Intel International
Interim Report
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Executive Summary

This interim report presents preliminary data and observations from evaluations of Intel Teach to the Future being conducted around the world, and recommendations for building and refining this evaluation portfolio to ensure that findings will be instructive at the local, national and international level. The data presented here reflect the various evaluation processes that are underway, as well as those that are just beginning, in countries participating in Intel Teach to the Future. This interim report is intended to provide formative information for consideration by program staff as they develop and/or extend their evaluation plans, rather than summative information about overall program impact. The report is structured to present the following:

- Preliminary data from the Core Surveys administered in four countries: Taiwan, Japan, India and the U.S. (n=11,986)
- Themes derived from analysis of the evaluation reports submitted to EDC, site visits to four countries, conversations with education managers and evaluators, and EDC's evaluation of the U.S. program. The report also presents programmatic and evaluation recommendations that address these themes.
- Summaries of the evaluation plans and findings from twenty countries.

The preliminary results from the Core Survey suggest that Intel Teach to the Future is having an impact on the teaching practice of participants. Not only did a large percentage of teachers report implementing a new technology-integrated lesson or activity since their participation in the program, but many also report that they are experimenting with a number of the project-based teaching strategies promoted in the training. These preliminary findings also suggest strong relationships between access to technical resources and rates of implementation, and an equally strong relationship between teachers' perception of the relevance of the project-based teaching strategies presented in the training and rates of implementation. Some key findings from the Core Survey administered in four countries include:

- 79% of teachers report implementing a new technology-integrated lesson or activity since the training.
- Teachers who did not have access to computer labs were more likely to report not having implemented (39%) than those who had access (19%).
- Teachers who had classroom computers were more likely to implement technology-integrated lessons than those who did not, and the more classroom computers teachers had, the more often they implemented.
- The challenges to implementation most commonly cited by both teachers who implemented and teachers who did not were those related to lack of access to technology and lack of time. However, among those who had not implemented, lack of administrative and technical support were also cited frequently as obstacles, while those who had implemented did not cite these as frequently.

- Teachers who agreed that the teaching strategies presented in the training were relevant to their teaching goals were more likely to implement technology-integrated lessons than those who did not.
- Nearly all teachers (94%) who implemented a technology-integrated lesson reported that their students were motivated and actively engaged in the lesson.
- More than 60% of teachers reported presenting lessons to students using technology, conducting research on the Internet, and accessing Internet resources for lesson planning *more frequently* since the training.

The themes that we identified across countries were organized using a research-based framework for analyzing technology integration in educational environments. This framework describes four factors that facilitate or impede the integration of technology: infrastructure, professional development, administrative support and time. We also identified some key evaluation themes and issues that have emerged in multiple countries. In each category we make programmatic and evaluation recommendations for addressing these themes.

- **Infrastructure** is consistently raised as an issue by teachers working in a wide range of access conditions. We suggest making it explicit in the training that Intel Teach to the Future is designed to help teachers integrate project-based ICT curriculum *within the given ICT environments in which they work,* and focusing discussion in the training around the specific access conditions of participants. We also suggest collecting stories of innovative implementation in challenging access environments through case studies and contests. These would provide concrete examples for teachers who find it difficult to conceptualize how to integrate technology into their teaching.
- Teachers across the world have been overwhelmingly positive about the **professional development** they have received through Intel Teach to the Future. We suggest ways in which the program can build on this initial positive response. Some countries have already developed methods for providing ongoing professional development for their MTs through the use of MT groups who meet regularly to share ideas and experiences. These groups could be the focus of qualitative evaluations that explore the ways in which these groups allow MTs to learn from each other and provide follow-up support to teachers. Based on concerns expressed by teachers in a number of countries regarding their need for guidance in helping students make effective use of digital resources, we also suggest follow-up professional development in "information literacy" or "media literacy."
- The relationship between **administrative support** and teachers' ability to implement technology-integrated curriculum varies across national and local contexts. In order for the program to be effectively adapted to a range of environments, program staff need to be able to create programmatic structures that involve administrators at the level necessary for participants to receive the support they need to experiment with technology. Case studies of administrator workshops currently in place could shed light on how these initiatives can be integrated into programs in other countries. In addition, hierarchical, multi-level evaluations of educational systems can be designed

to provide information to program staff about the administrative and structural issues that their programs need to address.

