath your answer.)

Very unenthusiastic	Unenthusiastic	Neutral	Enthusiastic	Very enthusiastic
θ_1	θ_2	θ_3	θ_4	θ_5

22. How useful do you think the computer is for each the following?

	Not useful at all	Somewhat useful	Useful	Very useful
a. Helping teachers use technology effectively	θ_1	θ_2	θ_3	θ_4
b. Helping teachers create innovative, collaborative learning environments	θ_1	θ_2	θ_3	θ_4
c. Helping teachers accommodate different learning styles	θ_1	θ_2	θ_3	θ_4
d. Helping students develop different types of technology skills	θ_1	θ_2	θ_3	θ_4
e. Helping students learn individually	θ_1	θ_2	θ_3	θ_4
f. Helping students learn in a collaborative environment	θ_1	θ_2	θ_3	θ_4

23. Please indicate your level of agreement with the following statements:

	Strongly disagree	Disagree	Agree	Strongly agree
a. Having a 1:1 computing is essential to my teaching.	θ_1	θ_2	θ_3	θ_4
b. Having a computer is essential to other aspects of my work (e.g., planning, management, research, communication)	θ_1	θ_2	θ_3	θ_4
c. All students in my school should be required to have a computer.	θ_1	θ_2	θ_3	θ_4
d. All students should have computer access at home.	θ_1	θ_2	θ_3	θ_4
e. If computers are not required, students should still be allowed to bring computers to school.	θ_1	θ_2	θ_3	θ_4
f. My students have gained technology skills from having a computer that they would not have gained otherwise.	θ_1	θ_2	θ_3	θ_4
g. My students could have gained the same technology skills from using a home or shared school computer.	θ_1	θ_2	θ_3	θ_4

Section E: Comfort/Skill with Technology

24. Before the introduction of the 1:1 computing, how comfortable were you with incorporating computers into your classroom? *(Circle your response.)*

Very Uncomfortable	Uncomfortable	Comfortable	Very comfortable
θ_1	θ_2	θ_3	θ_4

25. Now, how comfortable are you with incorporating computers into your classroom?

Very Uncomfortable	Uncomfortable	Comfortable	Very comfortable
θ_1	θ_2	θ_3	θ_4

26. Have your computer skills improved since the introduction of the 1:1 computing?

    θ_1 no θ_2 yes, somewhat θ_3 yes, a lot

27. Please explain:

    _____

Section F: Technology-Assisted Classroom Practice

28. How have your students used the 1:1 computing? (*Check all that apply.)*

θ_1 word processing θ_2 games θ_3 electronic portfolios (document storage) θ_4 Internet

θ_5 presentations θ_6 skill remediation (drill) θ_7 learning software applications θ_8 keyboarding

θ_9 spreadsheets θ_{10} games θ_{11} other (please specify) _____

29. Overall, how often do you require students to use computers during class time?

θ_0 never θ_1 1-20% θ_2 21-40% θ_3 41-60% θ_4 61-80% θ_5 81-100%

30. How does this compare to your expectation at the beginning of the year?

θ_1 they use them less than I expected θ_2 they use them as much as I expected θ_3 they use them more than I expected

31. What percentage of homework assignments requires the use of the computers?

θ_0 never θ_1 1-20% θ_2 21-40% θ_3 41-60% θ_4 61-80% θ_5 81-100%

32. How does this compare to your expectation at the beginning of the year?

θ_1 they use them less than I expected θ_2 they use them as much as I expected θ_3 they use them more than I expected

33. When you assign writing projects to your students, which of the following tasks do you require them to engage in: (*Check all that apply*.)

θ_1 I don't assign writing projects
θ_2 prewriting tasks (such as brainstorming)
θ_3 proof reading of their work
θ_4 share their work with a peer
θ_5 rough draft
θ_6 revise
θ_7 produce a final copy
θ_8 present or publish the project
θ_9 edit

a. Would you consider the writing process you use to be consistent with "process writing?"

θ_0 No θ_1 Yes θ_2 not sure/I don't know what process writing is

b. Has the 1:1 computing program had an impact on writing projects in your classroom?

θ_0 No θ_1 Yes

c. Please explain: _____

Section G: Student Outcomes

34. To what degree do you think the 1:1 computing has influenced your students' performance? (*Circle the number that corresponds with your answer choice.*)

	No impact	Improved	Much improved	Comments:
a. Writing skills	θ_1	θ_2	θ_3	
b. Research skills	θ_1	θ_2	θ_3	
c. Presentation skills	θ_1	θ_2	θ_3	
d. Interest in learning	θ_1	θ_2	θ_3	
e. Grades	θ_1	θ_2	θ_3	
f. Ability to work with other students	θ_1	θ_2	θ_3	
g. Problem-solving skills	θ_1	θ_2	θ_3	

Section H: Additional Feedback

35. Please feel free to share additional comments related to the 1:1 computing at your school:

_____

_____

_____

_____

_____

_____

Thank you for completing this survey!

Your feedback is critical to the improvement and success of the 1:1 Computing Program.

Evaluation Resources

1:1 Computing Evaluation Toolkit

Student Survey

* Modules 2, 3, & 4

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Student Survey

Purpose: To assess students' perceptions of their classroom experiences with 1:1 computing.

Rationale: To understand the impact of teachers' instructional practices on students' learning, it is important to gather feedback from both teachers and students. In some cases, students may look at lessons or strategies very differently, and their understanding of the goal of an activity may differ from teachers' (Doyle & Carter, 1983)[1]. A student survey therefore allows students to participate in the evaluation process.

Constructs measured:

- ***Student background characteristics***
  - Prior experience with technology such as home technology exposure, other access to technology, previous technology experience in schools
  - Demographics

- ***Technology-supported classroom practices***
  - Frequency of use of 1:1 computing technology for learning (how much and how often used)
  - Frequency and range of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
  - Technology-supported collaboration and communication

- ***Use of high-quality pedagogy***
  - Use of open-ended activities that require students to actively engage in the learning process
  - Use of activities that promote problem-solving and critical thinking
  - Grouping strategies (amount of individual, small, and whole-group instruction)

- ***Student engagement***

Organization of instrument: This survey is divided into four sections.

Section A: Background (p. 1). This section will allow you to collect background information about participants such as demographics and experience with technology. You can use that information to compare responses across variables of interest such as grade, gender, or home technology use.

Section B: Technology-supported classroom practices (p. 2). This section will help you collect data on the frequency of specific technology activities in the classroom, including those that require students to actively engage in learning (e.g., creating presentations and projects). This section also has an item about how often students work in small groups.

[1] Doyle, W., & Carter, K. (1983). Academic tasks in classrooms. *Curriculum Inquiry, 14,* 129-149.

Section C: Project-Based activities (p. 3). This section will give you information on one activity in depth. Students are asked to write about their favorite class project and the use of their computer in that project. Their answers reveal information about the opportunities to engage in critical thinking, grouping strategies, and technology-supported pedagogy.

Section D: Student engagement (p. 4). These questions will let you assess students' level of engagement in 1:1 computing activities and their motivation and interest in classroom activities and school.

Format: Pencil and paper

Administration time: At the end of the study

Implementation: This instrument can be used to compare teachers' instructional behaviors with students' reactions. It can also capture information about the frequency of technology use to complement classroom observations.

Student Survey

We are interested in hearing from students like you, and finding out how having a classroom computer has changed the types of things you do in the classroom. Your participation in this survey is voluntary, and your name and answers will be kept confidential. Your experiences and views about the 1:1 computing program are important, so please take a few minutes to answer the questions thoughtfully.

Section A: Background Information

1. Your name (optional): _____
2. School name: _____
3. Gender:

   θ_1 Male θ_2 Female
4. Grade level:

   θ_1 Primary

   θ_2 Middle

   θ_3 Secondary
5. How many years have you had access to a computer in your classroom?

   θ_0 Less than a year

   θ_1 1 Year

   θ_2 2 Years

   θ_3 3 Years
6. Did you have a computer at home before having a classroom computer?

   θ_0 No θ_1 Yes
7. Do you have access to the Internet at home?

   θ_0 No θ_1 Yes
8. Have you ever taken a computer technology or media skills class at school?

   θ_0 No θ_1 Yes
9. Have you been instructed on the consequences of "what will happen" if you misuse your computer?

   θ_0 No θ_1 Yes

Section B: Technology-Supported Classroom Practices

10. How often do you use your classroom computer to complete the following tasks?

*Check the response that **best** describes **how often you do each** of the following.*

How often do you…	Never	Once or twice this school year	Monthly	About once a week	Almost Daily
a. Play Internet games	☐0	☐1	☐2	☐3	☐4
b. Do school work	☐0	☐1	☐2	☐3	☐4
c. Perform calculations with spreadsheets (e.g., MS Excel)	☐0	☐1	☐2	☐3	☐4
d. Create PowerPoint presentations	☐0	☐1	☐2	☐3	☐4
e. Search the Internet for information or things you're interested in	☐0	☐1	☐2	☐3	☐4
f. Search the Internet for information for school	☐0	☐1	☐2	☐3	☐4
g. Use e-mail	☐0	☐1	☐2	☐3	☐4
h. Work with graphics, pictures, and clip art	☐0	☐1	☐2	☐3	☐4
i. Use Word to create, review, or revise a document	☐0	☐1	☐2	☐3	☐4

11. Click the response that **best** describes **how often you use a classroom computer** to do the following.

I use the laptop to…	Never	Rarely (once a month)	Sometimes (One or more times a month)	Often (One or more times a week)	Almost Always (Everyday or Almost daily)
a. Find information for assignments.	☐0	☐1	☐2	☐3	☐4
b. Send e-mail to friends or teachers	☐0	☐1	☐2	☐3	☐4
c. Organize information	☐0	☐1	☐2	☐3	☐4
d. Creating presentations and projects	☐0	☐1	☐2	☐3	☐4
e. Take notes.	☐0	☐1	☐2	☐3	☐4
f. Complete class assignments	☐0	☐1	☐2	☐3	☐4
g. Take quizzes or tests	☐0	☐1	☐2	☐3	☐4
h. Work on assignments in small groups	☐0	☐1	☐2	☐3	☐4
i. Do drills to increase my skills in Math, Science, language, etc.	☐0	☐1	☐2	☐3	☐4

Section C: Project-Based Activities

In this section, we want you to think about the **most exciting or your most favorite class project** you've done using your classroom computer. We want to know how you **used your classroom computer to complete this project**?

12. What was the project? _____

13. Did you work with a group?

θ_1 Yes

θ_0 No

14. If you answered yes to question 2, was it helpful to work in your group?

θ_2 Very helpful

θ_1 A little helpful

θ_0 Not helpful at all

15. Did you pick the topic?

θ_4 Yes, I picked it on my own.

θ_3 Yes, I picked it with a group.

θ_2 No, I didn't pick it.

θ_1 I don't remember.

16. What did you learn from your project?

17. How did you use the classroom computer? _____

18. Is there anything else you want to say about the project? _____

Section D: Student Engagement

Please choose the response that **best** describes **how you feel** about the following statements.

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
19. Computers make schoolwork easier to do.	☐1	☐2	☐3	☐4
20. I'd rather use a computer to do schoolwork than paper and pencil.	☐1	☐2	☐3	☐4
21. Using classroom computers for schoolwork has some disadvantages.	☐1	☐2	☐3	☐4
22. Computers make schoolwork more interesting.	☐1	☐2	☐3	☐4
23. Computers help me improve the quality of my schoolwork.	☐1	☐2	☐3	☐4
24. Solving *real problems* helps me learn more.	☐1	☐2	☐3	☐4
25. Talking to experts, gathering real world data helps me learn more.	☐1	☐2	☐3	☐4
26. I learn more when I talk to real world experts.	☐1	☐2	☐3	☐4

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
27. I want to learn more about computers.	☐1	☐2	☐3	☐4
28. I am trying to learn more about computers.	☐1	☐2	☐3	☐4
29. I think using a computer for schoolwork improves my grades.	☐1	☐2	☐3	☐4
30. I believe it is very important for me to learn how to use a computer.	☐1	☐2	☐3	☐4
31. Computers help me get my schoolwork done more quickly.	☐1	☐2	☐3	☐4
32. I am excited about the 1:1 computing program.	☐1	☐2	☐3	☐4
33. I would like to use my classroom computer more often in class.	☐1	☐2	☐3	☐4
34. Computers help me understand my classes better.	☐1	☐2	☐3	☐4
35. The more teachers use computers, the more I enjoy school.	☐1	☐2	☐3	☐4
36. I learn more from projects when I choose the topic of research.	☐1	☐2	☐3	☐4
37. I enjoy school more when I get to choose the topic of research.	☐1	☐2	☐3	☐4
38. Researching many viewpoints is important to solving a problem.	☐1	☐2	☐3	☐4

Evaluation Resources

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Stakeholder Interview

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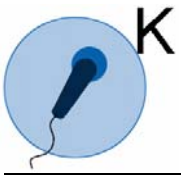

Stakeholder Interview

Purpose: To gather data from stakeholders about the introduction of technology in the schools, pre-post implementation of the 1:1 computing program, strategic planning, and future scale-up of 1:1 computing in their schools.

Constructs measured:

- *Goals and purpose of program*
- *Technology planning, both current and future*
- *Value of technology integration*
- *Development and implementation process*
- *Barriers/challenges to potential implementation success*
- *Supports and resources available*
- *How well technology fits with philosophy of learning*

Format: Open-ended questions

Approximate completion time: 30 to 45 minutes

Administration times: At the end of the study

Implementation: Responses to this instrument are coordinated with surveys and school administrator interviews to understand the processes of implementing 1:1 computing.

Stakeholder Interview

1. Goals and purpose of program

    - How did you envision the use of technology in your school/school district?
    - How well did the implementation match your vision?
    - How well does the 1:1 computing program match the goals of your curriculum?
    - How well does the 1:1 computing program meet the needs of your school/ district?
    - What new ideas do you have for using the technology for instruction in the future?
    - What new ideas do you have about using the technology for non-instructional purposes (e.g., administration, communication)?

2. Technology planning, both current and future

    - How well has the technology addressed the current needs of your school district? How well do you think it will address future needs?
    - In your view, what needs to be done in order to take advantage of the full potential offered by the 1:1 computing in your school/school district?
    - In your opinion, what needs to be done in order to sustain the 1:1 computing program in your school/school district?
    - In what ways do you see 1:1 computing implemented in the future?
    - What is the role and importance of 1:1 computing in your school/district's strategic planning?

3. Level of buy-in and value of technology integration

    - Regarding 1:1 computing, what was the level of buy-in from school administrators, teachers, and the school community in general?
    - How receptive was the school community to the idea of introducing 1:1 computing? What were the primary concerns, if any?
    - What do school administrators value about 1:1 computing?
    - What have teachers found most valuable?
    - What is the value added for students? What evidence do you have that this has been valuable for them?

4. Development and implementation process

    - How would you characterize the development of the 1:1 computing program?
    - If you could do it again, what might you do differently to scale-up the implementation?

5. Barriers/challenges to potential implementation success

    - What do you think are the factors that have supported the use of technology in your school or school district? What factors have hindered technology use?
    - What were the major concerns of school administrators and/or teachers before the implementation of the 1:1 computing program? How were concerns addressed or resolved?
    - What kind of barriers or constraints did you face in implementing 1:1 computing in your school district?
    - Can you describe three main challenges in implementing 1:1 computing in your school or school district?

6. Supports and resources available

    - What kinds of support have been provided to schools and teachers to integrate 1:1 computing into instruction? What has been most helpful?
    - What type of support would the schools and teachers need to scale up technology integration in your school?
    - What type of resources would you need to scale-up technology integration in your school or school district?

7. Technology and philosophy of learning

    - How well does 1:1 computing fit with your philosophy of learning?
    - Have there been any changes in how the school or school district thinks about learning?

Evaluation Resources

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Module III: Emerging Teacher Skills and Classroom Practices

Module 3
Emerging Teacher Skills and Classroom Practices

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Module III

EMERGING TEACHER SKILLS AND CLASSROOM PRACTICES

One of the goals of the Intel® 1:1 Computing Initiative is to support changes in teaching and classroom practice, in the areas of project-based and inquiry-based pedagogy as well as in technology integration. Module III facilitates this goal by providing tools and strategies for measuring teachers' technology skills and competence, knowledge of technology-supported pedagogy and planning, instructional strategies, and attitudes toward technology. The module provides guidance, tools, and protocols that assess not only what skills emerge but also how new skills and knowledge translate into effective technology-supported classroom practices. 1:1 computing strategies can help bring about changes in classroom practice by supporting collaboration, presentation, and inquiry, and the tools included here can help evaluators track and link the changes.

Identify Relevant Constructs and Indicators from the Logic Model

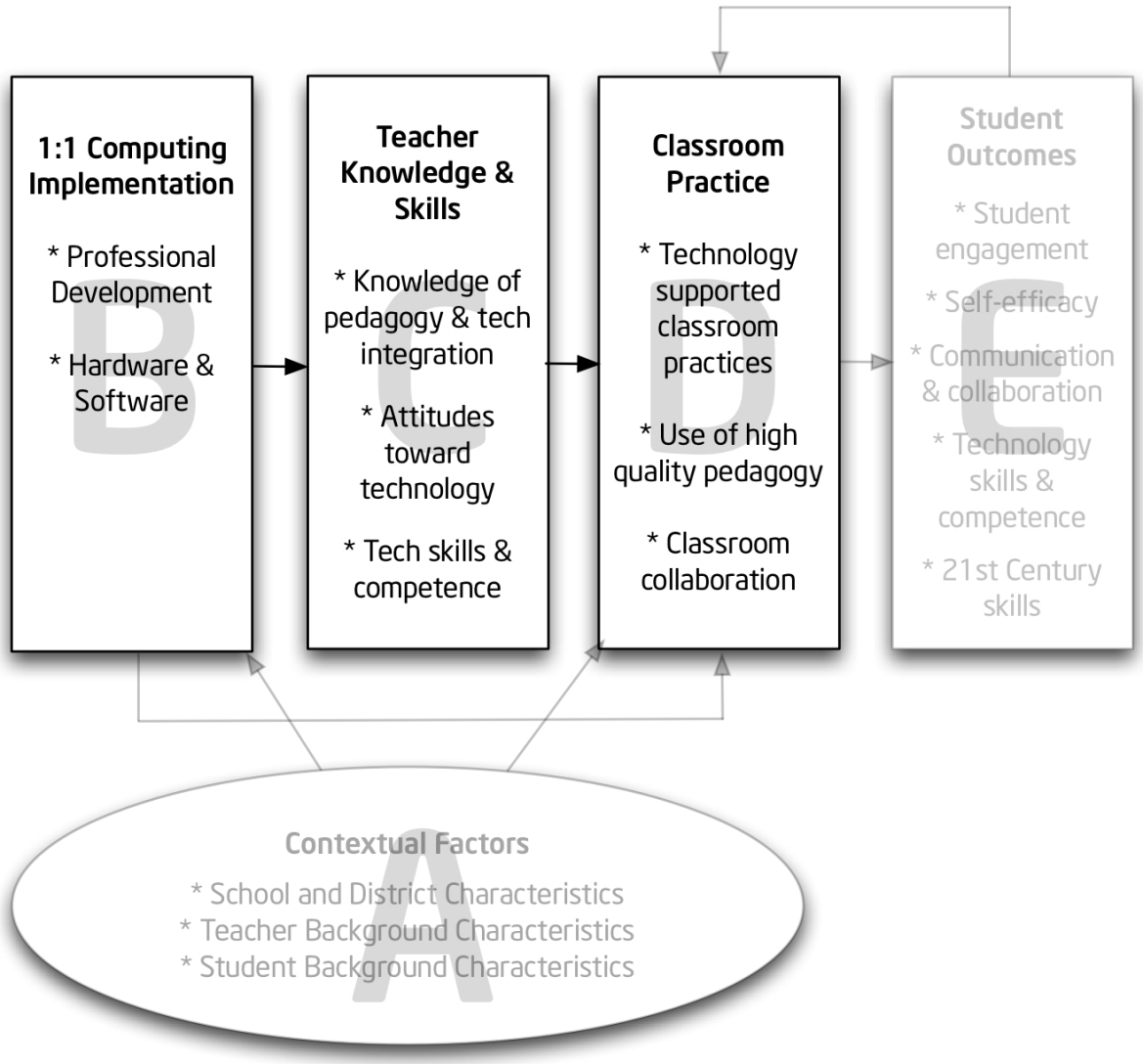
The tools included in Module III are designed to collect data to help evaluators and program managers understand how the implementation of 1:1 computing is related to teachers' emerging knowledge, skills, and attitudes, and to classroom practices related to technology integration, community, feedback and communication, and effective pedagogy. The related constructs are highlighted in **Boxes B**, **C**, and **D** of the **Logic Model (Figure III.A)** below.

