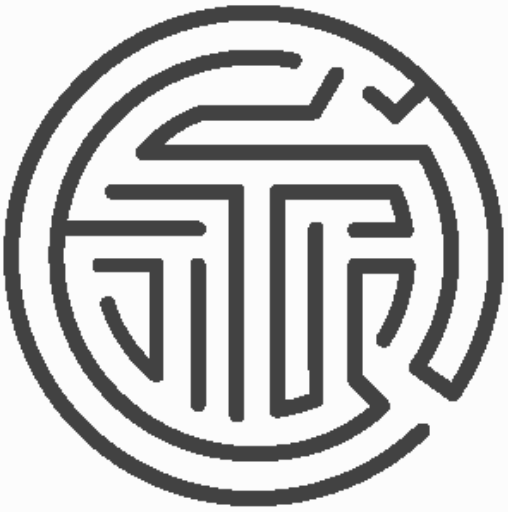
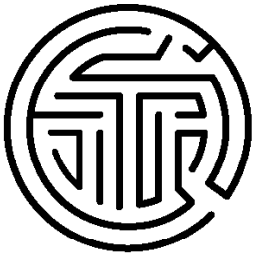


INTEL® TEACH TO THE FUTURE* SUMMARY OF EVALUATION FINDINGS, 2000-2003 U.S. CLASSIC PROGRAM IMPLEMENTATION

CENTER FOR CHILDREN & TECHNOLOGY

*Intel Teach to the Future is now referred to as the Intel® Teach Program



CCT REPORTS

JUNE 2004

INTEL® TEACH TO THE FUTURE SUMMARY OF EVALUATION FINDINGS, 2000-2003 U.S. CLASSIC PROGRAM IMPLEMENTATION

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INTRODUCTION

As a professional development effort, Intel Teach to the Future holds a unique position within the education technology community. It is one of the largest providers of ongoing, technology integration-oriented professional development to teachers in the country. Over the three years of implementation examined in this study, the program has provided direct professional development to more than 100,000 teachers in the United States. Between 2000 and 2003, Education Development Center's Center for Children and Technology (CCT) has extensively documented how Intel Teach to the Future has helped teachers understand how technology can be used to support project-based pedagogy and has influenced districts' approaches to instructional technology. This report summarizes three years of program evaluation and highlights findings regarding the impact that this program has had on educators, the students they teach, and the schools and districts in which they work.[1]

About Intel Teach to the Future

Intel Teach to the Future was designed to provide a professional development experience that would prepare teachers to use technology with their students. The developers of the Intel Teach to the Future program began with two equally weighted goals, one related to the type of impact they wished to have and one related to the scale of impact. The first goal was to improve the integration of technology into K-12 classrooms. The second goal was to train 100,000 teachers in the United States in three years and to create "critical masses" of trained teachers within participating schools and districts.[2] Intel anticipated that if a significant segment of a given teaching population was trained, this cohort of trained teachers would exert a strong influence on the overall school or district approach to technology.

The curriculum used in the Intel Teach to the Future trainings was developed in 2000 by the Institute for Computer Technology (ICT; www.ict.org) and Intel Corporation. It focuses on the use of widely available software in the context of inquiry-oriented and project-based teaching and learning, and stresses the alignment of curricula with standards. The 40-hour training sequence is delivered through a train-the-trainer model, with senior trainers from the Institute training Master Teachers from local districts or consortia of districts, who are then expected to train Participant Teachers in their districts. The training uses Microsoft productivity software, focusing primarily on how to use Windows-based versions of PowerPoint and Publisher to support students in creating presentations, web pages, brochures and newsletters. The training also discusses pedagogical and classroom management challenges associated with using technology with students, as well as conducting research on the Internet, and intellectual property issues.

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[1] For more information about CCT's evaluation of Intel Teach to the Future and copies of evaluation reports, visit http://www2.edc.org/cct/teachfuture.asp.[2] Intel Teach to the Future reached a million teachers worldwide as of June 2003. The program had equally important, parallel goal statements concerning its international implementation (which reaches thirty countries including the U.S.). The findings presented here are derived from evaluations of the United States implementation of the program. For more information about Intel Teach to the Future, visit www.intel.com/education.

The central activity of the curriculum is the creation of a unit plan, including model student work samples, support materials, and an implementation plan. Teachers are encouraged at the beginning of the training to select a unit that they already use in their teaching that might be enhanced with an infusion of technology. This structure is intended to allow teachers to expand their technical skills in the context of a curriculum development process. By designating a large amount of time in the workshops for the creation of immediately relevant materials, the curriculum puts the teachers' interests and concerns at the center of the training experience and enables them to walk away from the training with a usable product.

Methods

CCT's evaluation of the U.S. implementation of Intel Teach to the Future was conducted over three years and has drawn on a range of methods to investigate practitioners' response to the program, the local complexities of program implementation, and the program's impact in individual districts, schools and classrooms.[3] The goal of the evaluation was to provide formative feedback to program staff in order to inform program improvement and to look longitudinally at questions of implementation quality and program impact.

Methods employed have included the following:

- *End of Training surveys*. Given to teachers completing this professional development program, this instrument collected information on satisfaction with the training and perceptions of training goals. As of December 2003, this survey had been completed by 1,702 Master Teachers (response rate of 78%) and 49,329 Participant Teachers (response rate of 60%).

- *End of School Year survey*. Given annually to teachers completing this professional development program, this wide-ranging survey collected data on teachers' use of technology, their use of the materials they created during their training, their instructional practices, and the collegiality of their workplace. The survey was web-based. Each spring, emails were sent to the entire pool of teachers who had participated in the program asking them to respond to the survey. In 2001, 1,906 Master and Participant Teachers responded (response rate of 25%); in 2002, 4,720 Master and Participant Teachers responded (response rate of 22%) and in 2003 the survey was completed by 4,223 Master and Participant Teachers (response rate of 12%). Response rates are calculated based on the number of emails sent minus the number of email addresses contacted that were no longer valid.[4]

- *Observations and site visits*. In the first year of research, evaluators traveled to 11 participating districts, attended trainings, observed participating teachers' classrooms, and interviewed district technology coordinators, local program coordinators, trainers, and participants while trainings were in session.

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[3] This report examines only the "Classic," or original, version of the program implementation. In 2001 Intel began making the program available more broadly, and with fewer incentives, through the "Expansion" implementation model.[4] The 2001, 2002 and 2003 End of School Year surveys were very similar but not identical. Many findings reported here cite 2003 data – unless otherwise noted, findings for individual items asked over multiple years were broadly consistent from year to year.

- *Phone interviews*. The evaluation has used several waves of phone interviews in order to learn more about Intel Teach to the Future's role in districts' broader approaches to technology and professional development. In the first year of the evaluation, phone interviews were conducted with 24 local program coordinators after site visits had been made. In the third year of the evaluation, phone interviews were conducted with district technology coordinators in 35 randomly selected districts that participated in the program.

- *Case studies*. In the second year of research, evaluators made three separate visits to five different schools in three participating districts (15 visits overall) representing a range of geographic and socioeconomic contexts. Evaluators conducted classroom observations; interviewed school and district personnel, trainers, participant teachers and students; and examined student work.

Complete descriptions of methods can be found in our evaluation reports, available at http://www2.edc.org/cct/teachfuture.asp.

Findings

Findings from the three years of evaluation tell a multi-layered story about how Intel Teach to the Future has influenced teachers' knowledge and practices associated with the integration of educational technology into the classroom, and how the program has been leveraged within school districts to support teachers in their efforts.

Program demographics

Demographic data collected in the program application form and on surveys have demonstrated that the program is reaching a wide variety of teachers. The evaluation has consistently shown that Intel Teach to the Future teachers are broadly distributed across all grade levels and subjects. The percentage of Intel Teach to the Future participants who teach at low SES schools is consistent with the national average. Additionally, the distribution of the Intel Teach to the Future teacher population across categories of race/ethnicity is similar to the distribution for U.S. teachers nationally, with one exception: Intel Teach to the Future has attracted proportionally more Hispanic teachers. This is likely due to the fact that many states in which Intel Teach to the Future has a large presence (including Arizona, California, Florida, New Mexico, and Texas) have large Hispanic populations and greater numbers of Hispanic teachers than is the case nationally.

Program impact

The evaluation of Intel Teach to the Future has identified four key ways in which this program has had an impact on the teachers and districts it reached. Each of these broad conclusions is grounded in multiple, specific findings from surveys, classroom and training observations, and interviews.

- *Teachers feel prepared to integrate technology after this training*. Teachers valued the opportunity the workshops gave them to think about supporting their pedagogy with technology and create usable materials. Teachers not only rated the training positively, but they reported feel-

ing more prepared to integrate technology into their teaching after program participation.