- **Time** constraints are consistently mentioned as an obstacle to technology integration by program participants. Although lack of time is a difficult problem to resolve, there are ways that program design can address the issue. At least one program has required that all participating schools have Master Teachers on site. Evaluation of this design element can enable program staff in other countries to understand whether this strategy allows participating teachers to more effectively and efficiently implement technology-integrated lessons. In addition, data suggest that offering incentives, especially in the early stages of the program, is essential for encouraging both MTs and PTs to dedicate their time to the training. Systematic exploration of the importance of incentives will better enable program staff to make decisions about how to allocate resources.
- At this stage of our involvement with the international program, a number of **evaluation issues** have arisen. First, the core survey has already produced interesting, cross-country findings. However, we have identified some key areas of Core Survey development, administration and reporting that can be improved, such as the degree of standardization of the questions and communication about Core Survey requirements. On a broader level, we emphasize the need to establish realistic and meaningful criteria and indicators for program success. We also encourage the use of targeted case studies to explore various aspects of program design and a variety of educational contexts so that individual countries' evaluations can inform program staff around the world. Looking to the future, we suggest creating standardized instruments for use in pre-service program evaluations and documentation of the knowledge base that exists among program staff.

The interim report then presents summaries of the materials we have received from twenty evaluations being conducted around the world. Some countries with mature programs have submitted evaluation reports, the finding of which we summarize in this section. Other countries are at the preliminary stages of their evaluations, and for these we describe their evaluation plans.

Introduction

Since March 2003, EDC's Center for Children and Technology has been helping guide and coordinate evaluations being conducted in many of the countries taking part in the Intel Teach to the Future program. EDC's goals for this international evaluation project are to:

- Support the individual programs in establishing evaluations of Intel Teach to the Future in their countries.
- Collect standardized survey data across countries.
- Synthesize data across countries so that the international program staff can better understand how the program is working around the world.

As part of this work, EDC has created the following resources:

- Guidelines for evaluation.
- A RFP template for education managers to use to solicit evaluation proposals.
- A Core Survey to be administered worldwide.
- A data entry form for recording and delivering Core Survey data.
- A list of deliverables that identifies all of the information and materials country programs need to send to EDC.

Along with developing these materials, EDC has maintained regular communication with program staff around the world, consulting programs on their evaluation plans and providing feedback on materials they develop and on proposals they receive from prospective evaluators. EDC has received and reviewed the evaluation reports produced by these programs once they are completed. In addition, EDC has continued to collect and report on the end-of-training survey data from numerous countries. Finally, EDC evaluators have made visits to Russia, Mexico, India and China to learn more about these programs from Intel Teach to the Future staff, educators, students and others involved with the program and to discuss evaluation goals, plans, and findings in more detail.

This Interim Report presents reviews of survey data collected to date and preliminary observations from a number of sources—the Core Survey, the country-specific reports submitted by individual programs, conversations with program staff and evaluators worldwide, the information gathered from our site visits and our evaluation of the U.S. Intel Teach to the Future program.

In order to make sense of such a diverse array of data, we have used a research-based conceptual framework to structure our analysis. Several factors typically facilitate or impede the implementation of technology-based applications in K-12 educational environments (Mandinach & Cline, 1994). These factors have proven to be pervasive across a broad range of applications, innovations, and programs. The processes by which Intel Teach to the Future is being implemented, and the obstacles and opportunities associated with them, will be examined through the framework of these factors.

Infrastructure. Technology-based programs, such as Intel Teach to the Future, cannot be implemented without the necessary technological infrastructure. There are two interrelated components to infrastructure. First there is the need to have enough *hardware and software* to meet the pedagogical objectives of the schools. More often than not, schools must make do with less than optimal numbers of computers or with setups that do not correspond to the school's stated curricular goals, but regardless there must be a minimal level of computer access. Some schools prefer the laboratory model, while others prefer to distribute the computers across individual classrooms. There is no right or wrong model, only what matches the specific needs of the school and its instructional goals and that provides the best possible physical access to the hardware. The second infrastructure issue is *connectivity* or access to the Internet. Programs such as Intel Teach to the Future and the larger Innovation in Education initiatives require connectivity, in part to provide access to web-based applications such as Seeing Reason. More generally, the principles that underlie the program and the project-based learning it seeks to support necessitate Internet access. Without access, Intel Teach to the Future will have limited impact. There are many levels of quality and reliability of access to the Internet that teachers may have. However, the type of robust, high-speed access familiar to professionals working in office settings is still quite rare in classrooms. For example, teachers who nominally do have Internet access may have to share a single phone line with the building administrator. This level of access is not adequate to their instructional needs.