In the **Logic Model**, the key constructs that are reflected in the implementation of 1:1 computing in the classroom are teachers' knowledge, skills, behaviors and attitudes, and effective classroom practices. Training provided at the corporate, school, or district level can help teachers learn new skills and strategies for using 1:1 computing effectively. New knowledge and new skills may also be influenced by teachers' background and experience. Less-experienced teachers may learn and apply fewer strategies; teachers with more experience may adopt new strategies more readily. No matter what their experience, teachers' comfort in incorporating new strategies grows with time. Students, too, can respond differently to new instruction according to their backgrounds, experiences, and level of participation. The interactions between students and teachers form the basis for the set of classroom outcomes, specifically, the way teachers and students use technology and the opportunities for in-depth learning and problem solving.

Figure III.A: Logic Model Constructs for Examining Emerging Teacher Skills and Classroom Practices

Intel Evaluation Toolkit
Logic Model

Module III: Emerging Teacher Skills & Classroom Practices



Determine Evaluation Questions To Be Answered

It is important to pose questions that can guide the data collection process and the interpretation of data from multiple sources. These questions focus on the relationships among teachers' use of technology and 1:1 computing strategies, training and preparation, and classroom outcomes. **Exhibit III.A** shows questions that might be used to frame an evaluation of emerging teacher skills and knowledge and classroom practices.

Exhibit III.A: Sample Evaluation Questions for Evaluating Emerging Teacher Knowledge and Skills and Classroom Practices

1. Relationship of implementing 1:1 computing and changes in teachers' knowledge of pedagogy and technology integration
a. How has the introduction of 1:1 computing changed/influenced teachers' knowledge of technology and pedagogy related to technology integration?
2. Relationship of implementing 1:1 computing teachers' skill in lesson planning
a. Are teachers using technology resources for lesson planning? b. In what ways have teachers integrated online and web-based resources into lesson plans? c. How have teachers used technology resources to develop project-based and inquiry-based learning activities?
3. Relationship of implementing 1:1 computing strategies and teachers' use of effective instructional strategies
a. How have teachers integrated 1:1 computing strategies into lesson delivery? b. In what ways have teachers used 1:1 computing strategies to support project-based and inquiry-based learning activities? c. How have teachers used online and web-based resources in classroom activities? d. How have teachers used technology-supported assessment and communication/feedback strategies with students?

4. Relationship of implementing 1:1 computing strategies with changes in teachers' attitudes toward technology
a. How do teachers' experiences with 1:1 computing strategies change their values/perceptions toward technology? b. How do teachers' experiences with 1:1 computing strategies influence comfort and competence in using technology in the classroom?
5. Relationship of implementing 1:1 computing strategies with changes in teachers' technology skills and competence
a. What is the relationship between teachers' technology skills and their implementation of 1:1 computing strategies? b. How has the quality of classroom instruction changed as a function of using 1:1 computing programs in the classroom?
6. Relationship of implementing 1:1 computing strategies and technology-supported classroom practices and pedagogy
a. Are students and teachers engaged in technology-supported learning activities? b. Are students and teachers engaged in technology-supported assessment, feedback, and communication practices? c. How does the implementation of 1:1 computing strategies influence the quality of instructional interactions in the classroom and support real-world applications, opportunities for problem-solving and critical thinking, collaboration and communication, and the development of digital literacy? d. How is the development of classroom community supported by 1:1 computing programs?

Define Indicators and Choose Data Collection Tools

To conduct an evaluation of emerging teacher skills and classroom practices, evaluators must (a) clearly define the indicators that are associated with the constructs identified in Step 1, and (b) choose data collection methods that are appropriate for assessing those indicators and answering the evaluation questions identified in Step 2.

To assess emerging teacher knowledge and skills and classroom practices, the indicators for particular constructs should be operationally defined so that appropriate assessments can be chosen. The table (**Exhibit III.B**) below shows the indicators of interest for the constructs in a typical Module III study. The table also shows when each indicator might initially occur, and the likely interval or length of time before subsequent changes emerge. This table shows whether, from the baseline or before the 1:1 implementation, one might see changes within two months (particularly important for proof-of-concept evaluations) or whether change will take longer. These longer-term changes may occur within a year, or may take more than a year to emerge.

Five different data collection tools are recommended for assessing the teacher and classroom outcome constructs in Module III studies. These measures include a variety of methods (interview, survey, observation), and the tools, listed below, can be used separately or in combination:

- Teacher surveys
- Classroom observations of implementation of instructional strategies and classroom practices
- Teacher and administrator interviews
- Anecdotal teacher data
- Student surveys of classroom experience

More complete descriptions of these tools can be found on the cover sheet of each tool.

Exhibit III.B can be used to find evaluation tools. For example, if local evaluators are interested in assessing changes in teachers' knowledge and skills related to technology integration, they can click on the tool icons associated with the different data collection tools and jump (hyperlink) to the section of the tools that are relevant for that construct. The tools have been formatted so that evaluators can use the entire tool or only the sections related to specific constructs and modules.

Exhibit III.B: Module III Constructs and Indicators Alignment with Suggested Data Collection Tools

Logic Model Construct and Indicators	Time Observable	Data Collection Measures
	KEY: B **Baseline** 2- **Expected in 2 months** 2+ **Expected in 2+**	**KEY:** **Teacher Survey** **Classroom Observation** **Teacher Interview** **Student Survey** **Anecdotal Data**
Teacher Outcomes		
Knowledge and execution of pedagogy and technology integration		
Technology-supported instruction delivery	B 2- 2+	
Online resources to support students work	B 2- 2+	
Web-based tools for class presentations	B 2- 2+	
Project-based learning	B 2- 2+	
Inquiry-based learning	B 2- 2+	
Technology-supported assessment	B 2- 2+	
Technology-supported classroom communication and feedback	B 2- 2+	
Attitudes toward technology		
Self-efficacy	B 2- 2+	
Value of technology in schools	B 2- 2+	

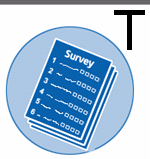
Technology skills and competence		
Comfort/skill with technology		
Quality of technology supported instruction		
Classroom Outcomes		
Technology-supported classroom practices		
Frequency of use of 1:1 computing tools for learning (how much and how often used)		
Ratio of technology-assisted and non-technology-assisted instructional activities		
Frequency and diversity of student participation in activities (types of activities)		
Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)		
Technology-supported assessment activities		
Technology-supported collaboration and communication		
Technology-supported feedback to students		
Use of high-quality pedagogy		
Use of open-ended activities that require students to actively engage in the learning process		
Use of activities that promote problem-solving and critical thinking		
Grouping strategies (amount of individual, small, and whole group instruction)		
Number and types of connection to real-world experience		
Number and types of connection across subject areas		

Level of challenge of activities (e.g., surface-level knowledge/fact gathering vs. in-depth analysis or discussion)		
Level of scaffolding/instructional support provided		
Contingent feedback and communication provided with students		
Classroom Collaboration		
Team work/group support (e.g., asking questions, taking turns)		
Community building strategies (e.g., peer assistance, showing respect)		

Evaluation Resources

1:1 Computing Evaluation Toolkit

Teacher Survey



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Teacher Survey

Purpose: To evaluate 1:1 computing programs in K-12 school classrooms in several countries.

Rationale: Teachers' instructional practices can be affected by a number of background characteristics, including years of experience, training on 1:1 computing strategies and technology integration, and attitudes toward technology. This survey is designed to measure indicators that can influence technology integration as well as teachers' perceptions of how they have changed their practices as a result of their classroom implementation of 1:1 computing.

Constructs measured:

- ***Teacher background characteristics***
  - Prior experience with technology integration
  - Teaching experience and preparation
- ***Commitment to technology in education***
- ***Professional development***
  - Satisfaction and usefulness of professional development related to technology-assisted pedagogy and technology use
- ***Knowledge and practices of effective pedagogy and technology integration***
  - Technology-supported instruction delivery
  - Online resources to support students' work
  - Web-based tools for class presentations
  - Project-based learning
  - Inquiry-based learning
  - Technology-supported classroom communication and feedback
- ***Attitudes toward technology***
  - Value of technology in schools
- ***Comfort/skill with technology***
- ***Technology-supported classroom practice***
- ***Student outcomes***

Organization: This survey is divided into eight sections.

Section A: Teacher background characteristics (p. 3). These questions will help you collect data on teachers' educational background and experience with and interest in technology integration.

Section B: Professional development (p. 4). These questions help you measure one aspect of 1:1 computing implementation and teachers' reactions to the training.

Section C**: **Knowledge and practices of effective pedagogy and technology integration (p. 6) This section gives you items to assess changes in teachers' technology integration and to document the frequency and range of technology use.

Section D: Attitudes toward technology (p. 8). These questions will allow you to measure teachers' enthusiasm for technology and their perceptions of its value in schools.

Section E: Comfort/skill with technology (p. 9). These questions will help you evaluate teachers' perceptions of their level of comfort and skill with computers and integration of 1:1 computing into teaching.

***Section F: Technology-supported classroom practice (p. 10**)* lets teachers reflect on their enthusiasm about 1:1 computing before and after the program, rate the extent to which they agree about statements describing the program's impact on their interactions with others, and identify the benefits and drawbacks to participating in the program.

Section G: Student outcomes (p. 11). In this section, teachers are asked to rate the program's effect on their students. Effect is divided into several constructs including student engagement, classroom collaboration, and problem-solving skills.

Section H**: **Additional information (p. 12) allows teachers to record other information about their experience with the 1:1 computing program.

Format: Mostly multiple or fixed-choice items, with some open-ended responses.

Administration times: At the end of the study.

Implementation: Responses to this instrument are analyzed to determine changes in knowledge and skill over the scope of the project and to document the implementation process.

Dear Teachers,

We are evaluating the effect of the 1:1 computing program in your classroom and school.

You are an integral part of this evaluation! Please share candid feedback about your general impressions of this solution and the use of technology in your classroom. This survey will take approximately 20 minutes to complete.

Please know that all the data we collect will be kept completely confidential. *We will not be using any names or identifying information in our analyses or reports.*

Thank you for your participation and support!

Teacher Survey

Section A: Teacher Background Characteristics

1. Name (optional):_____
   Last First
2. Email address (optional):_____

3. What grades have you taught this year?
   - o_1 Elementary
   - o_2 Middle
   - o_3 Secondary
   - o_4 Other:_____

4. What subject(s) have you taught this year?_____

5. What is your level of education and major area of study? List major areas of study for each degree attained.
   a. Bachelor's Degree _____
   b. Graduate Degree _____

6. Have you participated in the Intel Teach Program: No θ_0 Yes θ_1

7. If yes, which version of the Intel Teach Program:

   a. Essentials version 5.4 θ_1
   b. Essentials version 10 θ_2
   c. Essentials Online θ_3

8. How many years have you taught? _____ Years

9. Age Group: θ_1 20-29 θ_2 30-39 θ_3 40-49 θ_4 50+

10. How important was each of the following to your decision to introduce the 1:1 computing in your classroom:

	Not at all important	Somewhat important	No opinion	Important	Very important
a. I wanted to use computers in my classroom.	θ_1	θ_2	θ_3	θ_4	θ_5
b. I wanted to learn new ways to teach my students to use higher-order thinking skills.	θ_1	θ_2	θ_3	θ_4	θ_5
c. It is part of my job to provide professional development opportunities to others.	θ_1	θ_2	θ_3	θ_4	θ_5
d. Attending the training was one way to fulfill a professional development	θ_1	θ_2	θ_3	θ_4	θ_5

requirement.					
e. Someone at my school or district recommended I attend the training.	θ_1	θ_2	θ_3	θ_4	θ_5
f. I wanted to learn about integrating new technologies into my teaching.	θ_1	θ_2	θ_3	θ_4	θ_5

11. How enthusiastic were you about the classroom computing before using it? (Check the box underneath your answer.)

Very unenthusiastic	Unenthusiastic	Neutral	Enthusiastic	Very enthusiastic
θ_1	θ_2	θ_3	θ_4	θ_5

Section B: Professional development

12. Please rate the following statements about the 1:1 Computing Program:

	Strongly disagree	Disagree	Agree	Strongly agree
a. There was adequate professional development before I started using the 1:1 computing my classroom.	θ_1	θ_2	θ_3	θ_4
b. There has been adequate ongoing professional development throughout the school year.	θ_1	θ_2	θ_3	θ_4
c. There has been adequate ongoing technical support since the 1:1 computing was introduced.	θ_1	θ_2	θ_3	θ_4
d. There has been sufficient planning time for integrating 1:1 computing into the curriculum.	θ_1	θ_2	θ_3	θ_4
e. There has been sufficient time to discuss strategies for effective uses of the computers with colleagues.	θ_1	θ_2	θ_3	θ_4

f. Please explain your ratings. Specifically: What training was *most effective*? What *additional* technical training or professional development do you need?_____

_____

_____

_____

_____

_____

13. After having a chance to implement what you learned in the training in your classrooms, how well prepared were you to do the following?

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Technology Skills					
a. Facilitate students' open exploration of new technology tools.	θ_1	θ_2	θ_3	θ_4	θ_5
b. Support students' use of varied resources (e.g., peers, *Help Guide*) to learn new skills.	θ_1	θ_2	θ_3	θ_4	θ_5
c. Encourage students to try new skills for each activity and new activities for each technology area.	θ_1	θ_2	θ_3	θ_4	θ_5

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Critical thinking					
d. Help students follow the process of planning, doing, reviewing, and sharing their work.	θ_1	θ_2	θ_3	θ_4	θ_5
e. Support students in creating original work products that reflect their own unique ideas.	θ_1	θ_2	θ_3	θ_4	θ_5
f. Help students create products that communicate clear messages and match intended purposes.	θ_1	θ_2	θ_3	θ_4	θ_5
g. Facilitate groups of students in managing open-ended, complex projects.	θ_1	θ_2	θ_3	θ_4	θ_5

	Not at all prepared	Moderately prepared	Prepared	Well prepared	Very well prepared
Collaboration					
h. Help students ensure that all members are active participants in group activities (e.g., project work, presentations).	θ_1	θ_2	θ_3	θ_4	θ_5
i. Support students in sharing goals, strategies, and ideas.	θ_1	θ_2	θ_3	θ_4	θ_5
j. Support students in asking one another questions and helping one another as they work on their product.	θ_1	θ_2	θ_3	θ_4	θ_5
k. Promote peer-to-peer review and constructive feedback for improvements and further development.	θ_1	θ_2	θ_3	θ_4	θ_5

Section C: Knowledge of Pedagogy and Technology Integration

14. Before the introduction of the 1:1 computing, which of the following ways did you use a computer for your job? (*Check all that apply.)*

- o1 for planning or management (grading, attendance, calendar, lessons)
- o2 for student instruction
- o3 for classroom presentations
- o4 for online research
- o5 as a communication tool (e.g., email to parents or colleagues)
- o6 other:_____

15. Since integrating the 1:1 computing into your classroom practices, which of the following do you regularly use a computer for your job? (*Check all that apply.*)

- o1 for planning or management (grading, attendance, calendar, lessons)
- o2 for student instruction
- o3 for classroom presentations
- o4 for online research
- o5 communication tool (e.g., email to parents or colleagues)
- o6 none

16. Since the introduction of the 1:1 computing, have you integrated technology into lessons that you previously taught without the use of computers?

o1 no, never o2 yes, a few times o3 yes, sometimes o4 yes, all the time

17. Please explain your response:

_____

_____

18. How has the 1:1 Computing Program influenced how you teach? *For instance:*

a. Do your students do more research on the Internet? o0 No o1 Yes

b. Do your students do more group work? o0 No o1 Yes

c. Do your students do more presentations? o0 No o1 Yes

d. Do your students do more writing? o0 No o1 Yes

e. Do your students do more editing? o0 No o1 Yes

f. Do your students do more project-based activities? o0 No o1 Yes

g. Do your students do more inquiry-based activities? o0 No o1 Yes

h. Do you give more feedback to students? o0 No o1 Yes

g. Please add comments on how the 1:1 computing has influenced how you teach. C*onsider instructional practices such as hands-on activities, portfolios, presentations, writing projects, student-centered learning activities, and small group work.* _____

_____

_____

19. Please rate the following statements based on your experience with the 1:1 computing.

Because of the 1:1 computing…	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
a. I find it easier to complete my teaching tasks (grading, lesson preparation, communications)	θ_1	θ_2	θ_3	θ_4
b. I am better prepared to create lessons that integrate student use of computers.	θ_1	θ_2	θ_3	θ_4
c. I have created a more student-centered classroom.	θ_1	θ_2	θ_3	θ_4
d. My interactions and communications with students have increased.	θ_1	θ_2	θ_3	θ_4
e. My interactions and communications with parents have increased.	θ_1	θ_2	θ_3	θ_4
f. My interactions and communications with colleagues have increased.	θ_1	θ_2	θ_3	θ_4
g. I have increased the frequency of or emphasis on critical thinking in my classroom instruction.	θ_1	θ_2	θ_3	θ_4

20. What suggestions do you have for improving the integration of the 1:1 computing in classroom activities? _____

_____

_____

Section D: Attitudes toward technology

21. How enthusiastic are you about the 1:1 computing now? (Check the box underneath your answer.)

Very unenthusiastic	Unenthusiastic	Neutral	Enthusiastic	Very enthusiastic
θ_1	θ_2	θ_3	θ_4	θ_5

22. How useful do you think the computer is for each the following?

	Not useful at all	Somewhat useful	Useful	Very useful
a. Helping teachers use technology effectively	θ_1	θ_2	θ_3	θ_4
b. Helping teachers create innovative, collaborative learning environments	θ_1	θ_2	θ_3	θ_4
c. Helping teachers accommodate different learning styles	θ_1	θ_2	θ_3	θ_4
d. Helping students develop different types of technology skills	θ_1	θ_2	θ_3	θ_4
e. Helping students learn individually	θ_1	θ_2	θ_3	θ_4
f. Helping students learn in a collaborative environment	θ_1	θ_2	θ_3	θ_4

23. Please indicate your level of agreement with the following statements:

	Strongly disagree	Disagree	Agree	Strongly agree
a. Having a 1:1 computing is essential to my teaching.	θ_1	θ_2	θ_3	θ_4
b. Having a computer is essential to other aspects of my work (e.g., planning, management, research, communication)	θ_1	θ_2	θ_3	θ_4
c. All students in my school should be required to have a computer.	θ_1	θ_2	θ_3	θ_4
d. All students should have computer access at home.	θ_1	θ_2	θ_3	θ_4
e. If computers are not required, students should still be allowed to bring computers to school.	θ_1	θ_2	θ_3	θ_4
f. My students have gained technology skills from having a computer that they would not have gained otherwise.	θ_1	θ_2	θ_3	θ_4
g. My students could have gained the same technology skills from using a home or shared school computer.	θ_1	θ_2	θ_3	θ_4

Section E: Comfort/Skill with Technology

24. Before the introduction of the 1:1 computing, how comfortable were you with incorporating computers into your classroom? *(Circle your response.)*

Very Uncomfortable	Uncomfortable	Comfortable	Very comfortable
θ_1	θ_2	θ_3	θ_4

25. Now, how comfortable are you with incorporating computers into your classroom?

Very Uncomfortable	Uncomfortable	Comfortable	Very comfortable
θ_1	θ_2	θ_3	θ_4

26. Have your computer skills improved since the introduction of the 1:1 computing?

    θ_1 no θ_2 yes, somewhat θ_3 yes, a lot

27. Please explain:

    _____

Section F: Technology-Assisted Classroom Practice

28. How have your students used the 1:1 computing? (*Check all that apply.)*

θ_1 word processing θ_2 games θ_3 electronic portfolios (document storage) θ_4 Internet

θ_5 presentations θ_6 skill remediation (drill) θ_7 learning software applications θ_8 keyboarding

θ_9 spreadsheets θ_{10} games θ_{11} other (please specify) _____

29. Overall, how often do you require students to use computers during class time?

θ_0 never θ_1 1-20% θ_2 21-40% θ_3 41-60% θ_4 61-80% θ_5 81-100%

30. How does this compare to your expectation at the beginning of the year?

θ_1 they use them less than I expected θ_2 they use them as much as I expected θ_3 they use them more than I expected

31. What percentage of homework assignments requires the use of the computers?

θ_0 never θ_1 1-20% θ_2 21-40% θ_3 41-60% θ_4 61-80% θ_5 81-100%

32. How does this compare to your expectation at the beginning of the year?

θ_1 they use them less than I expected θ_2 they use them as much as I expected θ_3 they use them more than I expected

33. When you assign writing projects to your students, which of the following tasks do you require them to engage in: (*Check all that apply*.)