- *Teachers do something new when they return to their classrooms.* Large numbers of teachers used their unit plans with their students after the training, and many created other new technology-integrated lessons as well. Teachers also experimented with many of the project-based teaching strategies presented in the training, and used technology more often to support their own practice.

- *Teachers' involvement in project-based technology integration is focused and sustained over time.* Teachers reported that they continue to use the materials they developed during the training and to engage in additional technology-rich activities. Teachers also consistently reported that they were aware of the specific pedagogical messages embedded in the training curriculum, and that they felt that the pedagogical ideas presented in the training were relevant to their teaching. Survey responses indicated teachers' beliefs about the relevance of the pedagogy strongly influenced whether and how often they integrated technology.

- *Establishing district relationships helps create conditions for success.* The implementation model for the program enlisted districts as partners. Districts identified local educators to become Master Teachers, and were able to meet their professional development needs by recruiting and training as many Master Teachers as they needed to provide their local training. This strategy helped to establish cohorts of trained teachers in individual schools who were then able to support each other in their work, and helped to develop many Master Teachers into district-level technology leaders with a deep understanding of how technology could be used to support instruction.

These four key forms of program impact are described more fully below.

Teachers feel prepared to integrate technology after the training

In order for any professional development program to have an impact on the teachers it reaches, it must first offer a training experience that excites and motivates them. Intel Teach to the Future gives teachers the opportunity to invest a significant amount of time in developing curricular materials for their own use. During visits made to program trainings in the first year of the evaluation, both Master Teachers and Participant Teachers appreciated this hands-on experience and having enough time during the training to think about and create a technology-enhanced unit plan that would address the curricular standards they are required to meet. Additional findings from the second year case studies verified the importance of this sustained time for unit plan development. Teachers who described themselves as "technophobes" or inexperienced technology users stated that leaving the training with a complete unit plan in hand, ready to use with their students, had made it possible for them to take that crucial step of implementing a technology-rich project with their students for the first time.

Throughout three years of evaluation, Master and Participant Teachers have consistently given highly positive feedback on the training overall. Educators who participate in the program have

reported that they found the training useful and the trainers very skilled (see Figures 1 and 2). In addition, matched data from the application form (completed before the training) and the End of Training survey (completed after the training) indicate that the training helped teachers feel more prepared to integrate technology into their teaching and support their students in using technology in their school work, which were some of the key objectives of the training (see Figures 3 and 4). These increases in teachers' feelings of preparedness suggest that teachers' positive reactions to the training indicate not only that the training was generally enjoyable, but also that it was a productive experience with specific, useful outcomes for them.

Figure 1. Response to the training (Cumulative Participant Teacher responses, End of Training survey, n=49,329)

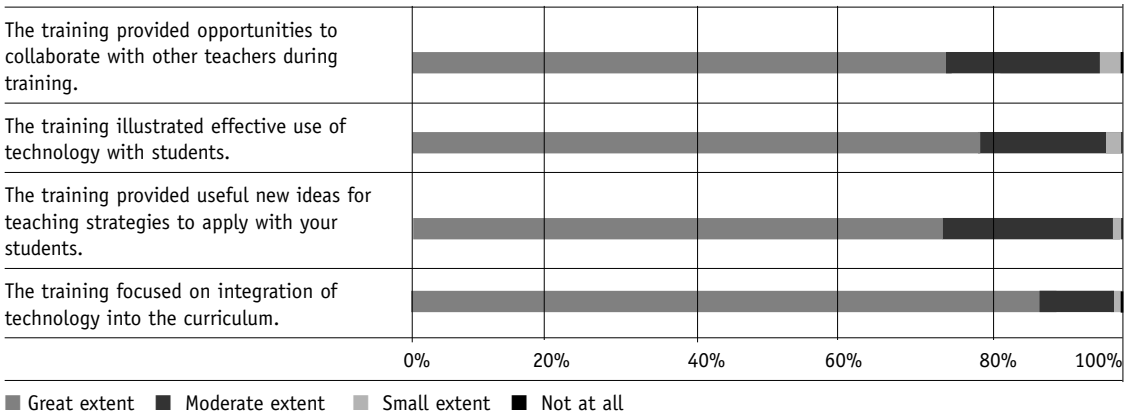


Figure 2. Response to the trainers (Cumulative Participant Teacher responses, End of Training survey, n=49,329)

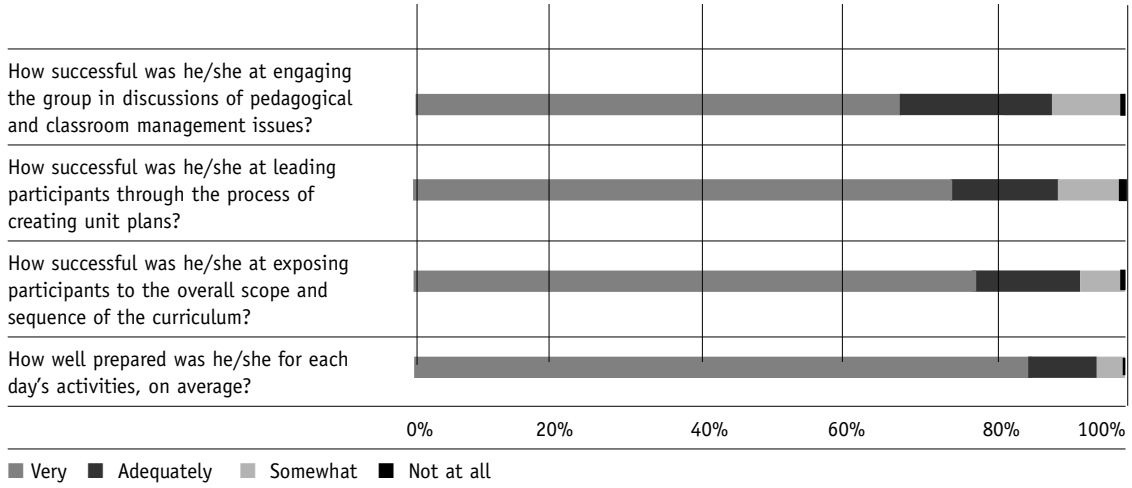


Figure 3: How prepared do you feel to integrate educational technology into the grade or subject that you teach? (Cumulative Participant Teacher matched responses, application form, and End of Training survey, n=45,621)