Professional development. Intel Teach to the Future addresses teacher professional development through the introduction of technology-based applications to support project-based learning. The implementation of technology requires that teachers, both at the pre-service and in-service levels, acquire new technical knowledge and skills as well as reflect on and adapt their instructional practices. Effective technology professional development must help teachers to identify and meet specific educational needs and should be ongoing, rather than generic and short-term. One-shot training frequently leaves teachers frustrated because it does not provide them with the chance to think through, explore, and reinforce the concepts being covered. Equally important in professional development is for training to address the paradigm shifts and pedagogical changes that are often associated with the use of many technology-based applications. In Intel Teach to the Future, as in some other high-quality professional development programs, the pedagogical emphasis is on constructivism and the creation of active, student-centered learning environments. Training must prepare teachers to deal with the fundamental philosophical and practical changes that emerge when shifting from the "sage on the stage" or the imparter of facts and information to the "guide on the side" or facilitator/coach in which teachers assist students to actively construct knowledge and engage in learning processes.

As Papert (1997) and Salomon & Almog (1998) have noted, the more creative and broad-based the particular application, the greater potential for paradigm shifts and discernable outcomes. However, the greater the paradigm shift, the more difficult the implementation and transition from previous instructional methods. By contrast, though

more easily integrated applications often show less dramatic impact, they often get implemented more broadly. Salomon & Almog (1998) state:

> The more a technology, and it usages, fits the prevailing educational philosophy and its pedagogical application, the more it is welcome and embraced, but the less of an effect it has (p. 224).

Intel Teach to the Future's strength lies in its broad applicability. From our perspective, the program does not take direct aim at paradigm shifts in practice, but rather finds appropriate niches in the curriculum to introduce project-based learning and technology-based instructional activities..

Administrative support. The implementation of any new professional development program, not just one involving technology, requires a certain level of buy-in from various levels of administration. Principals or headmasters can make or break any program. They can either facilitate or impede implementation. It is always optimal to have not only the approval but also the active support and engagement of the administrator in any program that seeks to cause real change in teachers' practices. Lack of support from administrators is nearly always problematic. In some instances, however, innovative programs can be effective despite a lack of administrative support. A grass roots or bottom-up model led by the teachers can succeed under certain circumstances, even when there is no support from the administration, but only if teachers have significant flexibility in implementing the curriculum, and can easily access technology on their own. However, the significance of administrative support in technology implementation is closely tied to the political and cultural realities of the particular educational system. In countries, states/provinces, regions, educational systems, and schools that have more tightly hierarchical structures, administrative support may be the key factor in determining whether technology can become a part of the teaching and learning process. In areas with a more decentralized educational system, where teachers have greater control over what they do with their students, administrative support may be not be as crucial.

Time. Teachers need time to be trained, acquire necessary knowledge and skills, assimilate new concepts, and practice with new technology. They must have sufficient time and resources to develop new curricula and instructional strategies, and then to integrate them into classroom practice. Such integration and implementation requires patience, skills, and the ability to perceive cues about what works effectively or does not and then use such feedback to further improve pedagogical practices.

Taken together, these preceding factors–infrastructure, professional development, administrative commitment, and time–form an interacting set of variables that play a significant role in determining whether ICT can become a significant learning tool in complex systems called schools. Intel Teach to the Future directly addresses one factor: professional development. The governments and educational systems in the participating countries are primarily responsible for addressing the other three factors: infrastructure, administrative support and time. Regardless of where responsibility lies, the evaluations of Intel Teach to the Future can be designed to explore how all four factors influence the

effectiveness of the program. By understanding their influence, Intel staff can make informed decisions as they adapt the program to meet the needs of the educators and schools their programs serve.

This report is divided into four sections. First, we explore findings from the Core Survey. Second, we examine themes that cross the countries. Third, we provide brief evaluation summaries from the twenty countries that have sent us information. Finally, we draw conclusions and discuss future directions.

Core Survey Results

In this first analysis of the Core Survey data, we look at the findings from surveys conducted in Japan, India, the U.S. and Taiwan. The Philippines has also completed the Core Survey, but the data are not currently in a format that will allow us to integrate them with the other data. We expect to integrate these data soon. In addition, China just completed its survey, and the evaluators are reviewing and analyzing it now. Brazil sent their Core Survey data on December 18. We will be able to provide an updated analysis of the Core Survey data that includes these three additional countries in January.