θ_1 I don't assign writing projects
θ_2 prewriting tasks (such as brainstorming)
θ_3 proof reading of their work
θ_4 share their work with a peer
θ_5 rough draft
θ_6 revise
θ_7 produce a final copy
θ_8 present or publish the project
θ_9 edit

a. Would you consider the writing process you use to be consistent with "process writing?"

θ_0 No θ_1 Yes θ_2 not sure/I don't know what process writing is

b. Has the 1:1 computing program had an impact on writing projects in your classroom?

θ_0 No θ_1 Yes

c. Please explain: _____

Section G: Student Outcomes

34. To what degree do you think the 1:1 computing has influenced your students' performance? (*Circle the number that corresponds with your answer choice.*)

	No impact	Improved	Much improved	Comments:
a. Writing skills	θ_1	θ_2	θ_3	
b. Research skills	θ_1	θ_2	θ_3	
c. Presentation skills	θ_1	θ_2	θ_3	
d. Interest in learning	θ_1	θ_2	θ_3	
e. Grades	θ_1	θ_2	θ_3	
f. Ability to work with other students	θ_1	θ_2	θ_3	
g. Problem-solving skills	θ_1	θ_2	θ_3	

Section H: Additional Feedback

35. Please feel free to share additional comments related to the 1:1 computing at your school:

_____

_____

_____

_____

_____

_____

Thank you for completing this survey!

Your feedback is critical to the improvement and success of the 1:1 Computing Program.

Evaluation Resources

1:1 Computing Evaluation Toolkit

Classroom Observation

IN COOPERATION WITH

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in partnership with Intel Corporation
for the Intel Education Initiative

Classroom Observation

Purpose: To capture evidence about the types of learning activities that occur in the classroom, who is using technology, and how technology is being used, and what type of resources are used for instructional purposes.

Rationale: Direct observations allow evaluators to see technology integration and project-based learning firsthand. Using a time-sampling procedure, observers can track the frequency of indicators related to teacher actions, student reactions, and technology use.

Constructs measured:

- ***Teacher outcomes***
  - Knowledge and use of pedagogy and technology integration
    - Technology-supported instruction delivery
    - Online resources to support students' work
    - Web-based tools for class presentations
    - Project-based learning
    - Inquiry-based learning

- ***Student outcomes***
  - Technology-supported classroom practices
    - Frequency of use of 1:1 computing technology tools for learning (how much and how often used)
    - Ratio of technology-supported and non-technology-supported instructional activities
    - Frequency and diversity of student participation in activities (types of activities)
    - Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
    - Technology-supported assessment activities
    - Technology-supported collaboration and communication
    - Technology-supported feedback to students

  - Use of effective pedagogy
    - Use of open-ended activities that require students to actively engage in the learning process
    - Use of activities that promote problem-solving and critical thinking
    - Grouping strategies (amount of individual, small, and whole-group instruction)
    - Number and types of connection to real-world experience
    - Number and types of connection across subject areas
    - Level of challenge of activities
    - Level of scaffolding/instructional support provided
    - Contingent feedback and communication provided with students

  - Classroom Collaboration
    - Team work/group support
    - Community-building strategies

Organization:
Each page of the protocol is organized around a construct.

Section A: Background (p. 1) is intended to provide a general context for interpreting the observations. Observers are asked to describe the activity, classroom setting, school/class background (e.g., location of school, grade, subject) and resources used.

Section B: Instructional approach and technology integration (p. 2) will help you track the duration and frequency of teacher approach (e.g., facilitator, hands-off manager), instructional approach (e.g., teacher-led lecture, hands-on activities), and project-based teaching strategies. You will use a time-sampling technique where you check all of the items that are relevant every five minutes of the class. Definitions of select observable indicators follow.

Section C: Technology-supported classroom practices (p. 4) allow you to track the frequency and duration of technology and software use. You can also record who is using the technology at a given point in time.

Section D: Use of high-quality pedagogy (p. 5) lets you document grouping strategies, classroom activities, and characteristics of project-based instruction that directly involve students and/or student-teacher interactions. It will also help you describe students, including their approximate level of engagement and demonstration of cognitive skills. Definitions of select observable indicators follow.

Section E: Classroom collaboration (p. 6) helps you describe students' actions in small groups, including their use of roles and frequency of conflict and conflict resolution. Definitions of select observable indicators are provided.

Section F: Post observation notes (p. 8) gives you space to record information about what you've observed that isn't captured on the protocol forms. This information could include additional observations that did not have codes in the protocol, or details about the kinds of observations that you considered evidence of certain indicators.

Section G: Teachers' follow-up interview (p. 9) will inform observation data. These questions allow you to expand on instructional strategies and use of computers during the observation.

Format: Pencil and paper, time-interval protocol

Approximate completion time: One hour

Administration times: Observations should be conducted at the beginning of the school year (or when the 1:1 computing is first introduced in the classroom) and at the end of the two-month period scheduled for the study.

Administration directions: This protocol is not necessarily meant to be used by one person in its entirety. It can instead be adapted for a variety of uses, such as:

- *Two observers may use different pages of the protocol for the same observation session* (gathers a wide breadth of observations)
- *Two observers may use the same pages of the protocol for the same observation session* (considers the reliability of observations, and reduces error from a single source)
- *One observer may use different pages of the protocol on different days in the same classroom* (samples a range of classroom practices over the course of an intervention. For instance, an

observer may want to collect data one day about general classroom management or the introduction of 1:1 computing, then return to study an inquiry activity in more depth)
- *One observer may use the same pages of the protocol on different days in the same classroom* (allows the observer to track changes over time or determine the consistency of classroom practices)

Implementation: Responses to this instrument are tracked at the beginning and end of the project to determine changes in implementation and impact.

CLASSROOM OBSERVATION

Section A: Background

Date:	**Teacher:**	**Grade level:**
School:	**Type of school: (public/private, rural/urban)**	**Observer:**
Duration of observation:		**# of students present:**

Attach a printout of or describe today's lesson plan. Housekeeping (before activities begin):	
Activity 1. Describe the lesson and activities observed, and subject being taught in this class.	
Activity 2. Describe the lesson and activities observed, and subject being taught in this class.	
Classroom Setting/Map:	Classroom Resources Checklist (include number and/or brief description in space) ___Books _____ ___ Computers _____ ___ Other technology_____ ___Dictionaries _____ ___CDs/Videos _____ ___Print materials _____

Section B: Instructional Approach and Technology Integration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Teacher Approach										
① Non-interactive leading approach	①	①	①	①	①	①	①	①	①	①
② Facilitator assisting individual students or groups	②	②	②	②	②	②	②	②	②	②
③ Hands-off approach observing students as they work	③	③	③	③	③	③	③	③	③	③
④ Classroom manager in control of processes	④	④	④	④	④	④	④	④	④	④
⑤ Co-learner	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
Instructional approach										
① Teacher led lecture/presentation	①	①	①	①	①	①	①	①	①	①
② Teacher led lecture with discussion	②	②	②	②	②	②	②	②	②	②
③ Demonstration by teacher	③	③	③	③	③	③	③	③	③	③
④ Student work presentations	④	④	④	④	④	④	④	④	④	④
⑤ Student reading	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Cooperative learning	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher interacting with students	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Hands-on activities	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Administrative tasks	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Interruption or break	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based teaching strategies										
① Teacher refers to/reflects on essential question of unit	①	①	①	①	①	①	①	①	①	①
② Teacher discusses/uses rubric to assess work products	②	②	②	②	②	②	②	②	②	②
③ Teacher provides feedback in ways besides using a rubric	③	③	③	③	③	③	③	③	③	③
④ Non-project based strategies are used	④	④	④	④	④	④	④	④	④	④

Category	Definition	Examples
Instructional approach		
Teacher-led lecture/presentation	Distinguished by lack of student-teacher interaction	• Teacher gives a presentation about whales
Teacher-led lecture with discussion	Student-teacher interaction, including teacher or student questioning, providing examples, explanations, discussion of concepts.	• Teacher and students discuss an article they have just read about whales.
Demonstration by teacher	Teacher provides a visual demonstration of concept, experiment, procedure, etc.	• Teacher demonstrates how to enter data into a spreadsheet
Student presentation of work	Student presents and explains work done as part of individual or group activity. Typically student stands and addresses the class.	• Students present information they have learned about whales
Student reading	Individual or group reading.	• Students take turns reading an article about whales out loud
Cooperative learning	Students divided into groups, with individual members fulfilling specific roles in the group (e.g., scribe, spokesperson, artist, etc)	• Students work in small groups to gather information about whales and present it to the class
Teacher interacting with student(s):	May be exhibited in conjunction with a hands-on activity, students presentation, or student reading where teacher provides hints, prompts, feedback to student(s).	• Teacher answers questions from groups and gives feedback on what to do next.
Hands-on activity	Individual or group activity work.	• Students measure different parts of their body to compare them with parts of a whale.
Administrative task	Taking role, signing-in, assigning homework, completing surveys	• Teacher collects permission slips for a trip to the museum.
Project-based learning strategies		
Teacher refers to/reflects on essential question of unit	Teacher incorporates the essential question of the unit into whole class, small group, and/or individual instruction	• Teacher helps students relate a science project idea back to the main question of the unit. • Teacher records what students have learned about the unit's main question on a chart.
Teacher discusses/uses rubric to assess work products	Teacher uses a list of criteria to look at what students do in the classroom or for homework.	• Teacher has students rate each other's presentations using a rubric
Teacher provides feedback in ways besides using a rubric	Teacher gives feedback without evidence of a rubric – feedback that could include but is not limited to informal comments about student work.	• Teacher tells a small group they need more research for their report.
Teacher scaffolds activities	Teacher provides structure or guidance to help students complete activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should answer when looking at data

Section C: Technology-Supported Classroom Practices

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Technology resources										
① Computer (1:1 computing)	①	①	①	①	①	①	①	①	①	①
② Printer	②	②	②	②	②	②	②	②	②	②
③ Scanner	③	③	③	③	③	③	③	③	③	③
④ TV	④	④	④	④	④	④	④	④	④	④
⑤ VCR	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Digital Camera	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Video Camera	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Projector	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Handheld computer	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ No technology used	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Software/Applications used										
① Word processor	①	①	①	①	①	①	①	①	①	①
② Presentation (e.g., PowerPoint)	②	②	②	②	②	②	②	②	②	②
③ Desk-top publishing (e.g., Publisher)	③	③	③	③	③	③	③	③	③	③
④ Web programming	④	④	④	④	④	④	④	④	④	④
⑤ Internet/WWW	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Intel® Teach to the Future website	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Intel® Teach to the Future CD-ROM	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ IIE Web-based thinking tools	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Spreadsheet	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Flowchart/concept mapping	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
⑪ Graphic software (i.e., Photoshop or KidPix)	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪
⑫ Educational software package	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫
Use of technology										
① As part of a lab, activity or assignment	①	①	①	①	①	①	①	①	①	①
② Students research to present information	②	②	②	②	②	②	②	②	②	②
③ Teacher lesson delivery	③	③	③	③	③	③	③	③	③	③
④ Teaching technology skills	④	④	④	④	④	④	④	④	④	④
⑤ Teaching application/software	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Student presentation via technology	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Technology supported group work	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Only the teacher uses the technology	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ No technology used	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨

Section D: Use of High-Quality Pedagogy

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Grouping strategy										
① Students working independently/ alone	①	①	①	①	①	①	①	①	①	①
② Pairs of students	②	②	②	②	②	②	②	②	②	②
③ Small groups (3 + students)	③	③	③	③	③	③	③	③	③	③
④ Students interacting with teachers	④	④	④	④	④	④	④	④	④	④
⑤ Whole class/working as a large group	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students listening to teacher, TV or other media.	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
Classroom activity										
① Students working actively on a project	①	①	①	①	①	①	①	①	①	①
② Students presenting their work	②	②	②	②	②	②	②	②	②	②
③ Questions and answer activity	③	③	③	③	③	③	③	③	③	③
④ Teacher led class/interaction w/students	④	④	④	④	④	④	④	④	④	④
⑤ Teacher lecture/non-interactive class	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students practicing skills on the computer	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Students completing worksheets	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Students working on an assessment	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Class supported by technology (CD, video).	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Class supported by a computer program.	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based instruction										
① Students develop or pursue their own project ideas	①	①	①	①	①	①	①	①	①	①
② Students work in collaborative groups on projects	②	②	②	②	②	②	②	②	②	②
③ Students present work to peers	③	③	③	③	③	③	③	③	③	③
④ Students conduct independent research	④	④	④	④	④	④	④	④	④	④
⑤ Teacher makes connections to real-world experiences	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Teacher makes connections across subject areas	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher scaffolds activities	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Non-project based strategies are used	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Project-based instruction		
Teacher makes connections to real-world experiences	Teacher relates classroom instruction to activities outside of the classroom.	• Teacher has students create a budget for a class field trip.
Teacher makes connections across subject areas	Teacher uses activities that incorporate knowledge and skills from more than one subject.	• Before reading a novel set during World War 2, students do research on the Internet about the time period.
Teacher scaffolds activities	Teacher provides structure for activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should

		answer when looking at data.

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Level of challenge of activities										
① Too easy for most of the students	①	①	①	①	①	①	①	①	①	①
② Appropriate for most of the students	②	②	②	②	②	②	②	②	②	②
③ Too hard for most of the students	③	③	③	③	③	③	③	③	③	③
Student engagement										
① Low engagement (< 20% of students on task)	①	①	①	①	①	①	①	①	①	①
② Moderate engagement (50% of students on task)	②	②	②	②	②	②	②	②	②	②
③ High engagement (> 80% of students on task)	③	③	③	③	③	③	③	③	③	③
Cognitive abilities (see definitions)										
① Receipt of knowledge	①	①	①	①	①	①	①	①	①	①
② Applied procedural knowledge	②	②	②	②	②	②	②	②	②	②
③ Knowledge representation	③	③	③	③	③	③	③	③	③	③
④ Knowledge construction	④	④	④	④	④	④	④	④	④	④
⑤ Other (specify)	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤

Category	Definition	Examples
Student engagement		
Low engagement (<20% of students on task)	Most of the students are not focused on the learning tasks. They may be doing things unrelated to the learning or confused about what they should do.	Not applicable
Moderate engagement (50% of students on task)	At least half of the students are focused on the learning tasks, but some are easily distracted or confused and a minority may not be on task.	Not applicable
High engagement (> 80% of students on task)	Nearly all of the students are focused on the learning tasks. Most of the activity in the classroom is relevant to the tasks.	Not applicable
Cognitive abilities		
Receipt of knowledge	May include listening, repetition, answering simple / closed-ended questions, or reading. Knowledge gained can be found in external sources; no original or creative thinking involved.	• Students listen to a lecture from the teacher. • Students watch an audio-visual presentation.
Applied procedural knowledge	Involves following step-by-step procedures for completing a task or activity or arriving at a solution. The procedural steps can be provided by the teacher or found in the student guide.	• Students enter data into a spreadsheet. • Students use a worksheet to conduct a Web Quest.
Knowledge representation	Students may present and explain their original work. May also include students explaining their understanding of concepts in a way that helps others understand.	• Students make a graph from data they have entered on a spreadsheet. • Students summarize an article they have read online.
Knowledge construction	Students are involved in activities or tasks that call for original or creative thinking to produce a product, arrive at a solution, or develop an understanding that they	• Students interpret a graph they have made. • Students explain why there may be differences in

	would not find elsewhere.	information they have read online (e.g., different sources of bias)

Section E: Classroom Collaboration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Classroom collaboration *Number of members engaged in the task*										
① None	①	①	①	①	①	①	①	①	①	①
② One	②	②	②	②	②	②	②	②	②	②
③ About half	③	③	③	③	③	③	③	③	③	③
④ All or almost all	④	④	④	④	④	④	④	④	④	④
Group work (see definitions)										
① Discussion of goals or strategies	①	①	①	①	①	①	①	①	①	①
② Asking questions	②	②	②	②	②	②	②	②	②	②
③ Showing respect for group members	③	③	③	③	③	③	③	③	③	③
④ Role-taking	④	④	④	④	④	④	④	④	④	④
⑤ Turn-taking	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Conflict	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Conflict resolution	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Shared meaning-making	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Group work		
Discussion of goals or strategies	Students identify what they are supposed to do and how they will do it.	• "Okay, where do you think we can find the answer?" • "No, we're supposed to take the temperature inside and outside before we calculate the averages!"
Asking questions	Students regularly ask one another questions while working on their activities and project.	• "Where am I supposed to enter the temperatures?" • "Wow! How'd you find that website?"
Showing respect for group members	Students consistently show respect for group members' contributions and perspectives.	• "Great idea. I like it!" • "What if we take your idea about the color of the website and add my design?"
Role-taking	Students take specific roles on the project.	• "I'll get information about what whales eat if you find something about where they live." • "I'll draw the pictures!"
Turn-taking	Students do the same activities at different times on the project.	• "My turn to type!" • "I'm tired of this (using the keyboard). You do it for a while."
Conflict	Students disagree on their work.	• "No fair! You've been typing all this time!" • "Yuck. That's a stupid idea."
Conflict resolution	Students resolve their disagreements.	• "Sorry. I didn't mean it was stupid. It's just not what the teacher told us to do." • "Okay, how about you type for five minutes and then I'll do it and we'll switch."

Shared meaning-making	Students come to a mutual understanding of information together.	• "Wait, the graph went down and then up." "Maybe the water was cold while the ice was melting."

Section F: Post Observation

Notes:

- Pacing/Transitions:

- Interactions (teacher-student, student-student)

- Teacher-led/ Student-led Activities

- Instructional Resources used

- Other comments

Section G: Teachers' Follow-Up Interview.

These additional follow-up interview questions ask teachers about their use of new technology, instructional approach and activities, and project-based and inquiry-based instructional approaches used during the observation. This discussion is intended to help evaluators understand the context for the observation; b) obtain information about the teacher's thinking about the lesson plan; c) gather background data for interpretation of study results; d) and gather qualitative data about the teachers' general use of the laptops and other technology.

Evaluation Questions:

1. Briefly describe the purpose of today's lesson, including whether it was part of a longer unit.

2. What were the learning goals or objectives for students?

3. How do you decide when to use the computers (or other technology)?

4. How do you think the computers supported students to reach the learning goals of this assignment?

5. What other ways have you used the computers with your students this year?

6. Describe how what you are doing this year with technology is different than what you've done in previous years.

7. What do you think has been most challenging about the 1:1 computing program?

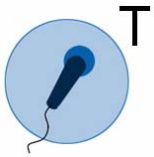
8. What do you see as the biggest benefits of the 1:1 computing program?

9. Other comments?

Evaluation Resources

1:1 Computing Evaluation Toolkit

Teacher Interview



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Teacher Interview

Purpose: To gather evidence about teacher impact that supplements observations and surveys.

Rationale: Classroom practices can be seen from two perspectives: intended tasks and enacted or actual tasks (McCaslin & Good, 1996)[1]. The activity that a teacher intends to carry out with students may be different than the one that takes place in the classroom, due to a variety of constraints including time, resources, and student knowledge/experience. This interview is designed to get teachers' perspectives on the intended and actual use of technology and inquiry-based pedagogy, and on the skills students need to be successful in the future.