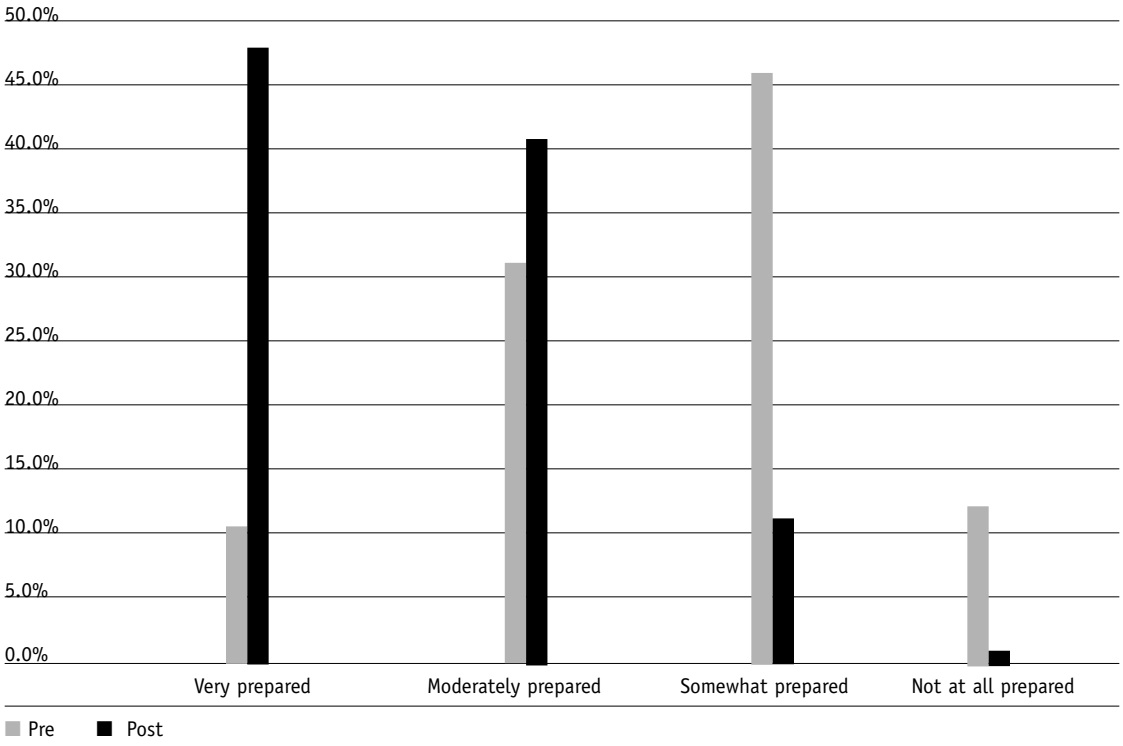
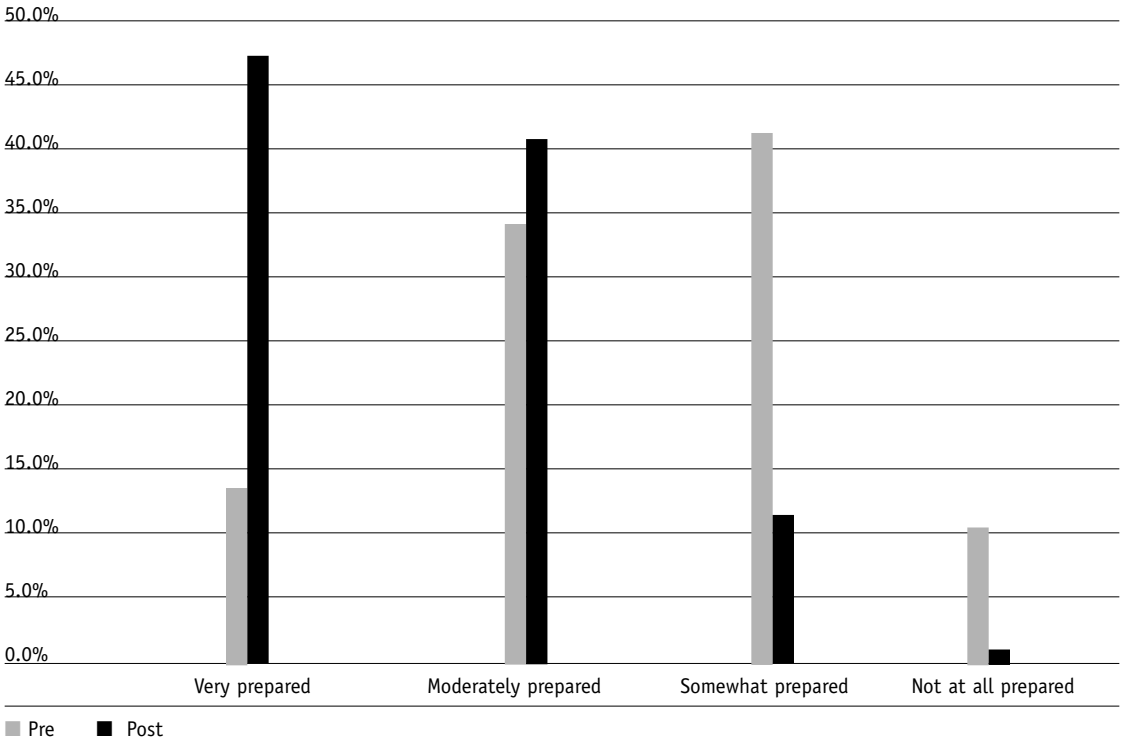


Figure 4: How prepared do you feel to support your students in using technology in their schoolwork? (Cumulative Participant Teacher matched responses, application form and End of Training survey, n=45,609)



Intel Teach to the Future focuses on pedagogy, and introduces technology as a tool that teachers can use to meet their goals. Teachers were trained in the use of widely available software applications (Microsoft PowerPoint and Publisher) with which existing technical support staff were likely to be familiar. The program's value resides in providing teachers with an extended professional development experience that creates a context in which teachers examine in depth how they can use ubiquitous software applications to support their instructional needs.

The implementation model, in which local education professionals were selected as the professional development providers, meant that Participant Teachers were being trained not only by fellow educators who understood the challenges of teaching, but by people who were familiar with the local conditions in which they worked. Often Participant Teachers were trained by educators from their own schools, making it possible for them to consult with trainers on a regular basis. Data from interviews with Participant Teachers and observations of the training demonstrated that teachers felt that this structure helped to create a sense of community in the workshops. Teachers felt safe and supported when working with these local trainers, allowing them to gain confidence to experiment with new ideas and resources.

This combination of a practical, hands-on training experience that leads to the production of concrete teaching materials and the leadership of local educators, created a training experience that was both challenging and comfortable for teachers who took part in the program.

Teachers do something new when they return to their classrooms

Intel Teach to the Future teachers leave their training feeling that they are prepared to act on what they have learned. Evaluation findings demonstrate that large numbers of teachers do, in fact, succeed in bringing significant parts of what they learned and what they created during the training to their classrooms. This finding indicates that Intel Teach to the Future has had significant success in meeting one of the primary hurdles faced by many professional development programs–ensuring that teachers act on what they learn once they return to their classrooms.

Specifically, a majority of survey respondents consistently report implementing all or part of their unit plans with their students (51% in the 2001 End of School Year survey, 78% in 2002, and 79.1% in 2003).[5] Large numbers of teachers also report creating and implementing other new technology-rich lessons.

Teachers are also significantly increasing their use of technology with students. Matched longitudinal data about the frequency of student technology use showed increases for a range of technology-based student activities (see Figures 5-8, n=1,347. Pre-data come from program application forms, post-data come from 2003 End of Year Survey). Some teachers also reported using software applications that were not introduced in the training more often after their participation (see Figure 9, data are from 2003 End of Year Survey, n=4,223).

[5] In the 2001 End of School Year survey, teachers were only asked if they had "implemented their unit plan." In subsequent years the question was changed to "some or all of their unit plan."

Figure 5. Change in number of times per week respondents have students learn about subject matter with computers (pre-post, n=1,347)

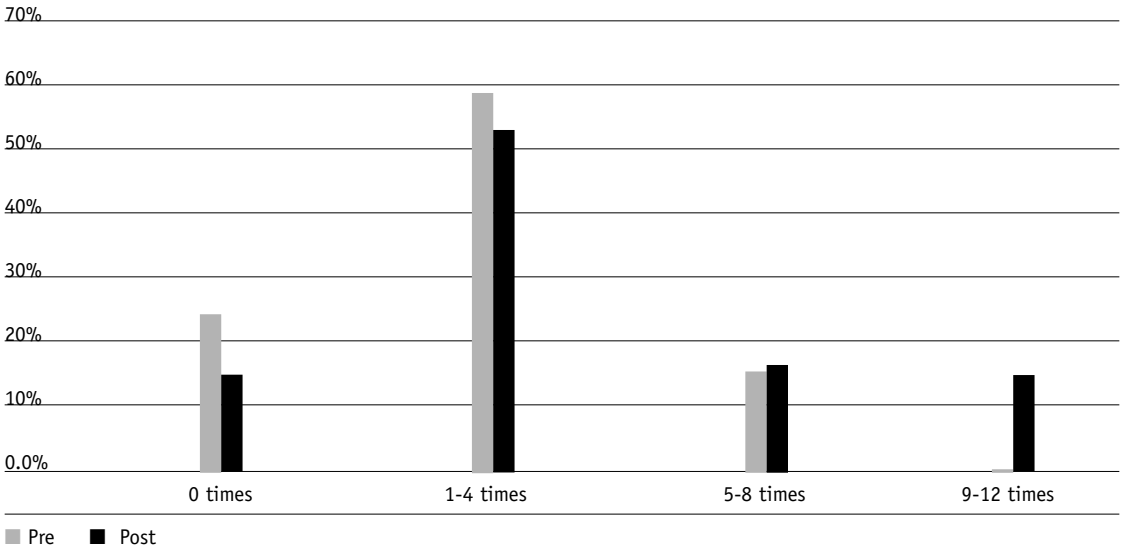


Figure 6. Change in number of times per week respondents have students solve problems using the computer (pre-post, n=1,347)

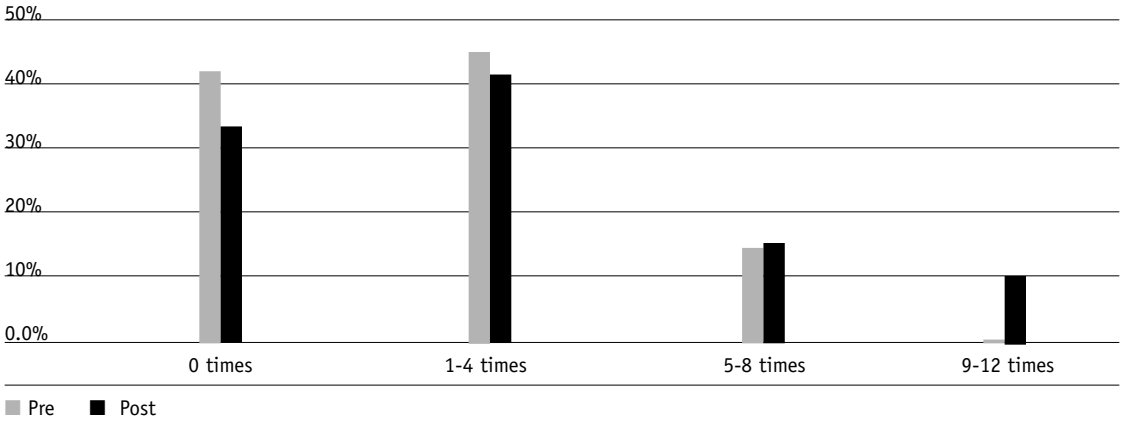


Figure 7. Change in number of times per week respondents have students work collaboratively using the computer (pre-post, n=1,347)