Table 1 provides information about the percentages of respondents from each country. We conducted the analysis so that each teacher's voice is weighted equally, rather than looking at results on a country-by-country basis. However, because the number of respondents varies a great deal from country to country, certain countries have greater representation in the total percentages than others.

Table 1. Countries represented in Core Survey findings

Country	Frequency	Percent
1. Japan	583	4.9
2. India	1848	15.4
3. USA	4277	35.7
4. Taiwan	5278	44.0
Total	11986	100

Intel Teach to the Future materials

In the Core Survey, we asked teachers to tell us how often they made use of the materials provided in the Intel Teach to the Future Program after they had completed the program. As the Figure 1 below indicates, teachers made use of the manual about as often as they made use of the CD-ROM. For both resources, roughly 35% of the respondents report using the materials 4-10 or more than 10 times since their training. The largest groups (43.8% for the manual and 41% for the CD-ROM) have only used these resources 1-3 times since the training. One-fifth of respondents said that they had not used these resources at all.

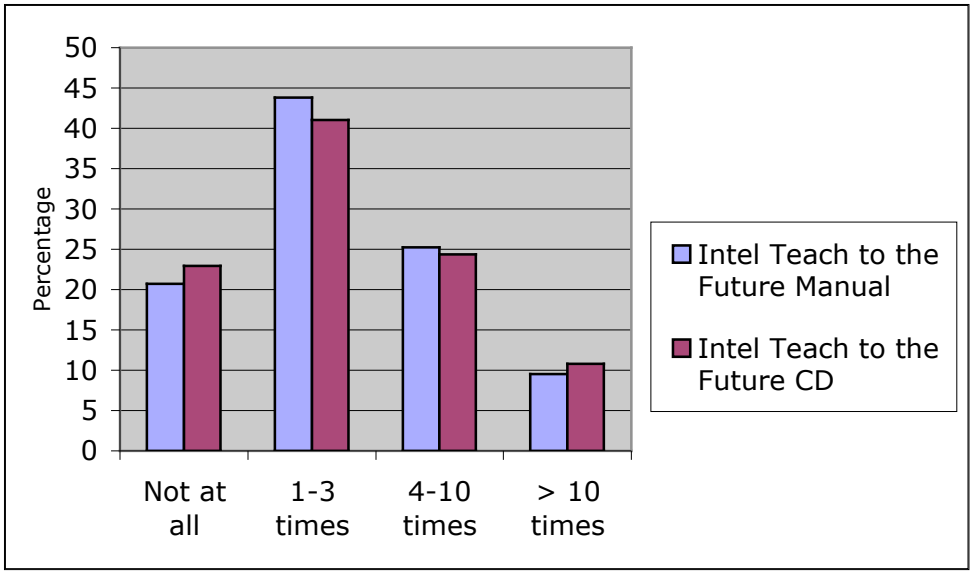

Figure 1. Use of Intel Teach to the Future Materials

Implementation of technology lessons or activities

A primary goal of Intel Teach to the Future is to have participants bring the knowledge and skills they gain through the training back to their classrooms. In the Core Survey we ask teachers to report on whether they have introduced a new technology-rich lesson or activity into their classroom teaching. **The Core Survey analysis indicated that many teachers were implementing new technology lessons and activities** (see Figure 2). Only 21% stated that they had not used computer technology at all with their students. About 30% of teachers reported having their students use computer technology in learning activities more than once a month; and roughly the same number had students use technology in their lessons less than once a month.