Constructs measured:

- ***Teacher outcomes***
  - Knowledge and use of pedagogy and technology integration
    - Technology-supported delivery of instruction
    - Online resources to support students' work
    - Web-based tools for class presentations
    - Project-based learning
    - Inquiry-based learning
  - Technology skills and competence
  - Comfort/skill with technology
  - Quality of technology-supported instruction
- ***Student outcomes***
  - Technology-supported classroom practices
    - Frequency of use of 1:1 computing technology for learning (how much and how often used)
    - Ratio of technology-assisted and non-technology-assisted instructional activities
    - Frequency and diversity of student participation in activities (types of activities)
    - Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
    - Technology-supported assessment activities
    - Technology-supported collaboration and communication
    - Technology-supported feedback to students
  - Use of high-quality pedagogy
    - Use of open-ended activities that require students to actively engage in the learning process

[1] McCaslin, M. & Good, T. L. (1996). The informal curriculum. In D. Berliner & R. Calfee (Eds.), *Handbook of educational psychology* (pp. 622-671). New York: Simon & Schuster.

- Use of activities that promote problem-solving and critical thinking
- Grouping strategies (amount of individual, small, and whole-group instruction)
- Number and types of connection to real-world experience

Organization: This interview is organized into four sections. This overview is intended to help evaluators decide how to structure the interview and when to probe for more detailed information.

Section A: Knowledge and use of pedagogy and technology integration

TP: Technology for Lesson Planning, Classroom Materials, and Teacher Administrative Needs (p. 1)

The questions in this section ask about teachers' use of technology for their own lesson planning and classroom management and administration, such as using the Internet to research a topic that the teacher is not familiar with, or to find materials to present to the class; creating grade books on the computer; producing handouts or quizzes; or writing lesson plans on the computer.

The first set of questions in this section explores teachers' activities since participating in a 1:1 computing program. It is important to establish whether teachers did these activities before the training or not. The questions divide the teachers into two groups—teachers who used technology for lesson planning before the training (questions LP1a – LP1c) and teachers who did not use technology for lesson planning before (questions LP1e – LP1g).

The second set of questions explores possible new uses of technology to create class materials (such as handouts, quizzes, presentations) or teacher administrative and classroom management tools (such as grade books, class lists, calendars).

PS: Preparing Students for their Future (p. 2)

The questions in this section ask about the skills and abilities that teachers think their students will need to be successful in the future; the use of technology is often connected to the development of complex thinking skills. These questions ask teachers what skills they feel students need in their country and whether the training has helped the teachers in supporting students' development of these skills.

Section B: Technology-supported classroom practices
UT: Using Technology with Students (p. 3)

The questions in this section ask about new technology activities that directly involve students. An objective of 1:1 computing is to support teachers in creating more opportunities for students to use technology. This section asks teachers to think about the lesson activities that they feel were inspired by their participation in 1:1 computing training and to talk about any student technology activities connected to those lessons. After describing the activities in detail, teachers are asked to place the student activities in to one of three categories: passive viewing, responding actively to something delivered via technology, or creating a technology product. Teachers who used technology with students before the 1:1 computing program are asked to compare this activity with the type of activities they did with their students before the training.

This section also asks teachers to talk about the challenges they face when trying to use technology with their students.

The optional follow-up interview questions ask about the teachers' use of new technology activities and project-based instructional approaches in his or her classroom. This section reviews the research objective for each section of the interview.

PB - Using Project-Based Approaches in the Classroom (p. 4)

The questions in this section ask about the use of project-based instructional approaches. An objective of 1:1 computing is to support teachers in integrating project-based teaching strategies into their classroom. The first question asks teachers to describe a project that they feel was inspired by their participation in the 1:1 computing program. The teachers then place that project into one of three categories that are set on a simple continuum from teacher-centered to student-centered teaching strategies: 1) teaching strategies centered around clear lectures with reinforcement activities for students, 2) teaching strategies that combine classroom discussions with lectures, and 3) teaching strategies encouraging students to critically explore material. Teachers are then asked to compare the target project with the teaching strategies they typically use.

Format: Mostly open-ended questions; some multiple-choice

Approximate completion time: 30 to 45 minutes

Administration times: At the end of the study

Implementation: Responses to this instrument are coordinated with observations and surveys to understand the processes leading to changes in teacher and student outcomes.

Teacher Interview Questions

Section A: Knowledge and use of pedagogy and technology integration

TP Technology for Lesson Planning, Classroom Materials, and Teacher Administrative Needs

READ TO TEACHER BEING INTERVIEWED: I want to ask you about your use of technology for lesson planning and preparation since the 1:1 computing initiative.

TP-1. Did you use technology to help prepare and plan your lessons before the 1:1 computing initiative?

IF RESPONDENT ANSWERS “YES,” COMPLETE ALL OF TP-1, AND THEN CONTINUE TO TP-3. IF RESPONDENT ANSWERS “NO,” GO DIRECTLY TO TP-2.

TP-1a. Can you describe how you are using technology in new ways now to help prepare and plan your lessons?

TP-1b. How has this been helpful?

TP-1c. What are some of the difficulties you have when using the technology to prepare your lessons?

TP-2. Have you tried using the Internet or the computer to help you prepare for your lessons SINCE the training? IF RESPONDENT ANSWERS “NO,” GO DIRECTLY TO TP-3.

TP-2a. Can you describe how?

TP-2b. How has this been helpful?

TP-2c. What are some of the difficulties you have using the technology to prepare your lessons?

TP-3. Have you used technology to create new class materials (examples – handouts, quizzes, presentations) or tools (examples – Excel attendance sheet, grade books, class lists, calendars) to help you as a teacher?

If yes, please briefly describe the materials or tools you created.

Section A: Knowledge and execution of pedagogy and technology integration

PS Preparing Students for their Future

READ TO TEACHER BEING INTERVIEWED: The next set of questions is about preparing students for the future.

PS-1. What skills and concepts do you think your students will need to be successful in life?

PS-2. What role, if any, does technology play in helping you prepare your students to be successful?

PS-3. Has your participation in the 1:1 computing initiative helped you meet this challenge?

PS-3a. Please explain why or why not.

Section B: Technology-supported classroom practices

(UT) Section UT: Using Technology with Students

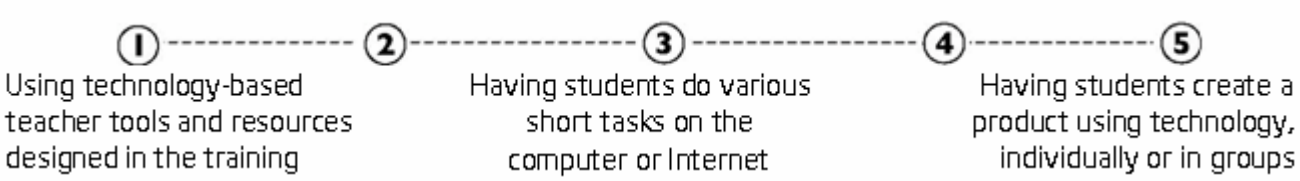
READ TO TEACHER BEING INTERVIEWED: I am going to ask you about your use of 1:1 computing in your classroom. In answering these questions, think about a unit of study in which you feel you successfully integrated 1:1 computing.

UT-1. Please describe the unit and the ways in which you incorporated 1:1 computing.

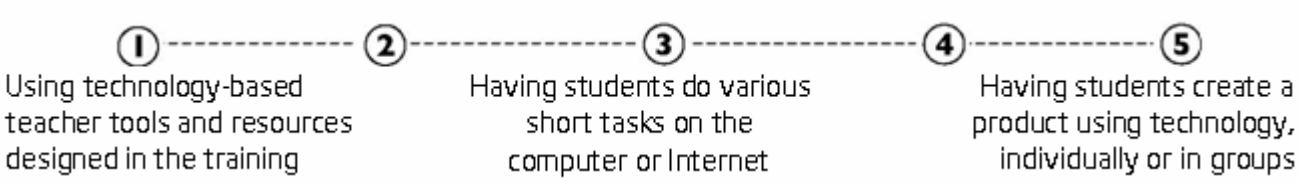
UT-1a. Did you use 1:1 computing in planning the unit?

UT-1b. Can you describe the most meaningful technology activity from your unit plan that you implemented?

UT-1c. Would you identify that technology activity you just described to me as primarily:



UT-2. Did you use other technology with your students before the 1:1 computing initiative? If yes, thinking about the other technology activities you used in your classroom and tell me whether you would identify these activities as primarily:



UT-3. While you were trying to integrate technology into your teaching, what factors (e.g., number of students, required curriculum, technology access) did you have to take into account to actually do these activities with your students? Please briefly describe any important factors that you had to take into account.

PB Using Project-Based Approaches in the Classroom

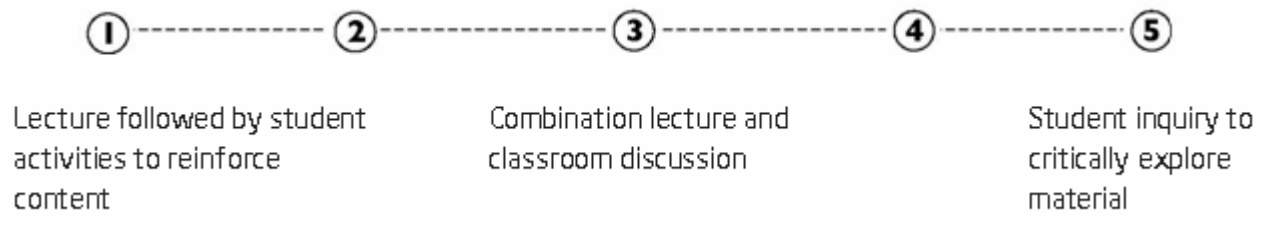
READ TO TEACHER BEING INTERVIEWED: This section is about projects you designed to incorporate 1:1 computing.

PB-1. Can you please briefly describe a project you developed that used 1:1 computing to encourage student inquiry.

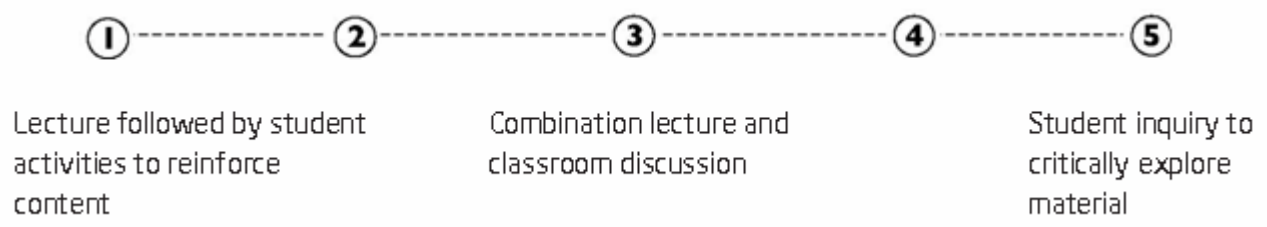
READ TO TEACHER BEING INTERVIEWED: I am now going to ask you about teaching strategies you use in your classroom. Teachers differ in their use of teaching strategies in the classroom, and these strategies can be grouped into three broad categories:

1) Lecture followed by student activities to reinforce content 2) Combination lecture and classroom discussion 3) Student inquiry to explore material

PB-2. Keeping this range in mind, where would you situate the activities from a 1:1 computing-supported project that you used with your students?



PB-3. Using this same range, where would you place most of your lessons before the 1:1 computing initiative? Please give an example.



PB-4. How useful do you think project-based approaches are in your school? Why or why not?

Evaluation Resources

1:1 Computing Evaluation Toolkit

Student Survey

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Student Survey

Purpose: To assess students' perceptions of their classroom experiences with 1:1 computing.

Rationale: To understand the impact of teachers' instructional practices on students' learning, it is important to gather feedback from both teachers and students. In some cases, students may look at lessons or strategies very differently, and their understanding of the goal of an activity may differ from teachers' (Doyle & Carter, 1983)[1]. A student survey therefore allows students to participate in the evaluation process.

Constructs measured:

- ***Student background characteristics***
  - Prior experience with technology such as home technology exposure, other access to technology, previous technology experience in schools
  - Demographics

- ***Technology-supported classroom practices***
  - Frequency of use of 1:1 computing technology for learning (how much and how often used)
  - Frequency and range of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
  - Technology-supported collaboration and communication

- ***Use of high-quality pedagogy***
  - Use of open-ended activities that require students to actively engage in the learning process
  - Use of activities that promote problem-solving and critical thinking
  - Grouping strategies (amount of individual, small, and whole-group instruction)

- ***Student engagement***

Organization of instrument: This survey is divided into four sections.

Section A: Background (p. 1). This section will allow you to collect background information about participants such as demographics and experience with technology. You can use that information to compare responses across variables of interest such as grade, gender, or home technology use.

Section B: Technology-supported classroom practices (p. 2). This section will help you collect data on the frequency of specific technology activities in the classroom, including those that require students to actively engage in learning (e.g., creating presentations and projects). This section also has an item about how often students work in small groups.

[1] Doyle, W., & Carter, K. (1983). Academic tasks in classrooms. *Curriculum Inquiry, 14,* 129-149.

Section C: Project-Based activities (p. 3). This section will give you information on one activity in depth. Students are asked to write about their favorite class project and the use of their computer in that project. Their answers reveal information about the opportunities to engage in critical thinking, grouping strategies, and technology-supported pedagogy.

Section D: Student engagement (p. 4). These questions will let you assess students' level of engagement in 1:1 computing activities and their motivation and interest in classroom activities and school.

Format: Pencil and paper

Administration time: At the end of the study

Implementation: This instrument can be used to compare teachers' instructional behaviors with students' reactions. It can also capture information about the frequency of technology use to complement classroom observations.

Student Survey

We are interested in hearing from students like you, and finding out how having a classroom computer has changed the types of things you do in the classroom. Your participation in this survey is voluntary, and your name and answers will be kept confidential. Your experiences and views about the 1:1 computing program are important, so please take a few minutes to answer the questions thoughtfully.

Section A: Background Information

1. Your name (optional): _____
2. School name: _____
3. Gender:

   θ_1 Male θ_2 Female
4. Grade level:

   θ_1 Primary

   θ_2 Middle

   θ_3 Secondary
5. How many years have you had access to a computer in your classroom?

   θ_0 Less than a year

   θ_1 1 Year

   θ_2 2 Years

   θ_3 3 Years
6. Did you have a computer at home before having a classroom computer?

   θ_0 No θ_1 Yes
7. Do you have access to the Internet at home?

   θ_0 No θ_1 Yes
8. Have you ever taken a computer technology or media skills class at school?

   θ_0 No θ_1 Yes
9. Have you been instructed on the consequences of "what will happen" if you misuse your computer?

   θ_0 No θ_1 Yes

Section B: Technology-Supported Classroom Practices

10. How often do you use your classroom computer to complete the following tasks?

*Check the response that **best** describes **how often you do each** of the following.*

How often do you…	Never	Once or twice this school year	Monthly	About once a week	Almost Daily
a. Play Internet games	☐0	☐1	☐2	☐3	☐4
b. Do school work	☐0	☐1	☐2	☐3	☐4
c. Perform calculations with spreadsheets (e.g., MS Excel)	☐0	☐1	☐2	☐3	☐4
d. Create PowerPoint presentations	☐0	☐1	☐2	☐3	☐4
e. Search the Internet for information or things you're interested in	☐0	☐1	☐2	☐3	☐4
f. Search the Internet for information for school	☐0	☐1	☐2	☐3	☐4
g. Use e-mail	☐0	☐1	☐2	☐3	☐4
h. Work with graphics, pictures, and clip art	☐0	☐1	☐2	☐3	☐4
i. Use Word to create, review, or revise a document	☐0	☐1	☐2	☐3	☐4

11. Click the response that **best** describes **how often you use a classroom computer** to do the following.

I use the laptop to…	Never	Rarely (once a month)	Sometimes (One or more times a month)	Often (One or more times a week)	Almost Always (Everyday or Almost daily)
a. Find information for assignments.	☐0	☐1	☐2	☐3	☐4
b. Send e-mail to friends or teachers	☐0	☐1	☐2	☐3	☐4
c. Organize information	☐0	☐1	☐2	☐3	☐4
d. Creating presentations and projects	☐0	☐1	☐2	☐3	☐4
e. Take notes.	☐0	☐1	☐2	☐3	☐4
f. Complete class assignments	☐0	☐1	☐2	☐3	☐4
g. Take quizzes or tests	☐0	☐1	☐2	☐3	☐4
h. Work on assignments in small groups	☐0	☐1	☐2	☐3	☐4
i. Do drills to increase my skills in Math, Science, language, etc.	☐0	☐1	☐2	☐3	☐4

Section C: Project-Based Activities

In this section, we want you to think about the **most exciting or your most favorite class project** you've done using your classroom computer. We want to know how you **used your classroom computer to complete this project**?

12. What was the project? _____

13. Did you work with a group?

θ_1 Yes

θ_0 No

14. If you answered yes to question 2, was it helpful to work in your group?

θ_2 Very helpful

θ_1 A little helpful

θ_0 Not helpful at all

15. Did you pick the topic?

θ_4 Yes, I picked it on my own.

θ_3 Yes, I picked it with a group.

θ_2 No, I didn't pick it.

θ_1 I don't remember.

16. What did you learn from your project?

17. How did you use the classroom computer? _____

18. Is there anything else you want to say about the project? _____

Section D: Student Engagement

Please choose the response that **best** describes **how you feel** about the following statements.

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
19. Computers make schoolwork easier to do.	☐1	☐2	☐3	☐4
20. I'd rather use a computer to do schoolwork than paper and pencil.	☐1	☐2	☐3	☐4
21. Using classroom computers for schoolwork has some disadvantages.	☐1	☐2	☐3	☐4
22. Computers make schoolwork more interesting.	☐1	☐2	☐3	☐4
23. Computers help me improve the quality of my schoolwork.	☐1	☐2	☐3	☐4
24. Solving *real problems* helps me learn more.	☐1	☐2	☐3	☐4
25. Talking to experts, gathering real world data helps me learn more.	☐1	☐2	☐3	☐4
26. I learn more when I talk to real world experts.	☐1	☐2	☐3	☐4

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
27. I want to learn more about computers.	☐1	☐2	☐3	☐4
28. I am trying to learn more about computers.	☐1	☐2	☐3	☐4
29. I think using a computer for schoolwork improves my grades.	☐1	☐2	☐3	☐4
30. I believe it is very important for me to learn how to use a computer.	☐1	☐2	☐3	☐4
31. Computers help me get my schoolwork done more quickly.	☐1	☐2	☐3	☐4
32. I am excited about the 1:1 computing program.	☐1	☐2	☐3	☐4
33. I would like to use my classroom computer more often in class.	☐1	☐2	☐3	☐4
34. Computers help me understand my classes better.	☐1	☐2	☐3	☐4
35. The more teachers use computers, the more I enjoy school.	☐1	☐2	☐3	☐4
36. I learn more from projects when I choose the topic of research.	☐1	☐2	☐3	☐4
37. I enjoy school more when I get to choose the topic of research.	☐1	☐2	☐3	☐4
38. Researching many viewpoints is important to solving a problem.	☐1	☐2	☐3	☐4

Evaluation Resources

1:1 Computing Evaluation Toolkit

Anecdotal Data

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Anecdotal Data

Purpose: To gather information from teachers about their instructional practices.

Constructs measured:
Depending upon teachers' responses, any of the following constructs could be measured:

- ***Teacher outcomes***
  - Knowledge and use of pedagogy and technology integration
    - Technology-supported instruction delivery
    - Online resources to support students work
    - Web-based tools for class presentations
    - Project-based learning
    - Inquiry-based learning
    - Technology-supported assessment
    - Technology-supported classroom communication and feedback
  - Attitudes toward technology
    - Self-efficacy
    - Value of technology in schools
  - Technology skills and competence
  - Comfort/skill with technology
- ***Classroom outcomes***
  - Technology-supported classroom practices
    - Frequency of use of 1:1 computing technology tools for learning (how much and how often used)
    - Ratio of technology-supported and non-technology-supported instructional activities
    - Frequency and diversity of student participation in activities (types of activities)
    - Frequency and diversity of teacher use of technology-supported instructional strategies and lesson delivery (types of activities)
  - Use of high-quality pedagogy
    - Use of open-ended activities that require students to actively engage in the learning process
    - Use of activities that promote problem-solving and critical thinking
    - Grouping strategies (amount of individual, small, and whole-group instruction)
    - Number and types of connection to real-world experience
    - Number and types of connection across subject areas
    - Level of challenge of activities
    - Level of scaffolding/instructional support provided
    - Contingent feedback and communication provided with students

- Classroom collaboration
  - Team work/group support (e.g. asking questions, taking turns)
  - Community building strategies (e.g., peer assistance, showing respect)

Format: Pencil and paper

Approximate completion time: Varies by teacher and anecdote

Administration time: Weekly, over the course of the evaluation

Implementation: This instrument can be used to gather qualitative data about the process of integrating technology into classrooms. Evaluators may want to use the existing teacher and classroom outcome constructs to code the information in the anecdotes. Evaluators could also incorporate relevant data into a case study.