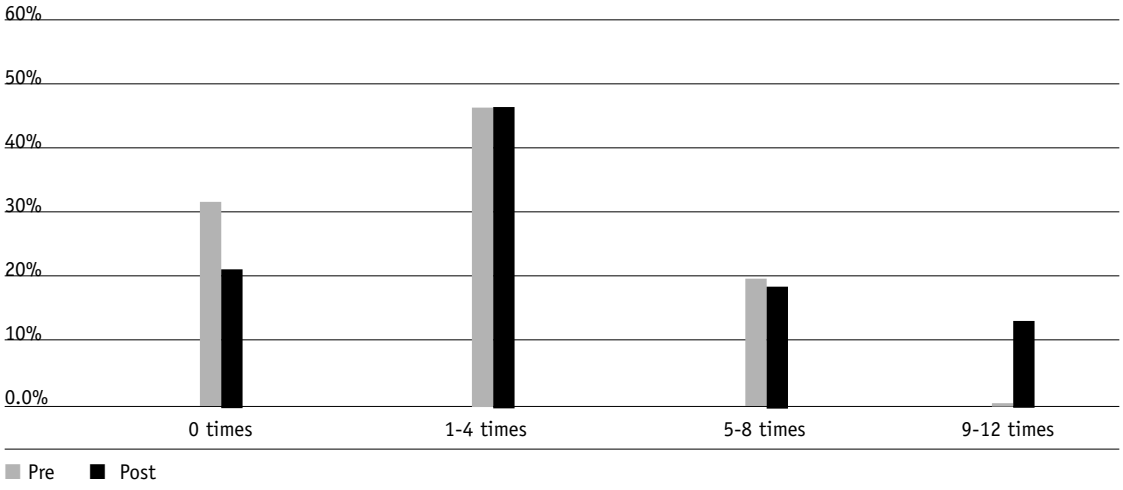


Figure 8. Change in number of times per week respondents have students produce multimedia products using the computer (pre-post, n=1,347)

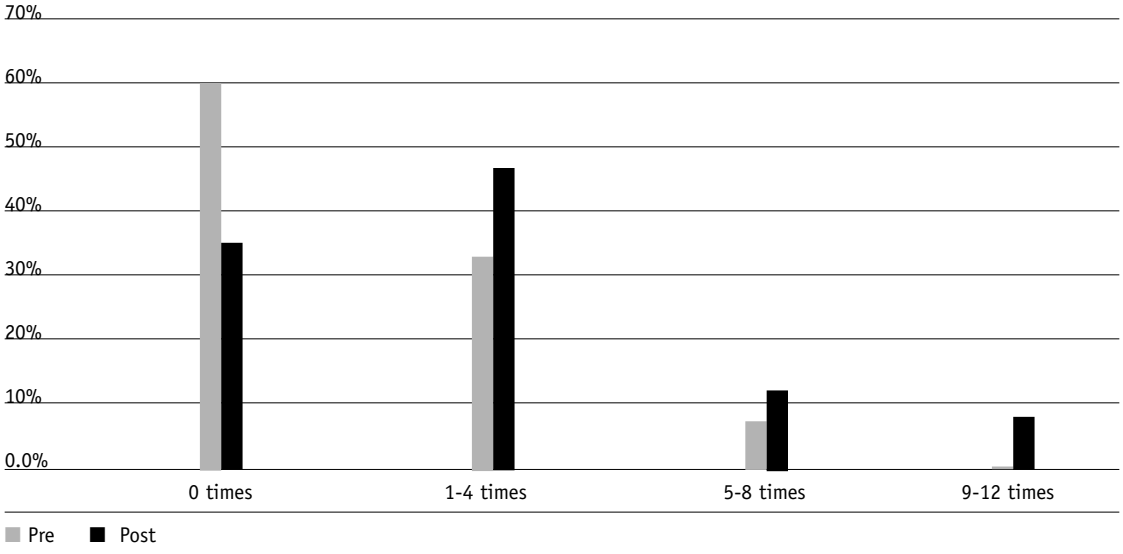
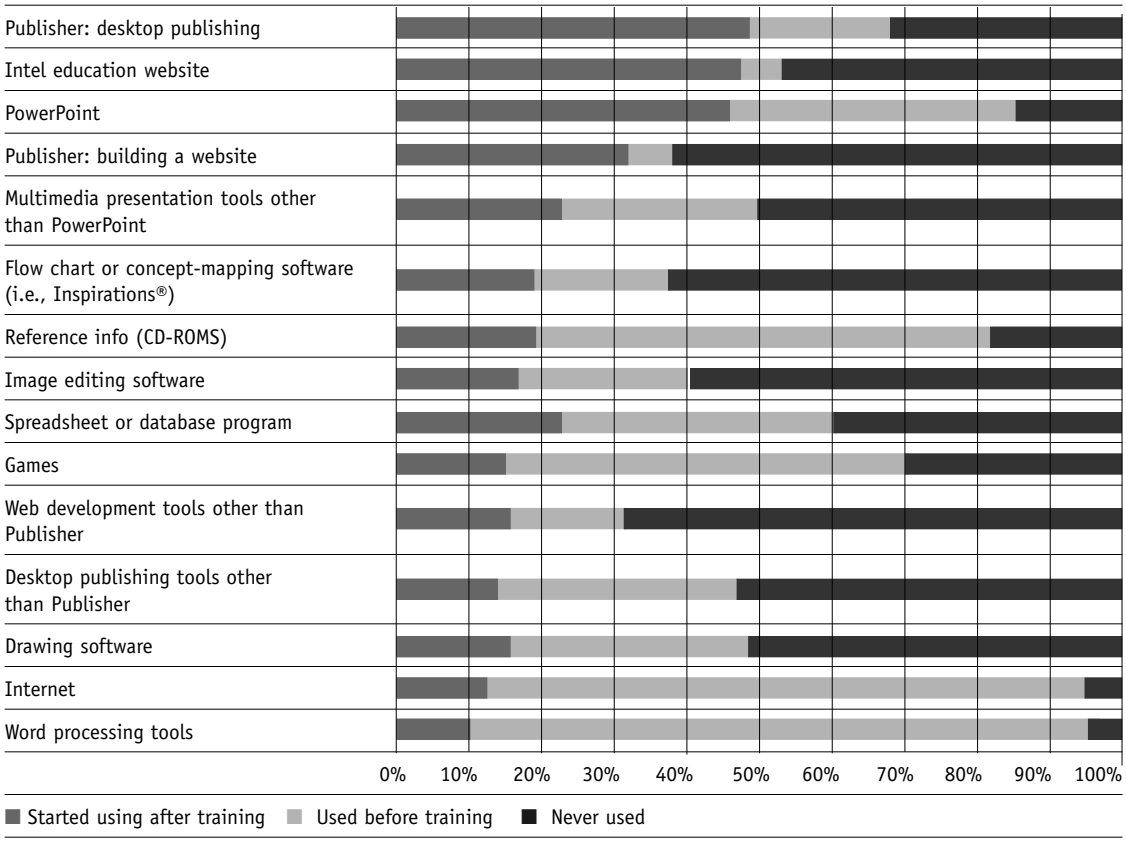


Figure 9. Use of software with students (n=4,223)



Case study findings from the second-year evaluation illustrated that teachers who went through this training were often making technology a regular part of their teaching routines. Many of the teachers interviewed and observed used their unit plans in their teaching, but others also created new technology-rich lessons and were making use of other kinds of software and technical resources to augment these lessons. For example, teachers were having students use digital cameras to create visual materials to include in PowerPoint presentations and were having them create charts and graphs in Excel to represent scientific data. The original unit plan often served for these teachers as a catalyst for generating new ideas about how to use technology with students.

Apart from implementing technology-rich activities with their students, evaluation findings also demonstrated that the program has had some impact on how participants teach. In response to survey questions, a majority of teachers reported using technology more often after the training in a variety of ways to support their own professional practice (see Figure 10, data are from 2003 End of School Year survey, n=4,223). Accessing the Internet to research lesson plans, and using technology to produce instructional materials increased substantially after the Intel Teach to the Future training.