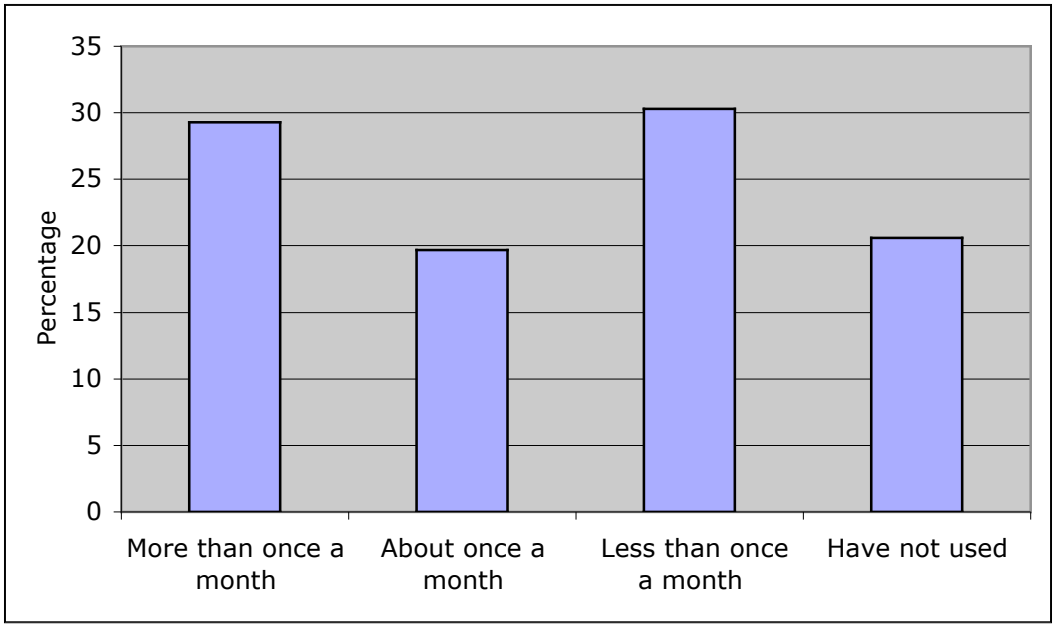

Figure 2. Implementation of technology lesson or activity

Relationship between access and implementation

Because access conditions vary dramatically, not only from country to country but also from school to school, it is difficult to define implementation success for every context. In cases where resources are limited, even implementing less than once a month would indicate a substantial change in some teachers' practices. For this reason, it is important to examine responses about implementation in relation to the kind of access conditions that teachers experience.

The Core Survey asked teacher to provide information about the kind of technology access they have in their schools. A majority of teachers (77%) have access to a computer lab or media center. Within that group nearly all teachers had Internet access in their computer labs (93%). **We found, not surprisingly, that access to computer labs was a key factor in whether or not teachers were able to implement a new technology lesson or activity**. As Figure 3 illustrates, teachers who reported that they did not have access to a computer lab were more likely to say that they had not implemented a technology lesson (39%) than those who did have access (19%), and those who had access to computer labs were also more likely to implement more than once a month (30%) than those who did not (16%).