Anecdotal Data Collection

Introduction:

Integrating the 1:1 computing into the learning environment can have a powerful effect on classroom dynamics. Changes in collaboration and communication patterns and in students' and teachers' behaviors are only some of the dynamics that could be influenced by the use of technology in a learning environment. Records of those changes are critical to understanding the effect of technology integration into classroom practices. Teachers' *Anecdotal Data* can help document these changes and provide rich data that indicate how 1:1 computing in the classroom influences the learning environment over time. *Anecdotal data* will also help evaluators to understand those unique events that signal changes in the classroom dynamic.

Procedure:

To document the introduction of the 1:1 computing in the classroom, over a period of two months teachers will be asked to write weekly anecdotal logs of those particularly revealing events that may be associated with the presence and use of 1:1 computing. These one-page logs are not intended to focus on specific constructs or indicators, but rather to report on those experiences or events associated in any way with the introduction of 1:1 technology in the classroom. The most qualified person to register those events is the classroom teacher.

This data collection method does not target any specific event, and the following indicators are only a few examples of particular aspects that could be observed in students, teachers, or the classroom dynamic:

Have you observed changes or reveling events associated with:	
• Student to student interaction?	• Interest in particular subject matter/topic?
• Teacher-student interaction?	• Group work?
• Increased participation?	• Engagement?
• Informed arguments?	• Responsibility?
• Collaboration patterns?	• Enthusiasm?
• Confidence?	• Initiative?
• Sense of community?	• Sense of ownership for products or activity?

Anecdote Log

Name (optional):_____
Last First

School: _____

Date: _____

What grades are you teaching this year? _____

What subject(s) are you teaching this year?_____

During the following two months, we are asking you to write one-page weekly logs to describe specific examples of events that you have observed, or have been involved in, which you feel are good examples of changes in your teaching approach, students' behaviors, or classroom dynamics. These changes or revealing events should be associated with the introduction of the 1:1 computing in classroom practices.

Please write your response below, continuing on the back of this page if needed.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Evaluation Resources

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Module IV: Student Outcomes

Module 4
Student Outcomes

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Module IV

STUDENT OUTCOMES

One of the goals of the Intel® 1:1 Computing Initiative is to help students acquire 21st Century skills (e.g., information literacy, communication and collaboration skills, and problem-solving and critical thinking skills). Participation in project-based and inquiry-based learning, as well as in the integration of technology in the classroom, helps students gain these skills. Module IV facilitates this goal by providing tools to measure these emerging 21st Century Skills and Competencies: (a) the emerging 21st Century skills and knowledge that students develop in 1:1 computing classrooms; (b) students' participation in more meaningful learning opportunities; and (c) changes in students' attitudes and sense of self-efficacy. The tools can also be used to examine the relationships among changes in teacher, classroom, and student outcomes. Overall, Module IV provides guidance, tools, and protocols that assess not only emerging 21st Century skills but also the ways in which these new skills and knowledge help students become more effective learners.

Identify Relevant Constructs and Indicators from the Logic Model

The tools included in Module IV can be used to collect data to understand how implementation of 1:1 computing in the classroom is related to students' emerging knowledge, skills, attitudes, and behaviors. The constructs covered are shown in **Boxes B**, **D** and **E** in the **Logic Model (Figure IV.A)** below.

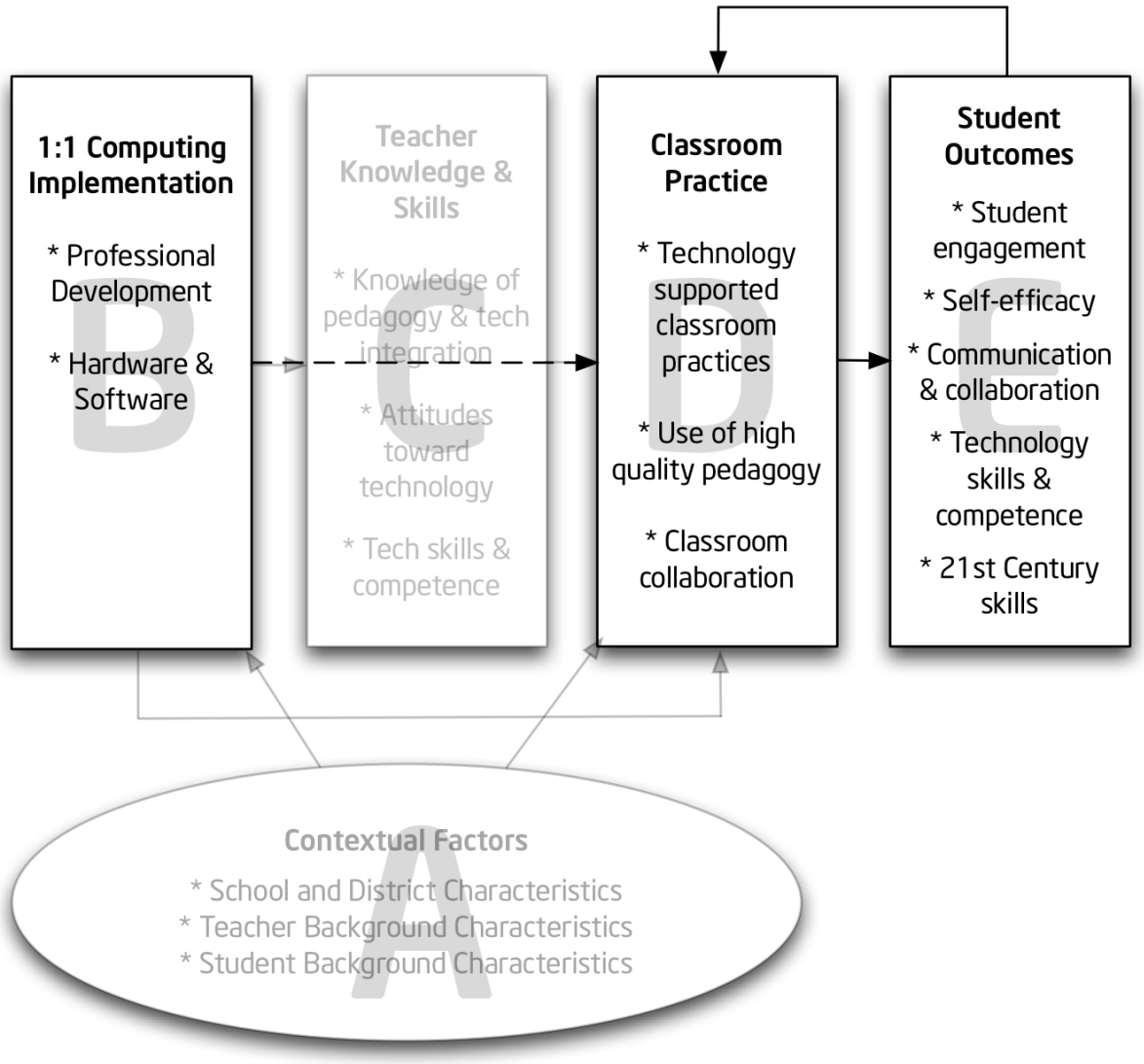
The key constructs in Module IV that are reflected in the implementation of 1:1 computing strategies in the classroom include: (a) student engagement and self-efficacy, (b) technology and information competencies, (c) collaboration and teamwork, (d) presentation of work and communication, and (e) academic learning. Students who have been taught by teachers using 1:1 computing strategies in their classrooms are expected to acquire an array of 21st Century skills[1] such as problem solving, information literacy, and collaboration. Students' prior experiences with technology, the knowledge that they bring to the classroom, and their experience with innovative instructional strategies such as project-based learning, also influence their acquisition of these skills.

[1] Partnership for 21st Century Skills (2003). *Learning for the 21st Century.* Report downloaded November 30, 2005 from http://www.21stcenturyskills.org/images/stories/otherdocs/P21_Report.pdf

Figure IV.A: Logic Model Constructs for Examining Emerging Student Skills

Intel Evaluation Toolkit
Logic Model

Module IV: Emerging Student Skills



At first, students may be challenged by the multiple demands of their work. In science, for example, they may have trouble creating research questions or drawing conclusions from their data[2]. A successful teacher will be able to anticipate or respond to these difficulties by providing appropriate scaffolds or supports (e.g., sample research questions, templates for organizing data, questions to press students' thinking). Over time these scaffolds will become obsolete as students become better able to do independent work and help their peers. Change in knowledge and skills may be very slow and incremental. Students may even appear to move backwards in some skills as they take on increasingly complex projects. Understanding the dynamics among teacher instruction, classroom practices, and student outcomes is essential to explaining and ultimately improving student learning.

Determine Evaluation Questions To Be Answered

It is important to propose questions that can guide the collection and interpretation of data from multiple sources. These questions focus on changes in student skills, engagement, and knowledge that emerge in a 1:1 classroom environment. Other questions consider the relationships between teachers' use of technology and 1:1 computing strategies and classroom practices that affect student outcomes. **Exhibit IV.A** shows evaluation questions that might be used to frame an evaluation of emerging student engagement, skills, and knowledge.

Exhibit IV.A: Sample Evaluation Questions for Evaluating Emerging Student Knowledge

1. Effect of implementing 1:1 computing on changes in students' attitudes, knowledge, and skills
1. To what degree has participation in 1:1 computing classrooms changed/influenced students': a. engagement in the learning process and attitudes toward learning? b. technology skills and competence? c. development of 21st Century Skills (e.g., problem solving, collaboration)? d. ability to engage in deeper and more meaningful learning?

[2] Krajcik, J., Blumenfeld, P., Marx R. W., Bass, K. M., Fredericks, J., & Soloway, E. (1998). Middle school students' initial attempts at inquiry in project-based science classrooms. *The Journal of Learning Sciences, 7,* 313-350.

2. Examine links between the implementation of 1:1 computing and factors that facilitate student learning
1. What is the relationship between the 1:1 computing instructional strategies, technology integration, and participation in learning activities with students': a. engagement in the learning process? b. comfort and skills with technology? c. development of 21st Century Skills? 2. What is the relationship between 1:1 computing instructional strategies and the depth and quality of learning?

Define Indicators and Choose Data Collection Tools

In Step 3 , evaluators must (a) clearly define the indicators that are associated with the constructs identified in Step 1, and (b) choose data collection methods that are appropriate for assessing those indicators and answering the evaluation questions identified in Step 2.

To assess emerging student knowledge and skills and classroom practices, the indicators for particular constructs should be operationally defined so that appropriate assessments can be chosen. The table (**Exhibit IV.A**) below shows the indicators of interest for the constructs in a typical Module IV study. The table also shows when each indicator might initially occur, and the likely interval or length of time before subsequent changes emerge. This table shows whether, from the baseline or before the 1:1 implementation, one might see changes within two months (particularly important for proof-of-concept evaluations) or whether change will take longer. These longer-term changes may occur within a year, or may take more than a year to emerge.

Five different data collection tools—survey, observation, focus groups, student work, and student reflections/narratives—are recommended for assessing the constructs in Module IV studies. The tools, listed below, can be used separately or in combination:

- Student surveys
- Classroom observations of student engagement and participation in learning activities
- Student focus groups
- Student work samples and knowledge and skills assessments
- Student reflections/narratives

More complete descriptions of these tools can be found on the cover sheet of each tool.

Exhibit IV.A can be used to find evaluation tools. For example, if local evaluators are interested in assessing changes in students' engagement or in their information literacy, they can click on the tool icons associated with the different data collection tools and jump (hyperlink) to the section of the tools that are relevant for that construct. The tools have been formatted so that evaluators can use the entire tool or only those sections related to specific constructs and modules.

Exhibit IV.A: Module IV Constructs and Indicators Alignment with Suggested Data Collection Tools

Logic Model Construct and Indicators	Time Observable	Data Collection Measures
	KEY: B **Baseline** 2- **Expected in 2 months** 2+ **Expected in 2+ Months**	**KEY:** **Classroom Observation** **Student Focus Group** **Student Survey** **Assessing Student Work** **Reflections/ Narratives**
Student Outcomes		
Student Engagement		
Student rating of level of engagement in technology-supported and non-technology supported activities	B 2-	
Motivation and interest in classroom activities and school	B 2-	
Rating of overall student engagement levels in classes (observation)	B 2-	
Self-Efficacy		
Perceived competence toward school and general learning	B 2+	
Perceived competence towards technology skills	B 2-	

Technology skills and competence		
Communicating ideas & messages to others		
Collaboration/teamwork with peers		
Presentation of work		
Problem-solving and critical thinking skills		
Posing problems that are clearly stated and feasible to answer		
Gathering evidence to solve the problem		
Analyzing, interpreting evidence		
Generating and evaluating solutions		
Technology competence and skills		
Computing operations skills		
Applications skills		
Quality of student-designed products		
Information Literacy (access, select, and manage information)		
Longer-Term Outcomes		
Improved performance in core subjects		
Productivity (technology literacy)		

Evaluation Resources

1:1 Computing Evaluation Toolkit

Classroom Observation

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Classroom Observation

Purpose: To capture evidence about the types of learning activities that occur in the classroom, who is using technology, and how technology is being used, and what type of resources are used for instructional purposes.

Rationale: Direct observations allow evaluators to see technology integration and project-based learning firsthand. Using a time-sampling procedure, observers can track the frequency of indicators related to teacher actions, student reactions, and technology use.

Constructs measured:

- ***Teacher outcomes***
  - Knowledge and use of pedagogy and technology integration
    - Technology-supported instruction delivery
    - Online resources to support students' work
    - Web-based tools for class presentations
    - Project-based learning
    - Inquiry-based learning

- ***Student outcomes***
  - Technology-supported classroom practices
    - Frequency of use of 1:1 computing technology tools for learning (how much and how often used)
    - Ratio of technology-supported and non-technology-supported instructional activities
    - Frequency and diversity of student participation in activities (types of activities)
    - Frequency and diversity of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
    - Technology-supported assessment activities
    - Technology-supported collaboration and communication
    - Technology-supported feedback to students

  - Use of effective pedagogy
    - Use of open-ended activities that require students to actively engage in the learning process
    - Use of activities that promote problem-solving and critical thinking
    - Grouping strategies (amount of individual, small, and whole-group instruction)
    - Number and types of connection to real-world experience
    - Number and types of connection across subject areas
    - Level of challenge of activities
    - Level of scaffolding/instructional support provided
    - Contingent feedback and communication provided with students

  - Classroom Collaboration
    - Team work/group support
    - Community-building strategies

Organization:
Each page of the protocol is organized around a construct.

Section A: Background (p. 1) is intended to provide a general context for interpreting the observations. Observers are asked to describe the activity, classroom setting, school/class background (e.g., location of school, grade, subject) and resources used.

Section B: Instructional approach and technology integration (p. 2) will help you track the duration and frequency of teacher approach (e.g., facilitator, hands-off manager), instructional approach (e.g., teacher-led lecture, hands-on activities), and project-based teaching strategies. You will use a time-sampling technique where you check all of the items that are relevant every five minutes of the class. Definitions of select observable indicators follow.

Section C: Technology-supported classroom practices (p. 4) allow you to track the frequency and duration of technology and software use. You can also record who is using the technology at a given point in time.

Section D: Use of high-quality pedagogy (p. 5) lets you document grouping strategies, classroom activities, and characteristics of project-based instruction that directly involve students and/or student-teacher interactions. It will also help you describe students, including their approximate level of engagement and demonstration of cognitive skills. Definitions of select observable indicators follow.

Section E: Classroom collaboration (p. 6) helps you describe students' actions in small groups, including their use of roles and frequency of conflict and conflict resolution. Definitions of select observable indicators are provided.

Section F: Post observation notes (p. 8) gives you space to record information about what you've observed that isn't captured on the protocol forms. This information could include additional observations that did not have codes in the protocol, or details about the kinds of observations that you considered evidence of certain indicators.

Section G: Teachers' follow-up interview (p. 9) will inform observation data. These questions allow you to expand on instructional strategies and use of computers during the observation.

Format: Pencil and paper, time-interval protocol

Approximate completion time: One hour

Administration times: Observations should be conducted at the beginning of the school year (or when the 1:1 computing is first introduced in the classroom) and at the end of the two-month period scheduled for the study.

Administration directions: This protocol is not necessarily meant to be used by one person in its entirety. It can instead be adapted for a variety of uses, such as:

- *Two observers may use different pages of the protocol for the same observation session* (gathers a wide breadth of observations)
- *Two observers may use the same pages of the protocol for the same observation session* (considers the reliability of observations, and reduces error from a single source)
- *One observer may use different pages of the protocol on different days in the same classroom* (samples a range of classroom practices over the course of an intervention. For instance, an

observer may want to collect data one day about general classroom management or the introduction of 1:1 computing, then return to study an inquiry activity in more depth)
- *One observer may use the same pages of the protocol on different days in the same classroom* (allows the observer to track changes over time or determine the consistency of classroom practices)

Implementation: Responses to this instrument are tracked at the beginning and end of the project to determine changes in implementation and impact.