In addition, approximately one-third of survey respondents reported using a variety of project-based teaching strategies, which were stressed in the training, more often after participation in the program (see Figure 11, data from 2003 End of School Year survey, n=4,223). This finding is consistent with findings from district case studies, in which evaluators observed teachers experimenting with rubrics for evaluating student work, structuring lessons to include more group work, and having students present their work to their peers more frequently. These teachers explained that the modeling of project-based technology integration activities and methods during the training had helped them to understand how they could organize technology-rich lessons within a project-based framework.

Figure 10. Professional practice activities teachers engage in since the training (n=4,223)

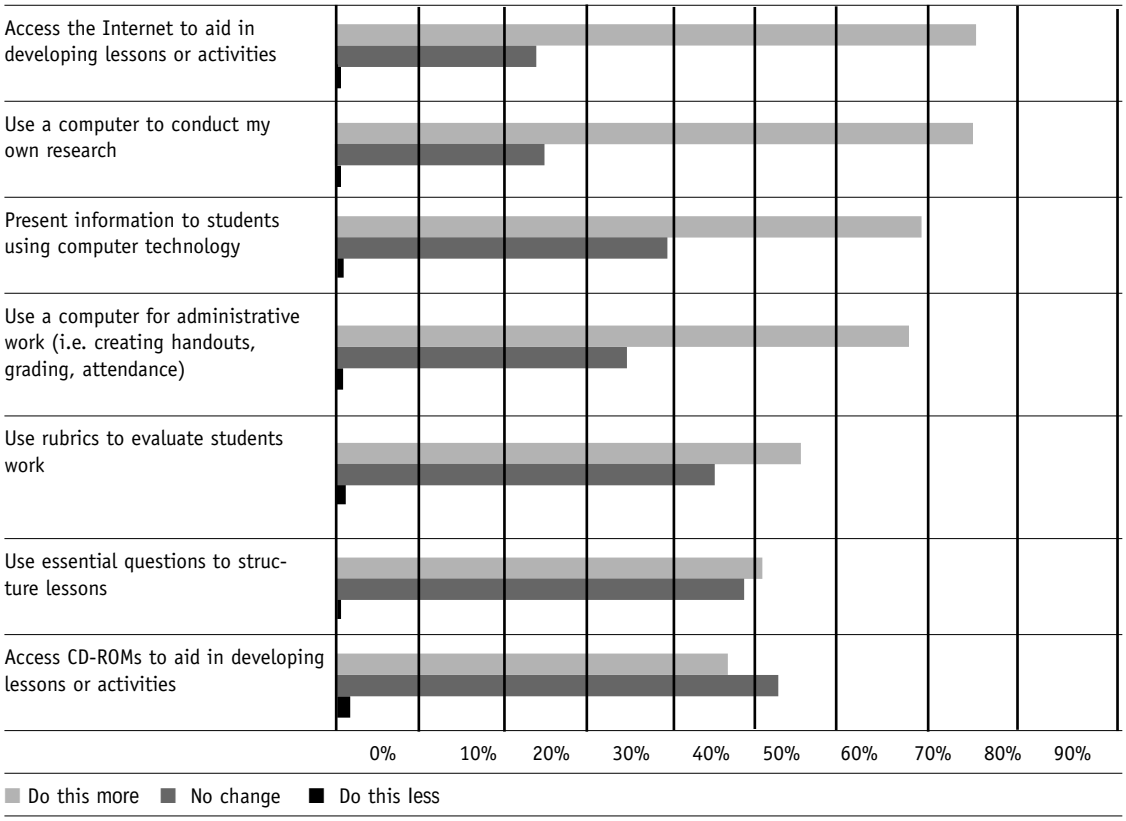
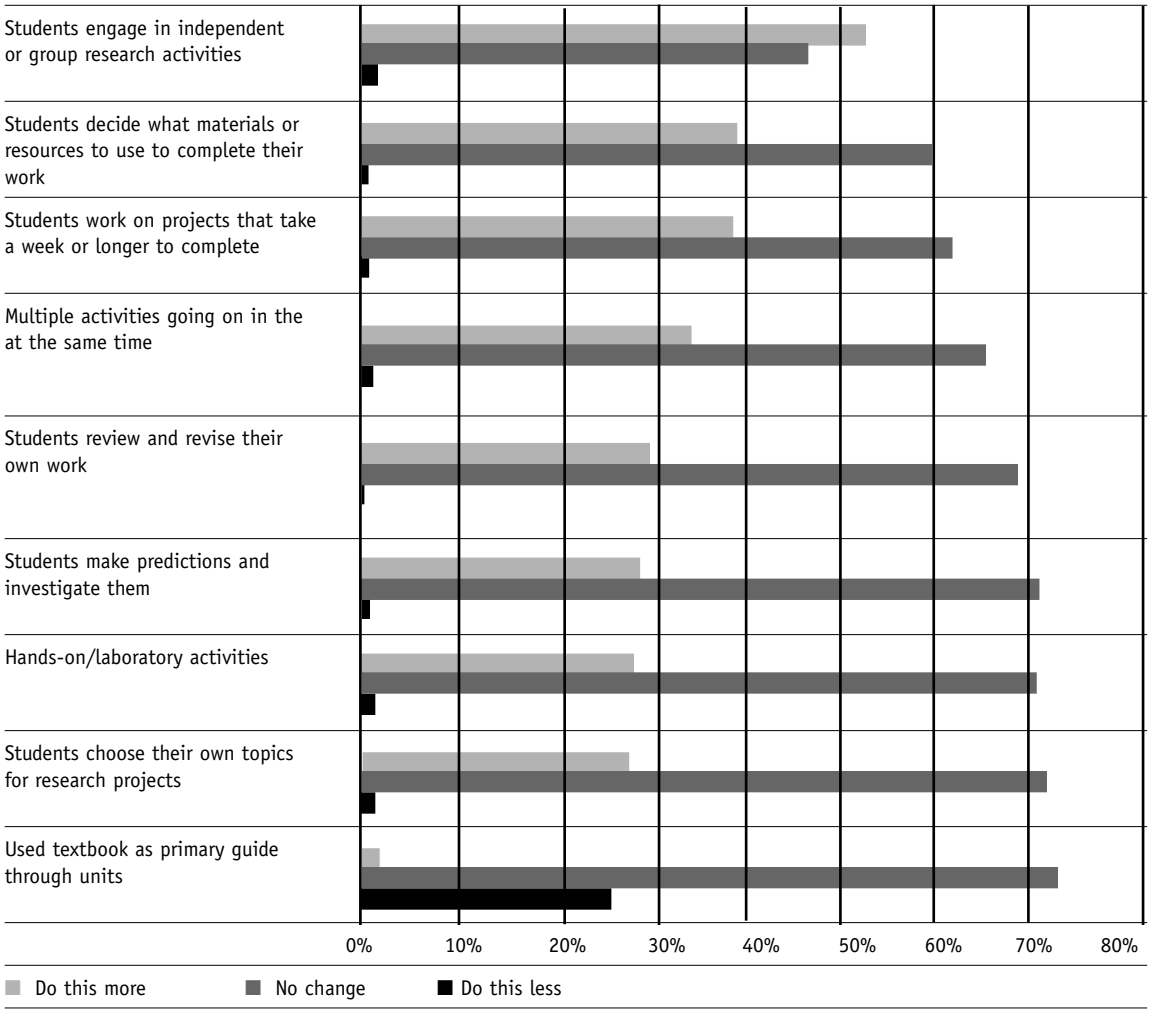


Figure 11. How often teachers use instructional strategies since the training (n=4,223)



Survey findings indicate that most teachers felt that the teaching strategies presented in the training were not entirely new to them, but case studies revealed that the training experience provided teachers with useful examples of how those general pedagogical ideas could be put into action. Taken together, the findings from this evaluation suggest that many teachers who participate in Intel Teach to the Future are experimenting with new teaching strategies and new kinds of student activities in their classrooms after their participation in this training. Because the training specifically prepares them to integrate project-based technology activities into their teaching, teachers feel able to return to their classrooms and take the first steps in this complicated process.

Teachers' involvement in project-based technology integration is sustained over time

Because the Intel Teach to the Future program has been evaluated since the first year of its implementation, it has been possible to track its longitudinal impact on participants and to compare some outcomes for cohorts of teachers trained during each school year included in the evaluation. In 2003, the evaluation found that many teachers trained in prior school years (2000-2001 and 2001-2002) were continuing to make project-based technology integration a part of their teaching practice. For example, a majority of teachers trained a year or more before completing the 2003 End of School Year survey reported implementing all or part of their unit plans more than once (67.8% of the 2000-2002 cohort and 53.9% of 2001-2002 cohort), suggesting that they had used their unit plan two or three school years in a row. When teachers were asked whether they had implemented their unit plans in the current (2002-2003) school year, there was little difference in the rates of implementation for teachers across all three training cohorts (74.6% of the 2000-2001 cohort, 80.9% of the 2001-2002 cohort, and 80.6% of the 2002-2003 cohort).