CLASSROOM OBSERVATION

Section A: Background

Date:	**Teacher:**	**Grade level:**
School:	**Type of school: (public/private, rural/urban)**	**Observer:**
Duration of observation:		**# of students present:**

Attach a printout of or describe today's lesson plan. Housekeeping (before activities begin):	
Activity 1. Describe the lesson and activities observed, and subject being taught in this class.	
Activity 2. Describe the lesson and activities observed, and subject being taught in this class.	
Classroom Setting/Map:	Classroom Resources Checklist (include number and/or brief description in space) ___Books _____ ___ Computers _____ ___ Other technology_____ ___Dictionaries _____ ___CDs/Videos _____ ___Print materials _____

Section B: Instructional Approach and Technology Integration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Teacher Approach										
① Non-interactive leading approach	①	①	①	①	①	①	①	①	①	①
② Facilitator assisting individual students or groups	②	②	②	②	②	②	②	②	②	②
③ Hands-off approach observing students as they work	③	③	③	③	③	③	③	③	③	③
④ Classroom manager in control of processes	④	④	④	④	④	④	④	④	④	④
⑤ Co-learner	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
Instructional approach										
① Teacher led lecture/presentation	①	①	①	①	①	①	①	①	①	①
② Teacher led lecture with discussion	②	②	②	②	②	②	②	②	②	②
③ Demonstration by teacher	③	③	③	③	③	③	③	③	③	③
④ Student work presentations	④	④	④	④	④	④	④	④	④	④
⑤ Student reading	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Cooperative learning	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher interacting with students	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Hands-on activities	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Administrative tasks	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Interruption or break	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based teaching strategies										
① Teacher refers to/reflects on essential question of unit	①	①	①	①	①	①	①	①	①	①
② Teacher discusses/uses rubric to assess work products	②	②	②	②	②	②	②	②	②	②
③ Teacher provides feedback in ways besides using a rubric	③	③	③	③	③	③	③	③	③	③
④ Non-project based strategies are used	④	④	④	④	④	④	④	④	④	④

Category	Definition	Examples
Instructional approach		
Teacher-led lecture/presentation	Distinguished by lack of student-teacher interaction	• Teacher gives a presentation about whales
Teacher-led lecture with discussion	Student-teacher interaction, including teacher or student questioning, providing examples, explanations, discussion of concepts.	• Teacher and students discuss an article they have just read about whales.
Demonstration by teacher	Teacher provides a visual demonstration of concept, experiment, procedure, etc.	• Teacher demonstrates how to enter data into a spreadsheet
Student presentation of work	Student presents and explains work done as part of individual or group activity. Typically student stands and addresses the class.	• Students present information they have learned about whales
Student reading	Individual or group reading.	• Students take turns reading an article about whales out loud
Cooperative learning	Students divided into groups, with individual members fulfilling specific roles in the group (e.g., scribe, spokesperson, artist, etc)	• Students work in small groups to gather information about whales and present it to the class
Teacher interacting with student(s):	May be exhibited in conjunction with a hands-on activity, students presentation, or student reading where teacher provides hints, prompts, feedback to student(s).	• Teacher answers questions from groups and gives feedback on what to do next.
Hands-on activity	Individual or group activity work.	• Students measure different parts of their body to compare them with parts of a whale.
Administrative task	Taking role, signing-in, assigning homework, completing surveys	• Teacher collects permission slips for a trip to the museum.
Project-based learning strategies		
Teacher refers to/reflects on essential question of unit	Teacher incorporates the essential question of the unit into whole class, small group, and/or individual instruction	• Teacher helps students relate a science project idea back to the main question of the unit. • Teacher records what students have learned about the unit's main question on a chart.
Teacher discusses/uses rubric to assess work products	Teacher uses a list of criteria to look at what students do in the classroom or for homework.	• Teacher has students rate each other's presentations using a rubric
Teacher provides feedback in ways besides using a rubric	Teacher gives feedback without evidence of a rubric – feedback that could include but is not limited to informal comments about student work.	• Teacher tells a small group they need more research for their report.
Teacher scaffolds activities	Teacher provides structure or guidance to help students complete activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should answer when looking at data

Section C: Technology-Supported Classroom Practices

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Technology resources										
① Computer (1:1 computing)	①	①	①	①	①	①	①	①	①	①
② Printer	②	②	②	②	②	②	②	②	②	②
③ Scanner	③	③	③	③	③	③	③	③	③	③
④ TV	④	④	④	④	④	④	④	④	④	④
⑤ VCR	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Digital Camera	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Video Camera	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Projector	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Handheld computer	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ No technology used	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Software/Applications used										
① Word processor	①	①	①	①	①	①	①	①	①	①
② Presentation (e.g., PowerPoint)	②	②	②	②	②	②	②	②	②	②
③ Desk-top publishing (e.g., Publisher)	③	③	③	③	③	③	③	③	③	③
④ Web programming	④	④	④	④	④	④	④	④	④	④
⑤ Internet/WWW	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Intel® Teach to the Future website	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Intel® Teach to the Future CD-ROM	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ IIE Web-based thinking tools	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Spreadsheet	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Flowchart/concept mapping	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
⑪ Graphic software (i.e., Photoshop or KidPix)	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪
⑫ Educational software package	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫	⑫
Use of technology										
① As part of a lab, activity or assignment	①	①	①	①	①	①	①	①	①	①
② Students research to present information	②	②	②	②	②	②	②	②	②	②
③ Teacher lesson delivery	③	③	③	③	③	③	③	③	③	③
④ Teaching technology skills	④	④	④	④	④	④	④	④	④	④
⑤ Teaching application/software	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Student presentation via technology	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Technology supported group work	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Only the teacher uses the technology	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ No technology used	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨

Section D: Use of High-Quality Pedagogy

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Grouping strategy										
① Students working independently/ alone	①	①	①	①	①	①	①	①	①	①
② Pairs of students	②	②	②	②	②	②	②	②	②	②
③ Small groups (3 + students)	③	③	③	③	③	③	③	③	③	③
④ Students interacting with teachers	④	④	④	④	④	④	④	④	④	④
⑤ Whole class/working as a large group	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students listening to teacher, TV or other media.	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
Classroom activity										
① Students working actively on a project	①	①	①	①	①	①	①	①	①	①
② Students presenting their work	②	②	②	②	②	②	②	②	②	②
③ Questions and answer activity	③	③	③	③	③	③	③	③	③	③
④ Teacher led class/interaction w/students	④	④	④	④	④	④	④	④	④	④
⑤ Teacher lecture/non-interactive class	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Students practicing skills on the computer	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Students completing worksheets	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Students working on an assessment	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨ Class supported by technology (CD, video).	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
⑩ Class supported by a computer program.	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
Project-based instruction										
① Students develop or pursue their own project ideas	①	①	①	①	①	①	①	①	①	①
② Students work in collaborative groups on projects	②	②	②	②	②	②	②	②	②	②
③ Students present work to peers	③	③	③	③	③	③	③	③	③	③
④ Students conduct independent research	④	④	④	④	④	④	④	④	④	④
⑤ Teacher makes connections to real-world experiences	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Teacher makes connections across subject areas	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Teacher scaffolds activities	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Non-project based strategies are used	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Project-based instruction		
Teacher makes connections to real-world experiences	Teacher relates classroom instruction to activities outside of the classroom.	• Teacher has students create a budget for a class field trip.
Teacher makes connections across subject areas	Teacher uses activities that incorporate knowledge and skills from more than one subject.	• Before reading a novel set during World War 2, students do research on the Internet about the time period.
Teacher scaffolds activities	Teacher provides structure for activities.	• Teacher tells students how to set up their spreadsheets. • Teacher provides a list of questions that students should

		answer when looking at data.

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Level of challenge of activities										
① Too easy for most of the students	①	①	①	①	①	①	①	①	①	①
② Appropriate for most of the students	②	②	②	②	②	②	②	②	②	②
③ Too hard for most of the students	③	③	③	③	③	③	③	③	③	③
Student engagement										
① Low engagement (< 20% of students on task)	①	①	①	①	①	①	①	①	①	①
② Moderate engagement (50% of students on task)	②	②	②	②	②	②	②	②	②	②
③ High engagement (> 80% of students on task)	③	③	③	③	③	③	③	③	③	③
Cognitive abilities (see definitions)										
① Receipt of knowledge	①	①	①	①	①	①	①	①	①	①
② Applied procedural knowledge	②	②	②	②	②	②	②	②	②	②
③ Knowledge representation	③	③	③	③	③	③	③	③	③	③
④ Knowledge construction	④	④	④	④	④	④	④	④	④	④
⑤ Other (specify)	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤

Category	Definition	Examples
Student engagement		
Low engagement (<20% of students on task)	Most of the students are not focused on the learning tasks. They may be doing things unrelated to the learning or confused about what they should do.	Not applicable
Moderate engagement (50% of students on task)	At least half of the students are focused on the learning tasks, but some are easily distracted or confused and a minority may not be on task.	Not applicable
High engagement (> 80% of students on task)	Nearly all of the students are focused on the learning tasks. Most of the activity in the classroom is relevant to the tasks.	Not applicable
Cognitive abilities		
Receipt of knowledge	May include listening, repetition, answering simple / closed-ended questions, or reading. Knowledge gained can be found in external sources; no original or creative thinking involved.	• Students listen to a lecture from the teacher. • Students watch an audio-visual presentation.
Applied procedural knowledge	Involves following step-by-step procedures for completing a task or activity or arriving at a solution. The procedural steps can be provided by the teacher or found in the student guide.	• Students enter data into a spreadsheet. • Students use a worksheet to conduct a Web Quest.
Knowledge representation	Students may present and explain their original work. May also include students explaining their understanding of concepts in a way that helps others understand.	• Students make a graph from data they have entered on a spreadsheet. • Students summarize an article they have read online.
Knowledge construction	Students are involved in activities or tasks that call for original or creative thinking to produce a product, arrive at a solution, or develop an understanding that they	• Students interpret a graph they have made. • Students explain why there may be differences in

	would not find elsewhere.	information they have read online (e.g., different sources of bias)

Section E: Classroom Collaboration

Time:										
Activity #										
Time Interval	5	10	15	20	25	30	35	40	45	50
Classroom collaboration *Number of members engaged in the task*										
① None	①	①	①	①	①	①	①	①	①	①
② One	②	②	②	②	②	②	②	②	②	②
③ About half	③	③	③	③	③	③	③	③	③	③
④ All or almost all	④	④	④	④	④	④	④	④	④	④
Group work (see definitions)										
① Discussion of goals or strategies	①	①	①	①	①	①	①	①	①	①
② Asking questions	②	②	②	②	②	②	②	②	②	②
③ Showing respect for group members	③	③	③	③	③	③	③	③	③	③
④ Role-taking	④	④	④	④	④	④	④	④	④	④
⑤ Turn-taking	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥ Conflict	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦ Conflict resolution	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧ Shared meaning-making	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧

Category	Definition	Examples
Group work		
Discussion of goals or strategies	Students identify what they are supposed to do and how they will do it.	• "Okay, where do you think we can find the answer?" • "No, we're supposed to take the temperature inside and outside before we calculate the averages!"
Asking questions	Students regularly ask one another questions while working on their activities and project.	• "Where am I supposed to enter the temperatures?" • "Wow! How'd you find that website?"
Showing respect for group members	Students consistently show respect for group members' contributions and perspectives.	• "Great idea. I like it!" • "What if we take your idea about the color of the website and add my design?"
Role-taking	Students take specific roles on the project.	• "I'll get information about what whales eat if you find something about where they live." • "I'll draw the pictures!"
Turn-taking	Students do the same activities at different times on the project.	• "My turn to type!" • "I'm tired of this (using the keyboard). You do it for a while."
Conflict	Students disagree on their work.	• "No fair! You've been typing all this time!" • "Yuck. That's a stupid idea."
Conflict resolution	Students resolve their disagreements.	• "Sorry. I didn't mean it was stupid. It's just not what the teacher told us to do." • "Okay, how about you type for five minutes and then I'll do it and we'll switch."

Shared meaning-making	Students come to a mutual understanding of information together.	• "Wait, the graph went down and then up." "Maybe the water was cold while the ice was melting."

Section F: Post Observation

Notes:

- Pacing/Transitions:

- Interactions (teacher-student, student-student)

- Teacher-led/ Student-led Activities

- Instructional Resources used

- Other comments

Section G: Teachers' Follow-Up Interview.

These additional follow-up interview questions ask teachers about their use of new technology, instructional approach and activities, and project-based and inquiry-based instructional approaches used during the observation. This discussion is intended to help evaluators understand the context for the observation; b) obtain information about the teacher's thinking about the lesson plan; c) gather background data for interpretation of study results; d) and gather qualitative data about the teachers' general use of the laptops and other technology.

Evaluation Questions:

1. Briefly describe the purpose of today's lesson, including whether it was part of a longer unit.

2. What were the learning goals or objectives for students?

3. How do you decide when to use the computers (or other technology)?

4. How do you think the computers supported students to reach the learning goals of this assignment?

5. What other ways have you used the computers with your students this year?

6. Describe how what you are doing this year with technology is different than what you've done in previous years.

7. What do you think has been most challenging about the 1:1 computing program?

8. What do you see as the biggest benefits of the 1:1 computing program?

9. Other comments?

Evaluation Resources

1:1 Computing Evaluation Toolkit

Student Focus Group

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Student Focus Group

Purpose: To gather data from students about their experiences with the integration of 1:1 computing into their learning activities.

Constructs measured:

Communication and collaboration
Students support
Expectations
Support and feedback

Format: Open-ended questions

Approximate completion time: 45 minutes to an hour

Administration times: At the end of the study

Implementation: Responses to this instrument are coordinated with Student Survey and teacher interviews to understand students' perceptions and reactions.

Student Focus Group

Introduction/Warm Up: (about 5 minutes)

- Moderator introduces self and goals
- Ground rules (e.g., everyone gets a chance to speak, both positive and negative comments are useful, it's okay to disagree with each other, one speaker at a time, confidentiality of ideas, etc.)
- Introduction. Get general information from participants: Name, grade level, teacher's name, and school name.

Discussion (about 45 minutes to an hour)
Note: These are lead-off questions that do not have to be strictly followed. Follow-up questions can be included as needed.

Questions

1. Technology integration

    - How did you feel about your technology skills before the 1:1 computing initiative in your school?
    - Describe the way 1:1 computing was introduced in your classroom activities.

2. Use of technology. Usefulness.

    - I am interested in how this technology has helped you in your classroom activities? Can you share your experiences?
    - For what type of activities and which subject matter specifically do you use the computer?
    - What sorts of work have you done with this computer?

3. Perceived changes.

    - How have your regular classroom experiences changed after the introduction of 1:1 computing?
    - What changes have you seen in your communication and collaboration with your teacher and other students?

4. Satisfaction.

    - How satisfied are you with this technology for classroom activities?
    - How well did this technology work for your class assignments?
    - Describe how you would recommend this technology to a friend?
    - Can you describe one the of the most rewarding classroom experiences with the 1:1 computing? Perhaps a story about something positive that happened to you while working with this technology.
    - Can you describe a frustrating experience (if any) with the 1:1 computing?

5. Expectations.

- How would you like to use the 1:1 computing in future school-work?
- How would you change the way that this technology has been used?
- What kind of activities would you like your teacher to do?

Evaluation Resources

1:1 Computing Evaluation Toolkit

Student Survey

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Student Survey

Purpose: To assess students' perceptions of their classroom experiences with 1:1 computing.

Rationale: To understand the impact of teachers' instructional practices on students' learning, it is important to gather feedback from both teachers and students. In some cases, students may look at lessons or strategies very differently, and their understanding of the goal of an activity may differ from teachers' (Doyle & Carter, 1983)[1]. A student survey therefore allows students to participate in the evaluation process.

Constructs measured:

- ***Student background characteristics***
  - Prior experience with technology such as home technology exposure, other access to technology, previous technology experience in schools
  - Demographics

- ***Technology-supported classroom practices***
  - Frequency of use of 1:1 computing technology for learning (how much and how often used)
  - Frequency and range of teacher use of technology-assisted instructional strategies and lesson delivery (types of activities)
  - Technology-supported collaboration and communication

- ***Use of high-quality pedagogy***
  - Use of open-ended activities that require students to actively engage in the learning process
  - Use of activities that promote problem-solving and critical thinking
  - Grouping strategies (amount of individual, small, and whole-group instruction)

- ***Student engagement***

Organization of instrument: This survey is divided into four sections.

Section A: Background (p. 1). This section will allow you to collect background information about participants such as demographics and experience with technology. You can use that information to compare responses across variables of interest such as grade, gender, or home technology use.

Section B: Technology-supported classroom practices (p. 2). This section will help you collect data on the frequency of specific technology activities in the classroom, including those that require students to actively engage in learning (e.g., creating presentations and projects). This section also has an item about how often students work in small groups.

[1] Doyle, W., & Carter, K. (1983). Academic tasks in classrooms. *Curriculum Inquiry, 14,* 129-149.

Section C: Project-Based activities (p. 3). This section will give you information on one activity in depth. Students are asked to write about their favorite class project and the use of their computer in that project. Their answers reveal information about the opportunities to engage in critical thinking, grouping strategies, and technology-supported pedagogy.

Section D: Student engagement (p. 4). These questions will let you assess students' level of engagement in 1:1 computing activities and their motivation and interest in classroom activities and school.

Format: Pencil and paper

Administration time: At the end of the study

Implementation: This instrument can be used to compare teachers' instructional behaviors with students' reactions. It can also capture information about the frequency of technology use to complement classroom observations.

Student Survey

We are interested in hearing from students like you, and finding out how having a classroom computer has changed the types of things you do in the classroom. Your participation in this survey is voluntary, and your name and answers will be kept confidential. Your experiences and views about the 1:1 computing program are important, so please take a few minutes to answer the questions thoughtfully.

Section A: Background Information

1. Your name (optional): _____
2. School name: _____
3. Gender:

   θ_1 Male θ_2 Female
4. Grade level:

   θ_1 Primary

   θ_2 Middle

   θ_3 Secondary
5. How many years have you had access to a computer in your classroom?

   θ_0 Less than a year

   θ_1 1 Year

   θ_2 2 Years

   θ_3 3 Years
6. Did you have a computer at home before having a classroom computer?

   θ_0 No θ_1 Yes
7. Do you have access to the Internet at home?

   θ_0 No θ_1 Yes
8. Have you ever taken a computer technology or media skills class at school?

   θ_0 No θ_1 Yes
9. Have you been instructed on the consequences of "what will happen" if you misuse your computer?

   θ_0 No θ_1 Yes

Section B: Technology-Supported Classroom Practices

10. How often do you use your classroom computer to complete the following tasks?

*Check the response that **best** describes **how often you do each** of the following.*

How often do you…	Never	Once or twice this school year	Monthly	About once a week	Almost Daily
a. Play Internet games	☐0	☐1	☐2	☐3	☐4
b. Do school work	☐0	☐1	☐2	☐3	☐4
c. Perform calculations with spreadsheets (e.g., MS Excel)	☐0	☐1	☐2	☐3	☐4
d. Create PowerPoint presentations	☐0	☐1	☐2	☐3	☐4
e. Search the Internet for information or things you're interested in	☐0	☐1	☐2	☐3	☐4
f. Search the Internet for information for school	☐0	☐1	☐2	☐3	☐4
g. Use e-mail	☐0	☐1	☐2	☐3	☐4
h. Work with graphics, pictures, and clip art	☐0	☐1	☐2	☐3	☐4
i. Use Word to create, review, or revise a document	☐0	☐1	☐2	☐3	☐4

11. Click the response that **best** describes **how often you use a classroom computer** to do the following.

I use the laptop to…	Never	Rarely (once a month)	Sometimes (One or more times a month)	Often (One or more times a week)	Almost Always (Everyday or Almost daily)
a. Find information for assignments.	☐0	☐1	☐2	☐3	☐4
b. Send e-mail to friends or teachers	☐0	☐1	☐2	☐3	☐4
c. Organize information	☐0	☐1	☐2	☐3	☐4
d. Creating presentations and projects	☐0	☐1	☐2	☐3	☐4
e. Take notes.	☐0	☐1	☐2	☐3	☐4
f. Complete class assignments	☐0	☐1	☐2	☐3	☐4
g. Take quizzes or tests	☐0	☐1	☐2	☐3	☐4
h. Work on assignments in small groups	☐0	☐1	☐2	☐3	☐4
i. Do drills to increase my skills in Math, Science, language, etc.	☐0	☐1	☐2	☐3	☐4

Section C: Project-Based Activities

In this section, we want you to think about the **most exciting or your most favorite class project** you've done using your classroom computer. We want to know how you **used your classroom computer to complete this project**?

12. What was the project? _____

13. Did you work with a group?

θ_1 Yes

θ_0 No

14. If you answered yes to question 2, was it helpful to work in your group?

θ_2 Very helpful

θ_1 A little helpful

θ_0 Not helpful at all

15. Did you pick the topic?

θ_4 Yes, I picked it on my own.

θ_3 Yes, I picked it with a group.

θ_2 No, I didn't pick it.

θ_1 I don't remember.

16. What did you learn from your project?

17. How did you use the classroom computer? _____

18. Is there anything else you want to say about the project? _____

Section D: Student Engagement

Please choose the response that **best** describes **how you feel** about the following statements.

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
19. Computers make schoolwork easier to do.	☐1	☐2	☐3	☐4
20. I'd rather use a computer to do schoolwork than paper and pencil.	☐1	☐2	☐3	☐4
21. Using classroom computers for schoolwork has some disadvantages.	☐1	☐2	☐3	☐4
22. Computers make schoolwork more interesting.	☐1	☐2	☐3	☐4
23. Computers help me improve the quality of my schoolwork.	☐1	☐2	☐3	☐4
24. Solving *real problems* helps me learn more.	☐1	☐2	☐3	☐4
25. Talking to experts, gathering real world data helps me learn more.	☐1	☐2	☐3	☐4
26. I learn more when I talk to real world experts.	☐1	☐2	☐3	☐4

Statement	I Strongly Disagree	I Disagree	I Agree	I Strongly Agree
27. I want to learn more about computers.	☐1	☐2	☐3	☐4
28. I am trying to learn more about computers.	☐1	☐2	☐3	☐4
29. I think using a computer for schoolwork improves my grades.	☐1	☐2	☐3	☐4
30. I believe it is very important for me to learn how to use a computer.	☐1	☐2	☐3	☐4
31. Computers help me get my schoolwork done more quickly.	☐1	☐2	☐3	☐4
32. I am excited about the 1:1 computing program.	☐1	☐2	☐3	☐4
33. I would like to use my classroom computer more often in class.	☐1	☐2	☐3	☐4
34. Computers help me understand my classes better.	☐1	☐2	☐3	☐4
35. The more teachers use computers, the more I enjoy school.	☐1	☐2	☐3	☐4
36. I learn more from projects when I choose the topic of research.	☐1	☐2	☐3	☐4
37. I enjoy school more when I get to choose the topic of research.	☐1	☐2	☐3	☐4
38. Researching many viewpoints is important to solving a problem.	☐1	☐2	☐3	☐4

Evaluation Resources

1:1 Computing Evaluation Toolkit

Assessing Student Work

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Assessing Student Work

Purpose: To measure the impact of the 1:1 computing program on selected student outcomes.