Other evaluation findings suggest several reasons why Intel Teach to the Future participants may continue to see value in the materials they created at the training years after completing it. First, the training is designed to make teachers feel invested in becoming experienced technology-using teachers. Teachers who take part in the program are required to become active producers of materials that address curricular topics of their own choosing, creating a resource that is likely to be of real value to them over time. Second, the training provides practical advice about how to cope with the obstacles to technology integration that many teachers face when they return to their schools. Teachers reported that this practical knowledge was often helpful to them during their initial attempts to use the materials they had created in the training. Third, teachers found the training's emphasis on using technology to support project-based learning relevant to their teaching goals (97% reported this in both 2002 and 2003 End of School Year surveys), suggesting that the materials they created in this context were also likely to be relevant and therefore worth using repeatedly. Further analysis of survey data validates this conclusion, indicating that teachers who found the teaching strategies stressed in this training to be relevant to their teaching goals were more likely to implement their unit plans and other new technology-rich activities more frequently than other teachers (see Figures 12-14, n=1,347).

Finally, a large majority of teachers consistently reported that they were satisfied with their experience implementing their unit plans (86% in the 2001 End of School Year survey, 85% in 2002, 84% in 2003). Case study data indicated that having a successful first experience was crucial in encouraging teachers to continue investing the time and energy required to make project-based technology use a regular part of their teaching.

Figure 12. Implementation of unit plan in 2002-2003 school year by relevance (n=1,339)

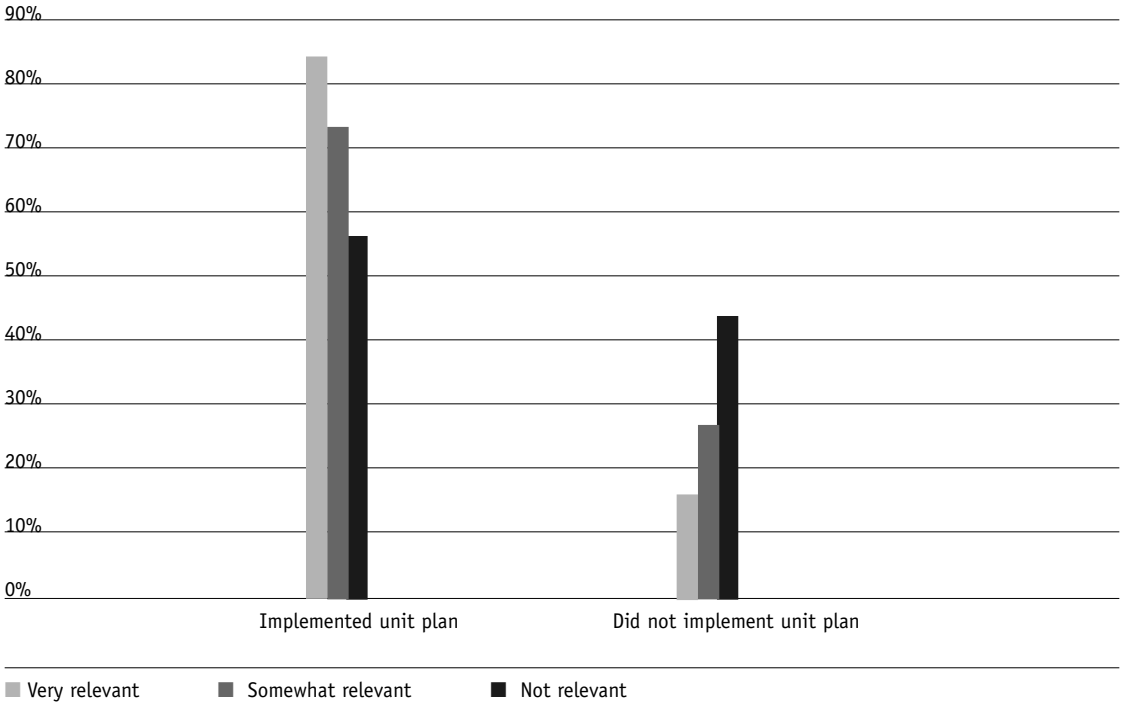


Figure 13. Frequency of unit plan implementation by relevance (n=961)

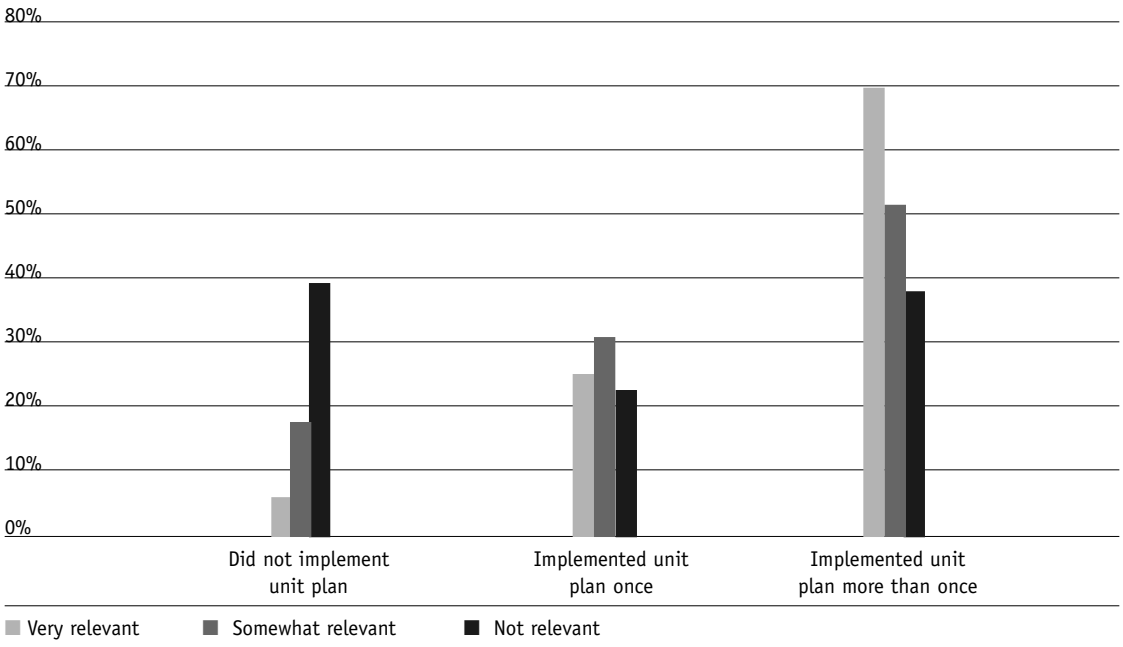
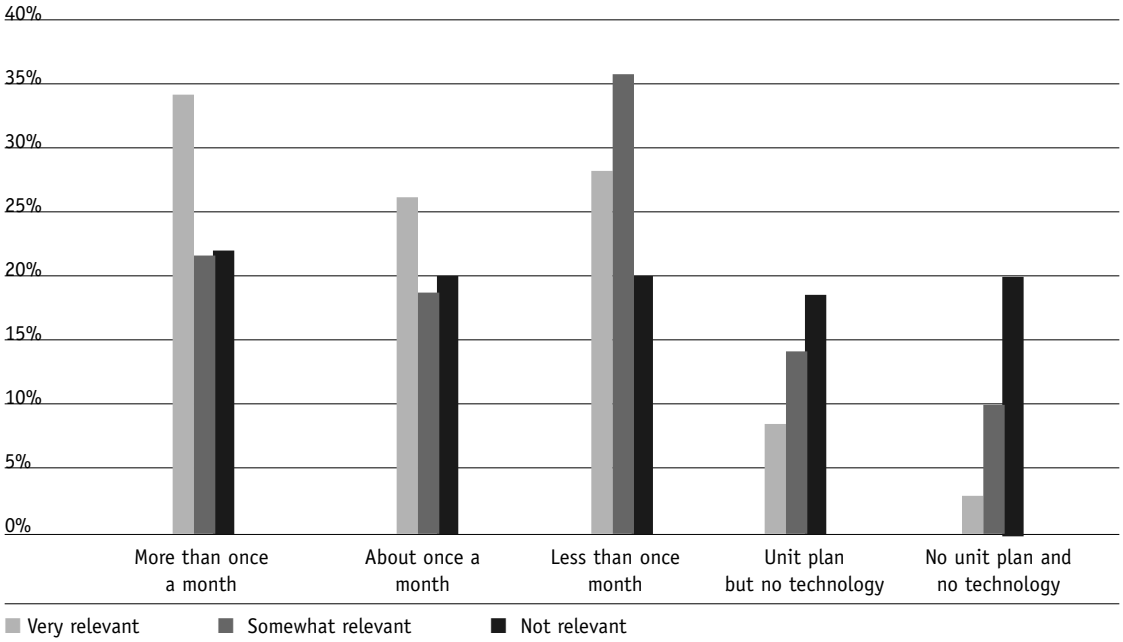