Constructs measured:
May include the following:

- ***Technology skills and competence***
  - Communicating ideas messages to others
  - Collaboration/teamwork with peers
  - Presentation of work

- ***Problem-solving and critical thinking skills***
  - Posing problems that are clearly stated and feasible to answer
  - Gathering evidence to solve the problem
  - Analyzing, interpreting evidence
  - Generating and evaluating solutions

- ***Technology competence and skills***
  - Computing Operational skills
  - Applications skills
  - Quality of student-designed products
  - Information Literacy (access, select, and manage information)

- ***Longer-Term Outcomes***
  - Improved performance in core subjects
  - Productivity (technology literacy)

Format: Varies

Administration times: Varies, depending on each class

Implementation: Student work can be tracked from the beginning to the end of the project to determine changes in implementation and impact. It can also be collected to supplement classroom observations.

Guidelines for Assessing Student Work

One of the least intrusive ways to measure student outcomes is to collect examples of student work. This work can give you a sense of what students are doing and learning in the classroom. Here are some suggestions for collecting and rating work.

Step One: Decide what you want to collect.

Your research questions will help you think about the work you'd like to collect. Do you want to track the development of certain skills from the beginning to the end of a project? Would you like to see what students are capable of doing by the end of a set period with computers? Are you interested in assessing specific content? Do you want to know what students do in groups? All of these questions will influence the constructs and indicators you want to measure, which in turn influences the student work you collect. You'll need to be in close contact with teachers to find out what students will be doing that matches what you want to measure.

Step Two: Decide how much work you want to collect.

Your research questions, time, and resources will influence the amount of student work you collect from each class. If you are working with a small number of classes, you might want to collect work from every student. If you are working with a larger number of classes, you might want to get work from a sample of students. You could ask teachers for examples from students they consider to be low, medium, and high-performing. A typical number is three to five examples per low, medium and high group.

Step Three: Decide how this work will be collected.

Will the teacher let you take the original copies of students' work, or will you have to rely on photocopies? If the latter, you'll need to make sure that the student work is readable. Some students' writing can be very faint.

You may also want to know some contextual information about the assignment in order to assess the work. For instance, what was the purpose of the assignment? How long were students given to complete it? Was there anything going on at the school that day such as a fire drill that could have affected the quality of students' work?

Step Four: Create an analysis scheme.

Once you have the work, you need to come up with some way to determine what it tells you about what students know and can do. If your study is primarily qualitative, you may want to identify some general themes or codes in students' work. If you want to analyze students' work quantitatively, you'll need to come up with a way to score students' work. The next page will give you some tips for thinking about using rubrics to assess student work.

Creating and Using Rubrics

Here are a few tips and resources when using rubrics to assess student work.

Analytic versus holistic rubrics
Do you want to assess work on a variety or criteria, or look at its overall quality?

Analytic Rubrics	Holistic Rubrics
• Give scores on several attributes • Allow for diagnosis of specific skills • *But,* are more time consuming to create and use	• Give a single score based on an overall impression of work quality • Good for quick snapshots • *But,* may be challenging to interpret. It may be possible to receive one score for several different reasons depending on the specificity of the rubric.

Creating a usable rubric

- It's useful to take a top-down, bottom-up approach when scoring student work. In other words, you should first think about the general categories of responses you'd expect to see. How would you define a high-quality piece of work? What would you expect from a low-quality piece, or something in between? Next, look at the student work, place it in piles by relative quality. Look at those piles and see what they have in common. You can then draft your rubric.
- Try to focus on ratings that look at the quality of a piece, not just the quantity of errors or details. For instance, instead of giving a rating of "good" to a piece that has "one or two spelling errors" you could say "piece has one or two spelling errors but they don't detract from understanding the content of the report." This gives the rating more meaning.
- Give your rating to another evaluator to review, especially if there are going to be multiple raters. Are your definitions clear? Does this person give the same ratings to the work? You may need to have a couple of "calibration conversations" in order to have a rubric that everyone can use in the same way.

Rubric resources

General issues

- Barbara Moskal has written a short article about when and how to use rubrics. It's a very good but brief introduction to general issues. http://pareonline.net/getvn.asp?v=7&n=3
- A longer, but very good, practical book on creating rubrics is

  Arter, J., & McTighe, J. (2001). *Scoring rubrics in the classroom: Using performance criteria for assessing and improving student performance.* Thousand Oaks, CA: Corwin Press, Inc.

Rubric examples

- The next page of this document contains an example of a general rubric for student work.

- Rubistar (http://rubistar.4teachers.org) is a website that allows you to design rubrics for different types of assignments and search for rubrics in the site's extensive database.
- The Chicago Public Schools has downloadable rubrics in several subjects: http://intranet.cps.k12.il.us/Assessments/Ideas_and_Rubrics/Rubric_Bank/rubric_bank.html

Evaluators' Version of the Student Work Rubric

This rubric is designed to help evaluators assess students' work products and process. The "Required Elements" category refers to the "Review It" section at the end of each activity or project. Note that it is not expected that all aspects of a piece of student work will fall within just one level. You must assign a level by determining which category has the most evidence that applies to the product, meaning that if the product meets *most* of the requirements of "exceeding expectations," it should be marked "exceeding expectations," even if it is "meeting expectations" in one or two ways.

	Description
Exceeding Expectations	Overall, the students' work goes beyond the requirements of the task and stands out as an excellent example of this kind of product (stamp, survey, advertisement, etc.). Skills were used to make a *highly original* product that reflects the students' unique and creative ideas. All the "Review It' elements were completed, and one or more of the challenges was also attempted. There is evidence that the students are very good at using the technology skills needed to make the product, and the choices for colors, sizes, words, and other details clearly communicate the students' message.
Meeting Expectations	Overall, the students' work meets the requirements of the task and is a good example of this kind of product (stamp, survey, advertisement, etc.). Skills were used to make an *original* product that reflects the students' own ideas, and all the "Review It" elements were completed. There is evidence that the students are able to use the technology skills needed to make the product, and the choices for colors, sizes, words, and other details communicate the students' message.
Approaching Expectations	Overall, the students' work approaches the requirements of the task and includes some but not all elements of a good example of this kind of product (stamp, survey, advertisement, etc.). Skills were used to make a *partially original* product that reflects some of the students' own ideas, and most of the "Review It' elements were completed. There is evidence that the students could improve their use of the technology skills needed to make the product, and the choices for colors, sizes, words, and other details only partly communicate the students' message.
Needing Improvement	Overall, the students' work is below expectations and needs improvement to be a satisfactory example of this type of product. The work was mostly copied from an example or someone else's work, and few, if any, of the "Review It' elements were completed. The work also shows that the students need help with the technology skills needed to make the product, and the choices for colors, sizes, words, and other details distract from the student's message.

Evaluation Resources

1:1 Computing Evaluation Toolkit

Reflections and Narratives

IN COOPERATION WITH

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Reflections and Narratives

Purpose: To measure the effect of the 1:1 computing program on selected student outcomes.

Constructs measured:
May include the following:

- ***Student engagement***
  - Motivation and interest in classroom activities and school

- ***Self-efficacy***
  - Perceived competence toward school and general learning
  - Perceived competence toward technology skills

- ***Technology skills and competence***
  - Communicating ideas messages to others
  - Collaboration/ teamwork with peers

- ***Problem-solving and critical thinking skills***
  - Posing problems that are clearly stated and possible to answer
  - Gathering evidence to solve the problem
  - Analyzing and interpreting evidence
  - Generating and evaluating solutions

- ***Technology competence and skills***
  - Computing Operational skills
  - Applications skills
  - Information Literacy (access, select, and manage information)

Format: Varies

Administration times: Varies, depending on each class

Implementation: Student reflections can be tracked from the beginning to the end of the project to determine changes in implementation and impact. They can also be collected to supplement classroom observations.

A Primer on Constructing Reflections

What is a reflection?

A reflection is a writing activity, typically brief, in which students discuss something that they have done or learned. Reflections can be open-ended or structured, and can reveal information about students' motivation for learning, their thoughts on what they have learned, or their ideas about what they could do to improve their learning.

Why should I collect reflections?

1. *Depth versus breadth of sampling.* Interviews or focus groups allow you to explore a set of questions in depth with a small sample of students. Reflections let you get the perspectives of a larger sample of students, often on a single question.

2. *Assessment of skill and knowledge development.* You can look at reflections over a period of time to track the development of skills or knowledge. You may even want to ask the same reflection question two or more times. If you do so, be sure to explain to the students why you are asking the question again; otherwise you may risk having students repeat their earlier answers.

3. *Convenience.* Teachers often have students write for brief periods of time to determine what they know. You may be able to collect existing reflections if they contain information related to your evaluation questions and constructs.

What should I keep in mind when creating reflections?'

1. *Questions matter.* Students' responses will only be as good as the question you ask them to answer. You'll have to decide if you want students to reflect generally on their experience, or if you'd like to see specific information. It's okay to ask one or two specific questions to probe students' thinking.

2. *Wording matters.* Make sure the question language is developmentally appropriate. Some students, especially younger ones, may not know how to explain something "in your own words," for example. If you have doubts about whether your reflection instructions are clear, test them with a couple of students.

3. *Audience matters.* You can get more informative reflections if you ask students to write to a friend than to write to a teacher or an unknown audience (Baker, Aschbacher, Niemi & Sato, 1992)[1]. For example, you might say "You have a friend who wants to learn about {topic}. Explain to your friend how you could use your computer to find information about {topic}."

4. *Mechanics do* not *matter.* Students, especially younger ones, can have trouble thinking about what they want to say and how to say it "properly" at the same time. Reflections are meant to be relatively informal pieces of work. If you tell students that spelling doesn't count, they may be freer to express themselves. Similarly, some students may

[1] Baker, E. L., Aschbacher, P. R., Niemi, D., & Sato, E. (1992). *CRESST performance assessment models: Assessing content area explanations.* Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing.

find it easier to communicate if they can add drawings. You might consider allowing students to express themselves in words and pictures.

What are some examples of reflection questions?

The following questions are not meant to be a comprehensive list, but are simply provided to inspire you.

From a high school website portfolio project

Portfolio Design approach

1. What is the "mood" you are trying to convey through your portfolio design? How did you try to create this mood, VISUALLY.
2. How did you choose the layout and colors for your portfolio? What do they say about you?
3. Describe your design process (how you created 2 elements—graphics, layout, buttons—of your design)
    a. Design element #1:How it was created:
    b. Design element #2: How it was created:
4. Describe the navigation for your portfolio. How did you come up with this navigation method?
5. What programs (DreamWeaver, Flash, Illustrator, etc.) did you use to create your portfolio? What were the advantages/disadvantages of this?
6. What was the biggest challenge to designing your portfolio?
7. What are you the happiest with?
8. What would you like to do to make it even better?

From a fourth-grade hands-on science class

You have a friend who has never studied circuits before. Explain to your friend what a circuit is and how it works. You can use words and/or pictures.

From a collaborative group project

1. What was your role(s) in the collaboration? What were the role(s) of the other team members? (Did everyone do everything, did you split up jobs, did you take turns being the driver? Who did what?)
2. What was helpful about collaborating?
3. What perspectives did you bring to the project?
4. What perspectives did the other team members bring to the project?
5. What was challenging about collaboration?
6. What did you do to work out the challenges?

General questions (not from a project)

When you were doing {activity or project} did you think you could do a good job on it? Why or why not?

When it comes to using the computers, what do you do the best? Give an example of something you did that you thought you did very well.

Evaluation Resources

K-12 Intel© Education

Evaluation Goals & Standards

Module 5
Intel Design Considerations

Evaluation Goals

- To collect data on, and to observe the extent and quality of teacher implementation of new techniques in the classroom.
- To determine the effectiveness and impact of K-12 programs on teachers classroom performance.
- To learn how to improve the effectiveness of the program
- To communicate effectiveness, thus encourage participating teachers to continue learning and implementing new techniques and encouraging nonparticipating teachers to participate.
- To provide evidence for an effective curriculum, pedagogy and processes of classroom interaction that directly influence learning.

Evaluation Standards

Intel's international program evaluation teams adhere to a set of evaluation standards to ensure consistent quality and integrity in their research designs. These standards state that effective evaluation efforts must:

1. Recognize and follow established ethical protocols.
2. Have systematic data collection processes to identify the extent and quality of participant implementation of new techniques in the classroom.
3. Provide concrete analysis of programs to enable the detailed investigation of the effectiveness and impact of the program on:
    - Participants' classroom motivation, engagement, and application;
    - Technology skills, higher order thinking skills, and critical thinking; and
    - Testing of new roles/interactions in an environment that encourages risk-taking and rewards competence.
4. Provide data to learn how to improve the effectiveness of the program.
5. Include analysis, synthesis, and reports that communicate effectiveness and therefore encourage participating teachers to continue learning and implementing new techniques and encourage nonparticipating teachers to participate.
6. Provide data to that may be used as evidence for an effective curriculum, pedagogy, and processes of classroom interaction that directly influence learning.
7. Include key stakeholders in planning and identification of desired outcomes.
8. Integrate systematic formative and summative evaluation that include adequate research base and quality assurance.
9. Be understood and supported as an integral element in the project life cycle.
10. Include skilled guidance and collaboration essential to the success of the design, synthesis, and communication of findings.

Evaluation Resources

K-12 Intel© Education

Model: Request for Proposal

MODEL

The following model is designed for reference use only and is not intended replace a Request for Proposals that articulates the needs of any particular country or the areas of interest for country Ministries of Education.
An evaluation is only required from cmpc Proof of Concept (Country Government or Fellow Traveler owned and driven) deployments, and an evaluation RFP is provided by IEG staff in a consultant/support role only. If the local Education manager chooses to investigate possible Intel Teach related opportunities for evaluation associated with on-going sustained implementation of the cmpc they will need to pay for evaluation out of their POR.

Intel Role: The Intel BDM and Ed Manager should provide guidance to the MOE on structuring the evaluation and ensuring that the results inform future changes in policy.
MOE Role: Drive the evaluation and assessment of the ICT for Education program on student outcomes and changes in practice for teachers. Evaluation and assessment should be part of the ongoing budget, curriculum, and professional development planning process, so that policies are established to render systemic changes in pedagogy. For instance, if the POC is successful, as measured by student outcomes and teacher feedback, then the MOE should roll out the model to additional schools, and bake into their budget accordingly.
Opportunity for Public/Private Partnership: Development Agencies, NGOs, and local academic institutions can provide an objective impact evaluation of the ICT for Education program, and may have existing monitoring & evaluation efforts already underway

Request for Proposals

An Evaluation Plan for the Intel powered classmate PC Proof of Concept for Country Name

The Intel powered classmate PC Project is a worldwide effort to provide low-cost mobile learning device for students for use in collaborative learning environments. This mobile device includes a handle that can snap shut when closed, the Microsoft Office suite software and applications that allow students in a classroom to interact individually with their teachers using a built-in wireless connection.

The low-cost PCs are part of an investment by Intel to promote the use of computers in schools, cafes, and other public spots in developing countries, in an effort to integrate technology into instruction to develop students' higher-level thinking skills and enhance learning. The device has been aimed first at developing countries, but its use in U.S. schools is currently being explored. In 2007, Intel will pilot the use of the classmate PC in a number of countries and will ask support governments, fellow travelers and universities to collaborate on evaluation of these proofs of concepts.

The classmate PC pilots will include training, connectivity to the internet and technical support.

The project will be implemented in, number & grade level schools, cities, regions, or districts, with deployment scheduled for Day, Month, Year, and evaluation activities ongoing until Day, Month, Year. School/Classroom logistical considerations include: Additional description of schools, classrooms, etc.

Goals of the Evaluation

The goal of this evaluation effort is to: (Include desired goals articulated from MOE), such goals may include, but are not limited to:

- The overall success of the Intel powered classmate PC program will be judged by the degree to which the program meets or exceeds its business goals and the degree to which it impacts teacher practice, student learning and school culture.
- Student behavioral changes will be interpreted as a result of the changed teacher practices and one-to-one learning environment as identified by measurable changes in ways students:
  - ✓ access and manage information,
  - ✓ articulate and solve problems,
  - ✓ analyze an interpret evidence
  - ✓ engage in sustained ICT based learning activities, and
  - ✓ collaborate and communicate in problem resolution and product development
- Teacher practice changes will be interpreted in light of the degree to which a teacher effectively integrates ICT into the classroom and the degree to which the teachers adopt the technology practices learned, as identified by:
  - ✓ lesson planning and preparation
  - ✓ instructional strategies that support 21st Century Thinking Skills
  - ✓ use of multiple modes of assessment beyond information retrieval
  - ✓ ICT use to support curriculum development and instruction
- 1:1 e-learning will be interpreted by …

About 1:1 eLearning: A reasonable implementation & evaluation of 1:1 eLearning environments (using classmate PC or other Intel-based mobile platforms) requires consideration of how 1:1 eLearning differs from computer lab installations. In computer labs students work in small groups around a few desktop computers and the work is about learning how to use computers or perhaps complementary to classroom content. With a 1:1 approach, students & teachers working together enhance the total classroom learning experience with small group interactions, content sharing, content broadcast, reduced administrative labor for teachers, and integration between inside and outside classroom learning activities.

The successful grant recipient will [for example, identify the components necessary for successful evaluation efforts to be conducted at the local level, utilize existing Intel Education evaluation resources or develop appropriate local evaluation instruments to study the multiple outcomes of the program, and synthesize possible evaluation designs with current literature in one-to-one computing where possible].

In addition, the evaluation may consider the potential for future longitudinal impact studies beyond the initial proof of concept study if desired, to inform policymakers about core aspects of the design and implementation of one-to-one initiatives.

The evaluation of the cmpc deployment will be designed to address the following questions:

[Insert Focus Research Questions such as:]

1. Was the program implemented as intended? Did the program meet its business objectives?
2. What was the quality of the implementation?
3. How did teachers change their practices as a result of the program? How did schools change?
4. How did student behaviors change?
5. How did ICT integration in the classroom affect teaching and learning?

Sample evaluation questions:

Below is a list of potential evaluation areas that could be addressed when evaluating an ICT in education POC. As stated above, evaluation areas should be aligned with the objectives of the specific POC, not against an ideal world scenario. As an example, if a POC did not involve project-based work in the classroom, then an evaluation should not attempt to evaluate the degree to which ICT supported project-based learning.

Administrators/Teachers:

- Assessment of the quality of training and professional development offered
- Assessment of the amount of training and professional development offered
- Degree to which teacher felt prepared for transition to 1:1 eLearning environment
- Degree to which teacher used ICT for lesson preparation
- Degree to which ICT usage has aided teacher efficiency or productivity
- Frequency of use of technology-supported lessons (music, videos, audio, simulations, online lessons) for core curriculum instruction
- Degree to which teacher used ICT to support differentiated instruction (for students of varying skills/learning styles)
- Degree to which teacher is engaged and satisfied with his/her teaching role
- Degree of ease managing the teacher and student PCs
- Degree of control teacher feels over class attention
- Degree to which teacher uses ICT to collaborate with administrators, other teachers and/or students
- Degree to which administrators can better monitor quality of education (b/c students test scores/portfolios more easily accessible online)
- Assessment of student 21st century skills
  - Collaboration: Degree to which students use ICT to collaborate with other students on core curriculum projects

    - Problem solving: Degree to which students identify and define authentic problems (real-life applications of classroom theory) and significant questions for investigation and plan strategies to guide inquiry.
    - Critical thinking: Degree to which students collect and identify data to identify solutions and make informed decisions.
    - Communication: Frequency/effectiveness of student use of ICT to communicate with administrators, teachers, students or parents
    - Technology & media literacy: Degree to which students understand and use technology systems and applications effectively and productively.
- Frequency of student discipline issues
- Rate of student attendance at school
- Student academic performance (vs. pre-POC level or vs. non-POC class students)

- Students Assessment of student 21st century skills
    - Collaboration: Degree to which student uses ICT to collaborate with other students on core curriculum projects
    - Communication: Frequency of student use of ICT to communicate with teachers, other students, experts
    - Technology & media literacy: Degree to which student understands and uses technology systems and applications effectively and productively.
- Degree to which student is excited and engaged about school
- Rate of student attendance at school
- Student academic performance

Parents/community

- School to home communication
- Perception of student's preparedness for the work environment

Technology assessment

- Screen size
- Internet connectivity
- Keyboard
- Battery life
- Memory
- Storage capacity
- Curriculum content
    - Ease of finding
    - Ease of integration
    - Adequacy of available materials

The answers to these questions will be used in a formative evaluation to guide both new implementations of the low cost PC and the continuous improvement of the use of the pc in teaching and learning. In addition, evaluation results of each program deployment will guide replications of the program in other countries and languages. Possible future

summative evaluations will review the program, describe its impacts, and make recommendations to those who intend to begin similar programs.