Figure 14. Frequency of implementation of technology-integrated lessons by relevance (n=1,340)



Establishing district relationships helps create conditions for success

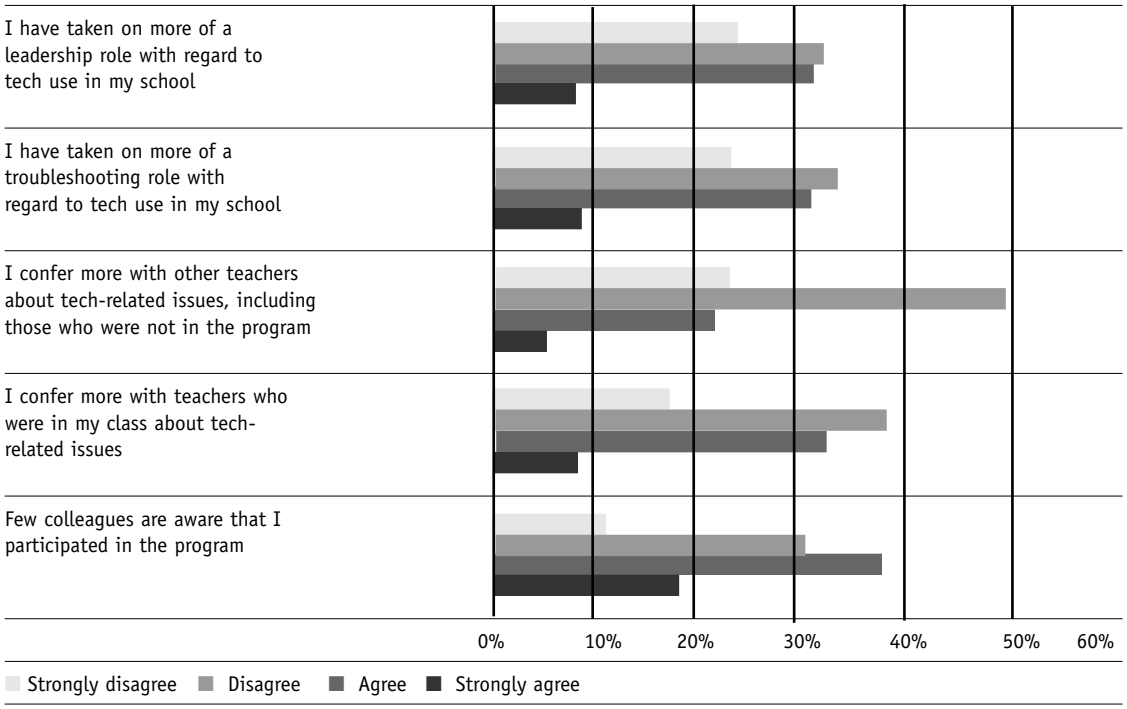
This evaluation found that, along with supporting teachers in using new resources and new teaching strategies in their classrooms, Intel Teach to the Future also often catalyzed changes in schools and districts that created improved conditions for teachers' sustained use of instructional technology. In addition to reaching teachers directly through the training itself, the implementation model for Intel Teach to the Future also involved direct engagement with district offices, in order to coordinate the training of Master Teachers and disseminate the program. Evaluation across three years has looked into how this two-tiered approach to implementation has allowed the program to extend and deepen its reach.

The sections above provide a window into what takes place in the classroom after teachers complete the training. However, teachers do not work in isolation; the environments in which they work inevitably influence the kind of impact any professional development program can have on their classroom practices.

First, this evaluation found that, because Intel Teach to the Future often reached large numbers of teachers within individual schools, within-school support networks often evolved, through which teachers provided one another with informal advice, support, and encouragement as they sought to implement their unit plans and experiment with project-based technology use more broadly.

Through the district case studies, evaluators found that teachers worked together to create technology-based projects, share ideas, and act as advocates to obtain additional resources and more professional development. Survey data reinforced these findings, indicating that teachers who participated in the program believed that their role in school had changed (see Figure 15, from 2003 End of School Year Survey, n=4,223). Teachers reported having more conversations with their colleagues about technology related issues after the training, and half felt that they had taken on technology leadership roles in their schools. By working in an environment in which technology integration is a shared enterprise rather than an individual effort, teachers, especially those who are not particularly tech-savvy, may feel more capable of sustaining and expanding their use of technology in their teaching.

Figure 15. Change in collegial behavior after training (N=4,223)



Second, by involving district-level administrators in program from the outset, Intel Teach to the Future helped to ensure that districts had the opportunity to align the program with their existing technology programs and priorities in order to meet local needs. Data from case studies and interviews with district personnel have demonstrated that this program is often having an impact on district policies and practices, particularly regarding the design of professional development sequences and the distribution of technology resources. District personnel repeatedly explained that this program had helped them to see (or helped them to convince their colleagues to see) how they could refocus their existing programs away from basic technology skills training and toward the integration of technology into the teaching of core content. They also often reported that their involvement in this program had spurred them to organize a coherent sequence of professional development offerings related to technology, often creating "basic" and "advanced" courses for teachers to take before or after their participation in Intel Teach to the Future. Finally, these administrators also often reported shifting their budgets to allow for greater investments in professional development and more selective and carefully planned investments in hardware and other technological infrastructure.

Importantly, this program has also helped to develop technology leaders. Intel Teach to the Future Master Teachers are moving into positions of leadership in their districts, and were often directly involved in moving forward many of the kinds of changes described above. Master Teachers have played a key role in this program, acting as a bridge between their teaching colleagues and district administrators and seeking to support their colleagues' efforts to expand and improve their use of technology in the classroom.

Challenges and Recommendations

Deepening teachers' understanding of the learning potential of technology

Teachers' positive experiences with this program were important because they facilitated a first major step toward integration of technology into meaningful, content-rich student work. However, teachers involved in the evaluation were typically experimenting with new technology tools and with new teaching practices. They had not typically achieved a high level of proficiency in designing technology-rich lessons that really exploit the learning potential of these technology tools, or a depth of understanding of how specific uses of various technology tools could best support student learning. For example, one reason teachers often used only part of their unit plan (for example, the PowerPoint presentation but not the webpage design) is because they viewed these activities as equivalent to one another, rather than seeing them as distinct work products associated with distinct learning goals. Therefore, the real changes this evaluation documented in teachers' willingness and readiness to use technology with their students did not necessarily translate into significant changes in what or how their students were learning.

Teachers who have been through Intel Teach to the Future Essentials[6] need two key forms of further support in order to help them move toward integrating technology in ways that will have an impact on student learning. First, teachers need more opportunities to refine their assessment strategies for technology-rich student work. Assessment drives instruction, and while the Essentials course offers some opportunities to think about appropriate assessment, teachers need much more time to think critically about exactly what they expect technology tools to add to their students' learning. For example, PowerPoint assessment rubrics still often include a section on "number of slides," giving students more points for more slides, instead of focusing on whether and how students used PowerPoint's design features to enhance the communication of their messages in specific ways. Creating more explicitly criteria for describing exactly how these tools are supposed to enhance learning is fundamental to ensuring that this program has a real and meaningful impact on teacher practice.

Second, these teachers also need further training that is focused on improving teachers' understanding of how students learn and how lessons and units can be designed to scaffold that learning process. Teachers have been consistently positive in their response to the strong emphasis on pedagogy in the Essentials course, which suggests that further emphasis on student learning and effective pedagogy would be well received in future trainings and resources. The research on effective professional development indicates that deepening teachers' understanding of how students learn specific content (such as, for example, mathematics learning in early grades) is an important pathway to changing their teaching practices. When teachers understand why, for example, it is important to students' learning processes to give them time to review and revise their own and each others' work, then teachers are more likely to use those teaching strategies in ways that are instructionally effective.

In designing such follow-up training, it is important to take into account where teachers are in their understanding of these pedagogical concepts, and teachers' own instructional goals and curricular requirements. Just as the Essentials course was designed to build on what teachers already do in their classrooms, these follow-up trainings could build on teachers' initial experiences integrating project-based technology lessons by having teachers reflect on the opportunities and challenges they encountered. Teachers would then be asked to revise existing lessons or create new ones to better address their own and their students' needs.