Level of Effort

The successful proposal will include a plan for the following work:

[Insert tasks]

- Identify components of a single proof of concept evaluation strategy for evaluating the Intel powered classmate pc and its relationship to one-to-one computing.
- Participate in weekly meetings between [insert dates] and advise on the evaluation concerns and needs of the classmate PC during the design of the project.
- Utilize existing Intel Education resources or design and implement appropriate local surveys, interview and observation protocols, and all other assessment instruments to evaluate the classmate PC integration in the classroom.
- Adapt or create teacher self-assessments, student self-assessments and observation/interview protocols that measure teacher practice, student performance, classroom culture, and use of technology with precision sufficient to measure change over time.
- Assist in specifying data elements to be collected from participants and as a result of program activities.
- Survey all participants at various stages of the POC deployment.
- Conduct onsite observations of classrooms during the POC deployment.
- Interview a sample of participants at various stages of the POC deployment.
- Report monthly on progress and interim findings.
- Collect, compile, analyze and synthesize data collected.
- Report on the POC deployment with sufficient detail to inform stakeholders of implementation/teacher practice/classroom environment impact resulting from 1:1 e-learning. This report will be required within one month of the completion of the pilot.

Funding

[Insert funding source, amount, specific timelines]

Evaluation Resources

K-12 Intel© Education

Selecting an Evaluator

Selecting an Evaluator

The Intel K-12 Education initiative approach to evaluation is one of a systemic study of a program or set of events over a period of time to assess effectiveness in terms of its aims, and implies some form of systematic examination of events in order to be able to make more informed decisions about a particular program.

The purpose of this resource is to think about program evaluation as a management and learning tool by considering two specific questions:

	✓ How can we use evaluation information and innovations in evaluation methodology for program continuous improvement and inform policy?
	✓ What do leaders and policymakers in the area of education technology need to know and be able to do as a result of evaluation findings?

Key Questions for Evaluators

The following are several questions for program managers to address each and every opportunity they engage in an evaluation, regardless of its purpose or goal.

-What type of evaluator do we need?

In addressing this question there are generally three options.
(1) You can hire an external evaluator contracted from an outside organization.
(2) You can assign the responsibility for evaluation to a person already on staff, or hire an internal evaluator to join your organization.
(3) You can use a combination approach where an internal staff person either assumes primary responsibility for managing the evaluation with the help of an external consultant who might assist with the technical aspects (such as survey analysis or gathering specialized information). The decision you make will depend on answers to questions such as these:

	✓ How important is an outside perspective for this evaluation?
	✓ Does the evaluation require specialized evaluation skills?
	✓ Is it politically important to engage a third party evaluator?
	✓ Is it critical that our evaluator is familiar with the program and our organization?

	✓ How important are opportunities for ongoing, day-to-day data gathering and informal feedback between the evaluator and key stakeholders?

In the end, the formation of an evaluation team consisting of key staff, relevant stakeholders, and evaluators is more important than who you hire.

Through teamwork and collaboration, an evaluation team approach will ensure that a well-planned and appropriate evaluation emerges. A team approach will also ensure that many perspectives regarding the knowledge of the program and multiple evaluation designs will be considered, discussed and implemented.

Preparing for Evaluation

-How do I select an evaluator or evaluation team that is right for my organization and that will lead to useful and usable information?

Despite recent changes in the way evaluation is perceived, funders, managers, practitioners, and researchers still rely on the traditional model of the external, third party evaluator, who conducts standalone evaluation with little participation or involvement of organization staff or program participants. All too often, the unquestioned evaluation plan leads to unclear or peripheral findings of little use in the continuous improvement decision making of the program or in illustrating the impact of the program.

As a result, when selecting an evaluator, a few questions can help identify the right evaluator for your needs:

	✓ Is the evaluator willing to promote and support stakeholders' buy-in, participation, and support? e.g., by collaborating with key players to review evaluation plans and reports
	✓ Is the evaluator willing to engage stakeholders in discussions to identify their priority questions, desired information, preferred evaluative criteria, preferred evaluation approach, intended uses of findings, nature and timing of needed reports, and concerns related to the projected evaluation?
	✓ Does the evaluator have previous evaluation plans and reports, or evaluations of similar efforts in similar settings, or other information having relevance to the evaluation?
	✓ Does the evaluator adopt and apply the evaluation field's Standards and Guiding Principles to help assure that evaluations will be useful, feasible, ethical, and accurate.?
	✓ Does the evaluation team possess expertise in field work, group

	process, interviewing, measurement, statistics, surveys, cost analysis, policy analysis, writing, editing, computers, and project management?
	✓ Is the evaluator capable of employing a range of qualitative and quantitative evaluation methods, e.g., case studies, cost analysis, demographic analysis, document analysis, interviews, literature review, meta-analysis, participant observation, photographic and videotape records, quasi experiments, site visits, and/or surveys.
	✓ Is the evaluator experienced in working with populations with diverse gender and ethnic backgrounds?

-What criteria should we use to select an evaluator?

Often, the selection of an evaluator is based on criteria associated with specific evaluation skills or knowledge sets. However, other criteria may be important to consider.

	✓ What knowledge, experience and in the case of Intel Teach, knowledge of both education and technology is important.
	✓ What understanding is there regarding technology use as viewed in the context of effective pedagogical integration, not as simply software proficiency?
	✓ You may require someone familiar with the specific community you are working in, with knowledge of the specific target population you are engaging, or with an understanding of your program strategy and approach. Often, such evaluation resources can be found within a faculty of education at a nearby university.
	✓ Conflicts of interest must be discussed. Does the evaluator do a lot of work for the district, or are they associated with other teaching or training duties and therefore will not be objective?

-What does the evaluator need to know and be able to do?

Contradictory to research designs that are entirely objective, value free process, the evaluation efforts of education programs are increasingly a participatory process, where the collection of data, comments and behaviors provide interpretation and meaning to the data collected. As such, both the process and results are meaningful and useful to those responsible for improving and assessing the program.

	✓ What methodological expertise does the evaluator possess, both quantitative and qualitative?
	✓ How do their philosophical assumptions and values about evaluation

	align with your own?
	✓ What evidence is there that illustrates their ability to listen, negotiate, bring together multiple perspectives, analyze contextual factors, manage people, and assist in developing a design with an evaluation team that will lead to the most useful and important information?
	✓ What evidence is there that illustrates their ability to remain flexible, strong problem-solving skills, and effective interpersonal skills

- *What does the evaluator need to do with the data?*

The value of the evaluation is only as valuable as the level of effort the evaluators put into the analysis, synthesis and reporting of findings. The findings of the evaluation will be useful for the discovery of strengths and areas of improvement for continuous improvement of the program and communication of impact to key stakeholders.

	✓ How well can the evaluator identify program strengths, areas of improvement and alignment to existing benchmarks?
	✓ How well can the evaluator report clearly and concisely? – Ambiguity in a report renders it near useless and ministry of education officials are busy. A well written, often bullet list of key findings in an upfront executive summary is critical.
	✓ How well prepared is the evaluator to support data, tables or other quantitative findings with additional analysis and contextual illustrations? This will allow the reader to not only understand percentages of varying responses, but also descriptions of comments, responses or noted behaviors associated with the data.
	✓ How prepared is the evaluator to provide recommendations based on data and findings?
	✓ How familiar with the program or the educational system is the evaluator. Often, the most telling examples or illustrations of changes in behavior are discovered is informal ways and need to be recognized and included in reports.

Evaluation Resources

Additional Resources

Work Plan Template

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Work Plan Timeline Template

Here is an example of a chart you can use to plan your work. Advanced planning will ensure that everyone involved in the study – researchers and schools – will have the same set of expectations for what will happen at what time.

DIRECTIONS

Under the column *"Evaluation activities"* list the tasks you will complete. A few have been suggested for you.

Decide on the evaluation timeframe you'd like to monitor. On a short study, you might want to chart activities by week, on a longer study you could track by month. List the time periods (weeks or months) in the columns at the top of the chart.

Look at the intersections of activity rows and time period columns. Place an X in the appropriate boxes that indicate when you will be conducting each activity.

Evaluation Activities	Initial Planning				Phase 1 of Evaluation						Phase 2 of the Evaluation											
	Time period																					
Project management																						
Develop research plan																						
Develop evaluation instruments and sampling strategies																						
IRB procedures (if necessary)																						
Evaluation objective or task																						
Instrument design																						
Data collection																						
Data analysis and reporting																						
Evaluation objective or task																						
Instrument design																						
Data collection																						
Data analysis and reporting																						
Evaluation objective or task																						
Instrument design																						
Data collection																						
Data analysis and reporting																						
Evaluation objective or task																						
Instrument design																						
Data collection																						
Data analysis and reporting																						
Preparation of annual reports																						
Preparation of final report																						
Deliverables																						
Research design																						
Instruments and sampling strategy																						
Status report																						

Evaluation Resources

1:1 Computing Evaluation Toolkit

Budget Sample

IN COOPERATION WITH

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Budget Sample

Some of the best things in life may be free, but evaluation is not one of them. To ensure that your time and money is well spent, you'll want to create an itemized budget of expenses. You'll need to think about personnel costs, travel, participant incentives and other anticipated expenditures. Establishing a budget at the start of a project is a good way of clarifying the expectations for an evaluation and allocating your resources efficiently.

Here is a simple table you could use to summarize your budget and share with others. You may want to create a more detailed budget in which you itemize costs by individual evaluators and/or amount of time (i.e., in terms of hourly or daily rates and estimated time to be spent).

BUDGET

	Phase I	**Phase II**	**Total**
Management Planning Task I: Instrumentation Task II: Data collection Task III: Data analysis Task IV: Reporting Travel Incentives Mailing/ photocopying			
Total			

Evaluation Design

Eval Design	Pre-Test	Intervention	Observations	Post-Test	Impact Eval
• Longitudinal **(evidence-based)**	Participants & Control	Program	Participants & Control	Participants & Control	Participants & Control
2. Comparison	Participants & Control			Participants & Control	
3. Truncated Longitudinal		Program	Participants & Control	Participants & Control	
4. Truncated Comparison	Participants	Program		Participants & Control	
5. Pre-Test / Post-Test	Participants	Program		Participants	
6. Post-Test Comparison		Program		Participants & Control	
7. Post-Test Analysis		Program		Participants	
*Intel Education Eval Model	**Participants*	Program	Participants	Participants	Participants

Cost

Time

+ *localization

*** Quasi-experimental design lacks randomization of groups.**

Evaluation Resources

1:1 Computing Evaluation Toolkit

Human Subjects Review Process

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A Guide to Understanding the Human Subjects Review Process

Introduction

> *You want to tape-record an interview with an administrator, but do you need to get permission first? You're reading a student's journal and find a great comment that you'd like to include in your evaluation report can you? You want to look at test scores of students who attended a school before the introduction of a 1:1 computing program. Do you need parental consent?*

When you conduct an evaluation, especially in an educational setting, you may come across questions about how to treat study participants fairly and ethically. A human subjects review process is designed to help you articulate the kinds of data you are going to collect, the ways you'll communicate the study to participants, and the forms of permission you will want to obtain.

A human subject is defined as "a living individual about whom an investigator (whether professional or student) conducting research obtains (1) Data through intervention or interaction with the individual, or (2) Identifiable private information." (United States Department of Health and Human Services, 2007a). In the U.S., research with human subjects often requires approval from an Institutional Review Board, or IRB, a group of individuals that reviews research plans and protocols to determine if they are in compliance with government regulations on the protection of human subjects. A district, school, or government may require that you get a certificate from an IRB, or other appropriate agency, declaring your research to be "approved" or exempt from review.

PARTS OF A HUMAN SUBJECT REVIEW

Although an IRB process is not required in all of the geographies Intel K-12 Evaluation efforts are conducted, we follow a strict ethic of care regardless. As a result, even if an IRB process is not required, it is expected that certain protocols are followed to ensure informed consent of participants and respondents. Here are the some pieces of information you'll typically need to consider in designing your research, these items should be addressed in the evaluation plan as documented by evaluation teams.

Research protocol. You will need to describe in as much detail as possible what the participants in your study will be asked to do. These are the kinds of questions you'll want to consider:

- What are the objectives and goals of the study?
- What kind of data will you collect and when?
- If you are assigning participants to groups (i.e., 1:1 computing versus no computing) how will those assignments be made?
- How will you identify participants (e.g., using code numbers, names), and how will you keep their identities anonymous in your reports?
- What instructions will be given to the participants about their rights?

- What will happen to the data at the end of the study?

Answers to these kinds of questions will help you clarify exactly what you will do in your study and how you will do it.

Consent forms and recruitment information. The Intel K-12 Education ethical approach to evaluation asks that you include all materials that you will be giving to the participants, including copies of any electronic communication or flyers you plan to use in your recruitment, as well as copies of the consent forms you will be asking participants to sign. Resources for creating consent forms appear at the end of this document.

Instruments. As part of the Intel K-12 Education evaluation control protocol you will also typically include any instruments you'll be using with the participants. This is done to ensure that you aren't asking any questions or collecting any data that would jeopardize participants' privacy in any way.

Evidence of human subjects training. Anyone who is going to be interacting with study participants may also need to go through training about protecting human subjects. Examples of online training are included in the resources section. The Intel K-12 Education ethical approach to evaluation may include documentation indicating completion a specific training program.

CONCLUSION

Your study participants are going to provide you with valuable, voluntary information on the implementation and impact of 1:1 computing programs. You have an obligation to them to ensure that they are fully informed about what they will be asked to do and how their identities will be protected. This guide has given a brief overview of the human subjects review process, but is by no means a comprehensive discussion of the issues. We encourage you to gather further information about human subject policies that pertain to your particular evaluation.

RESOURCES

Human Subjects

- A free, two-hour tutorial designed for those involved in conducting research involving human participants: http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp
- HRSA Protecting Human Subjects Training: http://www.hrsa.gov/humansubjects/
- Office of Human Subjects Projections (OHRP): http://www.hhs.gov/ohrp/
- List of useful websites on human subjects research: http://orspdocs.umesp.maine.edu/Ethical/humanweb.htm
- Informed Consent / Consent Forms / Consent Form Wizard: https://rcr.gradsch.wisc.edu/cfwizard

- University of Michigan site on informed consent: http://www.research.umn.edu/consent/menu_soc.html

References

(United States Department of Health and Human Services, 2007a). Code of Federal Regulations Title 45 Department of Health and Human Services Part 46.101a Protection of Human Subjects. Accessed June 29, 2007 from http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm#46.101

Evaluation Resources

K-12 Intel© Education

Sample: Parental Permission

Parent or Legally Authorized Representative
Informed Consent Form

STUDY TITLE: The Intel Powered ClassMate PC Classroom Usage Study **COUNTRY:** _____
DATES: _____ **CITY/STATE/PROVINCE:** _____
PROJECT MANAGER: _____ **CONTACT NAME & #:** _____

DESCRIPTION:
Your child is invited to participate in a research study examining how K-5 students use the classmate PC, a learning device, to accomplish their school work both in the classroom as well as at home. Here are the main topics we are interested in researching:

RESEARCH TOPICS:
- How do students use the equipment in a classroom setting? What happens to student-teacher interactions when this technology is introduced? What happens to child-child interactions when this technology is introduced? How does it affect the overall environment of the classroom?
- What additional technology, tools and educational resources are used to supplement the classmate PC both inside and outside of the school?
- What are the student, teacher and school principal's general perception of the tool?
- How did the form factor of the technology work in the classroom? Were the Software, Screen size; Internet connectivity; Keyboard; Battery life; Memory; Storage capacity; High level SW usability adequate to support classroom teaching and learning?

METHODS:
2:1or 3:1 Interview session with students: *The objective of the interview session is to find insights regarding the main research topics from the student's point of view.*
- *Multiple students in groups of two or three*
- *Duration: ~30 minute each*
- *Task Analysis: The objective of the task analysis activity is to explore how easy or hard students find the software applications on classmate PC and whether classmate PC usages are appropriate.*
- *Multiple students in groups of two or three*
- *Duration: ~30 minute each.*

Classroom Observations: *The objective of the observations is to explore student-teacher, student-student and student-classmate PC interactions*
- *Duration: 2-3 hours*

More detail on research topics and research methods is available in the research protocol that is available with the school principal.

PARTICIPANT ANONIMITY, RESEARCH DATA CONFIDENTIALITY AND PROTECTION:
This research will be recorded using digital photography, digital video recording and audio recording for subsequent transcription, analysis and interpretation. Researcher will also be taking personal notes. The video tapes, digital audio recording files and digital photographs and researcher notes (all data) will be kept on file with the researcher unless you specifically ask us to destroy the collected research. Video Tapes will be physically kept under lock and key with the researcher. Other collected data will be kept with the researcher in a password protected Windows based computer within secure Intel IT infrastructure. Your child's individual privacy will be maintained in all published and written data resulting from the study.

DATA OWNERSHIP AND SUBSEQUENT USAGE
The data collected from researcher-student interaction and our interpretations of the data will be kept confidential and the student actual names will be kept anonymous, Intel reserves the right to use the specific pieces of collected data to inform the improved design of next generation design of the classmate PC product. This data is being collected for internal use by authorized personnel within Intel Corporation. Intel shall not use

verbal content such as verbatim quotes; digital photographs or digital video content in publicly available promotional material associated with classmate product without your additional consent.

RISKS AND BENEFITS:
The risks associated with this study are minimal. The experience will last 2 to 3 weeks. Hence, it is highly unlikely that there will be a negative disruption to planned classroom activity or resultant student achievement. The benefits which may reasonably be expected to result from this study are increased student engagement. The student will likely be very interested in using the new technology. Note, we cannot and do not guarantee or promise that your child will receive any benefits from this study. Your decision whether or not to allow your child to participate in this study will NOT affect your child's grades or participation in school.

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TIME INVOLVEMENT:
Your child's participation in this experiment will take approximately 2 to 3 weeks of school time between the timeframe May 1 – June 15, 2007. They will use the ClassMate to accomplish appropriate school work at school as well as at home for the duration of the research study .

PAYMENTS:
Your child will not receive reimbursement for his/her participation. They will have 24/7 access to a classmate PC for the duration of the experiment.

SUBJECT'S RIGHTS:
If you have read this form and have decided to allow your child to participate in this project, please understand your child's participation is voluntary and your child has the right to withdraw his/her consent or discontinue participation at any time without penalty or loss of benefits to which he/she is otherwise entitled. Your child has the right to refuse to answer particular questions.

CONTACT INFORMATION:
Questions, Concerns, or Complaints: If you have any questions, concerns or complaints about this **research study**, its procedures, risks and benefits, you should ask the Protocol Director, NAME, CONTACT #

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact SECOND LEVEL MANAGER, CONTACT #.

I approve my child, _____, participate in the ClassMate Classroom Usage Study

I give consent for my child to be audio taped during this study: *Please initial:* _____ Yes ____ No

I give consent for my child to be videotaped during this study: *Please initial:* _____ Yes ____ No

I give consent for tapes resulting from this study to be used for closer study of how the students interact with a classmate PC. *Please initial:* _____ Yes ____ No

I give consent to Intel Corporation and the School Name, Address, to administer a program evaluation, including surveying and interviewing my child. I understand that this data will be kept confidential and that materials gathered as a result of this study to include photos, audiotapes, quotes, etc. will NOT be used for advertising or sales purposes. *Please initial*: _____ Yes ____ No

I have read and fully understand the provisions of the above release and am voluntarily agreeing to its contents.

_____

Signature(s) of Parent(s), Guardian or Conservator Date