Extending district-wide program impact by supporting Master Teachers

The evaluation data on school- and district-level impact is much more limited than the teacher data. However, evaluation findings do suggest that the linchpin of this level of the program's impact is the Master Teachers. Their hard work, dedication to the program, and sometimes their previous status as leaders or experienced teachers within their districts have made it possible for them to extend the impact of this program, in many districts, beyond the individual teachers who

[6] The "Essentials" course is the basic Intel Teach to the Future course, consisting of a series of ten modules. This is the program described in the introduction and the focus of the evaluations presented in this paper. Since this initial program was delivered, Intel Innovation in Education had created a number of subsequent professional development offerings.

participated in the training. This suggests that Intel will be well served by continuing to invest in and support these teachers over time.

However, the evaluation also suggests that while many Master Teachers have been able to extend the impact of this program very effectively through various efforts, other Master Teachers have been frustrated in similar efforts. For example, while a Master Teacher in one district may have worked with a district technology coordinator to make Intel Teach to the Future a required mid-level stage in teachers' technology-related professional development sequence, another Master Teachers' district administrators may be much less receptive to such a plan.

Three strategies would help to create an environment in which more Master Teachers would be able to expand this program's impact effectively within their school districts.

First, the program itself and associated trainings would need to be represented to all teachers and administrators as a coherent sequence of trainings that guide teachers through a process of developing the skills and knowledge they need to use technology to support student learning. When district-level administrators do pay attention to Intel Teach to the Future, they do so because this program demonstrates to them that technology training can be focused on improving instruction and supporting student learning, and that it can be more than just technical training. All Intel Innovation in Education offerings need to be aligned to this message and presented as a sequence – one that teachers may be able to participate in flexibly, but that introduces teachers over time to more differentiated and deeper ideas about when and how to use technology to enhance their instruction and deepen their students' learning.

Second, efforts to raise administrators' awareness of Intel's programs and of the perspective on technology and learning that underlies them are likely to be useful to Master Teachers in those administrators' districts. Formative evaluation of the Leadership Forums that will take place in the fall will help to determine if this is true, but it is likely that one indirect outcome of those Forums may be greater administrator awareness of and support for the work of the Master Teachers in their schools or districts.

Third, continuing to invest in Master Teachers through further training and possibly through other forms of support such as mini-grants for research or to extend local training opportunities is important both to maintain Master Teacher's connections to Intel and to build their professional knowledge and stature within their districts.

On a final note, findings from the 2004 End of School Year survey suggest that the Master Teachers in the Expansion program may be a very different population of educators than Classic Master Teachers. This difference is discussed in detail in the 2004 End of School Year Survey Summary report. In the Expansion program, it appears that many Master Teachers are educators who are already working full-time as technology coordinators or professional developers. Only 52% of Expansion Master Teachers responded to the survey that they are classroom teachers. Consequently, Expansion Master Teachers may integrate this program into their professional lives

differently than Classic Master Teachers have done, and the program may be less important to their professional growth and advancement than it has been for Classic Master Teachers. The Master Teacher survey planned for 2005 may provide further insight into these differences.

Increasing need for differentiation in instruction

The Essentials course was surprisingly successful in its ability to reach teachers of all grade levels and content areas. However, some issues did arise consistently, particularly the relatively large numbers of early grade elementary teachers who participated in the training and the difficulties that some of those teachers encountered in applying the lessons of the training to their age groups. Evaluation of the Online Thinking Tools Workshops is beginning to demonstrate that this problem is exacerbated with more specialized tools. Large numbers of early elementary teachers continue to participate but find these tools difficult to use with young students. Similarly, the Essentials course has always been designed to reach core-content-area teachers, but evaluation data from the Classic and Expansion Essentials course, as well as the Online Thinking Tools workshops, suggest that, as these programs become less centrally administered by Intel and ICT, more and more non-content-specific teachers are participating in the trainings. These teachers often find that these tools are not necessarily relevant to them. Or, even if they appreciate their value, they are not in a position to then use the tools with students.

Even among teachers who do teach core content areas, moving beyond the initial, important first stages of experimenting with project-based uses of technology in the classroom quickly requires teachers to think in more detail about the particular learning needs and circumstances of their students and the content they are expected to learn. Helping teachers to move further along in their use of technology in the classroom is likely to require more differentiated instruction for teachers working with different grade levels, in different content domains, and with different populations of students (particularly special education, a group consistently well-represented among teachers trained in Intel Teach to the Future).

Revaluation of recruitment practices

Comparisons to date of the Classic and Expansion programs have suggested that the Expansion program is reaching, on average, more advantaged school districts than the Classic program. Intel Teach to the Future initially stated that it was committed to reaching schools serving high proportions of low-SES students, and the evaluation has demonstrated that this program is useful to teachers in these schools (for example, they implement their unit plans at just as high a rate as, and sometimes higher than, teachers in high-SES schools). If this is still a priority for the program, more systematic identification and recruitment of appropriate school districts for the program will be an important task to take on.

CONCLUSION

Intel Teach to the Future has been very successful in providing a positive, productive professional development experience to a very large population of teachers. This evaluation demonstrates that participants in this program are consistently enthusiastic about the training; follow up on what they learn in the training by using their unit plans and other technology-rich activities with their students; use technology modestly with the students, both with greater frequency and diversity; and experiment with new instructional strategies emphasized in the training. Further, the evaluation demonstrates that the program has also frequently acted as a catalyst at the school and district level, spurring changes in policies and practices that have created improved conditions for supporting teachers' efforts at technology integration.

The evaluation team believes that three factors played a central role in shaping the successes of this program. First, the design of the curriculum and implementation model are well grounded in lessons learned from past professional development programs. Second, the program committed itself to two well-defined goals at the outset and did not shift these goals over time. Finally, the program invested in and supported a population of Master Teachers who have enhanced and extended the reach of this program within schools and districts by supporting their colleagues and improving the conditions for teaching and learning within their school districts. We present a brief discussion of each of these factors below.

1. *Program design*. Many features of the curricular content and implementation model of this program, which were developed in response to lessons learned from other, earlier technology-related professional development programs, contributed significantly to the program's considerable success. These features include the emphasis on the use of technology by students to support the learning of core content through project-based work; explicit discussions of concrete classroom management challenges that arise during technology-based work; the provision of extensive time and a collaborative context for focused curriculum development work; acknowledgement of the importance of assessment as a driver of instruction; and the requirement that teachers leave the training with a completed unit plan, grounded in their own curriculum and ready for use in the classroom. Strong rationales for each of these program elements can be found in the past programs such as ICT's own ACE program, which served informally as a pilot for Intel Teach to the Future, and the Apple Classrooms of Tomorrow initiative, and are consistent with the research literature on effective professional development (Fishman, Marx, Best & Tal, 2003; National Foundation for the Improvement of Education, 1996; U.S. Department of Education, 2000; Wiggins & McTighe, 2000).

2. *Clarity and consistency of goals*. The goal of Intel Teach to the Future is to improve the quality of technology integration in the classroom through professional development. This program has consistently understood this goal to be focused on helping teachers move forward from their personal starting points, rather than moving all teachers to a certain specified goal state. Rather than seeking to transform teachers into expert technology users after one 40-hour series

of workshops, this program sought to facilitate attainable alterations in practice for large numbers of teachers. The program was designed to make technology integration, a practice that is sometimes perceived as peripheral to teachers' daily lives, relevant to the life of the classroom, by connecting it to a core concern for all teachers—engaging in quality teaching practice in order to improve student learning.

The program's second goal has been to achieve its first goal at a very large scale. This commitment to achieving scale responded both to a broad national need for this level of technology training, and to the need, felt within districts, to deliver a training that could reach significant proportions of teachers within individual schools and across districts, establishing a common language about and vision of how technology can be used to support student learning. This evaluation has demonstrated that, in many cases, this program has succeeded in creating this base of shared knowledge and common practices within schools and districts.

3. *Support of Master Teachers.* This evaluation has documented a variety of ways in which the core concepts of Intel Teach to the Future have been translated into new classroom practices by teachers and in many cases into changing policies and practices at the school and district level. Master Teachers have played central roles in facilitating these processes. They are the individuals who have provided formal and informal guidance and support to their colleagues, acted as role models for managing student technology use within their schools, and taken on leadership roles within their districts to inform future technology plans.

In addition to facilitating the success of this program to date, these three factors have also laid the groundwork for further, deeper investment in improving the quality of technology integration among K-12 teachers. The next great challenge for Intel's K-12 education programs will be to chart a course forward for those teachers who have already engaged with Intel Teach to the Future to learn in greater detail how technology can best be used in the classroom to support high-quality instruction and enrich student learning. Although this evaluation has documented many successes for this program, it has also made clear that these successes depended in part on specifying only a limited, realistic set of goals for influencing teacher practice through a single program. However, the true measure of Intel's success in improving technology integration in K-12 schools more broadly will be determined by how they define the next stages in their professional development offerings, and how effectively their programs can reach out to and engage the teachers they have already invested in and begun to influence.

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