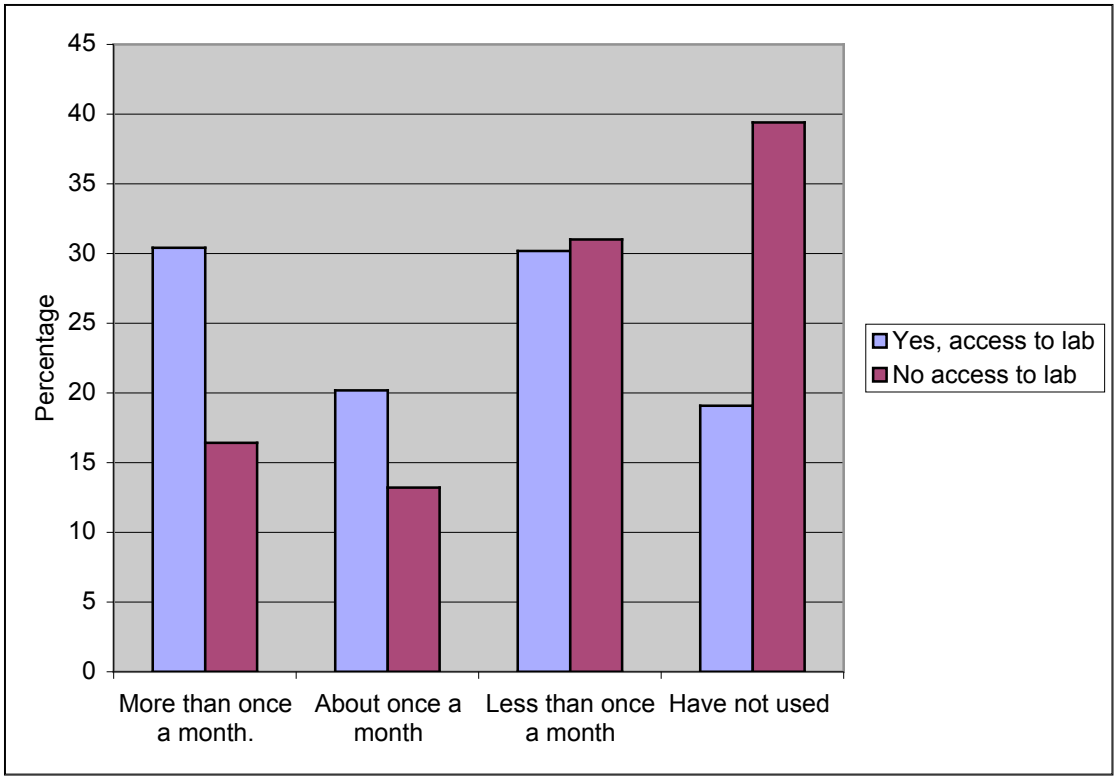

Figure 3. Frequency of implementation by access to computer lab

Along with asking teachers to report on their access to computer labs, we asked them about their access to classroom computers. Forty-one percent of respondents had no computers in their classrooms, 29% had only one computer in their classrooms, 16% had 2-4 computers, 5% had 5-7 computers and 8% had more than 7 computers in their classrooms. Of those who did have classroom computers, 78% had Internet access for all of them;18% had Internet access for some; and only 4% had no Internet access for their classroom computers. **There was a strong relationship between access to classroom computers and the frequency with which teachers implemented technology lessons**. As Figure 4 shows, 50% of teachers with 7 or more computers in their classrooms implemented technology lessons more than once a month, while only 27% of teachers with no classroom computers were able to implement that often. Conversely, even those teachers who had just one classroom computer were half as likely to say they had not implemented (17%) as those who had no classroom computers (33%). Very few teachers with 2 or more computers in the classroom reported not having implemented at all (16%).

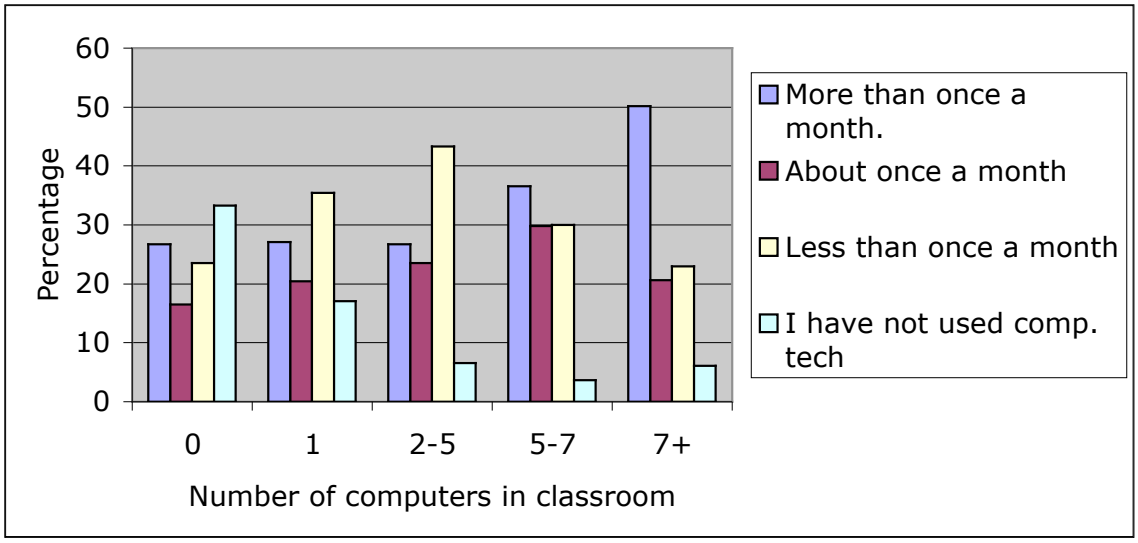

Figure 4. Frequency of implementation by classroom computer

Implementation challenges

Teachers face many challenges in their teaching that can make it difficult for them to implement technology. The Core Survey asked those teachers who had not implemented a lesson to give feedback on the reasons why they were not able to do so. Figure 5 shows what those teachers who had not implemented any new technology lesson cited as the key obstacles to technology integration. **The findings on implementation obstacles are in alignment with much of what we suggested in the introduction, namely that infrastructure, time and administrative support are some of the most influential factors in determining whether teachers can actually use technology in their teaching.** Respondents cited the following as the greatest obstacles to implementation: necessary computers were not available (64% agree or strongly agree), necessary software was not available (56% agree or strongly agree), lack of adequate planning time (58% agree or strongly agree), lack of administrative support (50% agree or strongly agree) and lack of technical/instructional support (51% agree or strongly agree). It should be noted that the items cited least often as reasons for not implementing include that respondents did not consider implementing the lesson (14%) and that it would not help them meet the learning standards they are required to meet (15%). **These findings are important, because they indicate not only that teachers are willing to implement their lessons, but that they also feel these lessons meet their teaching needs.**

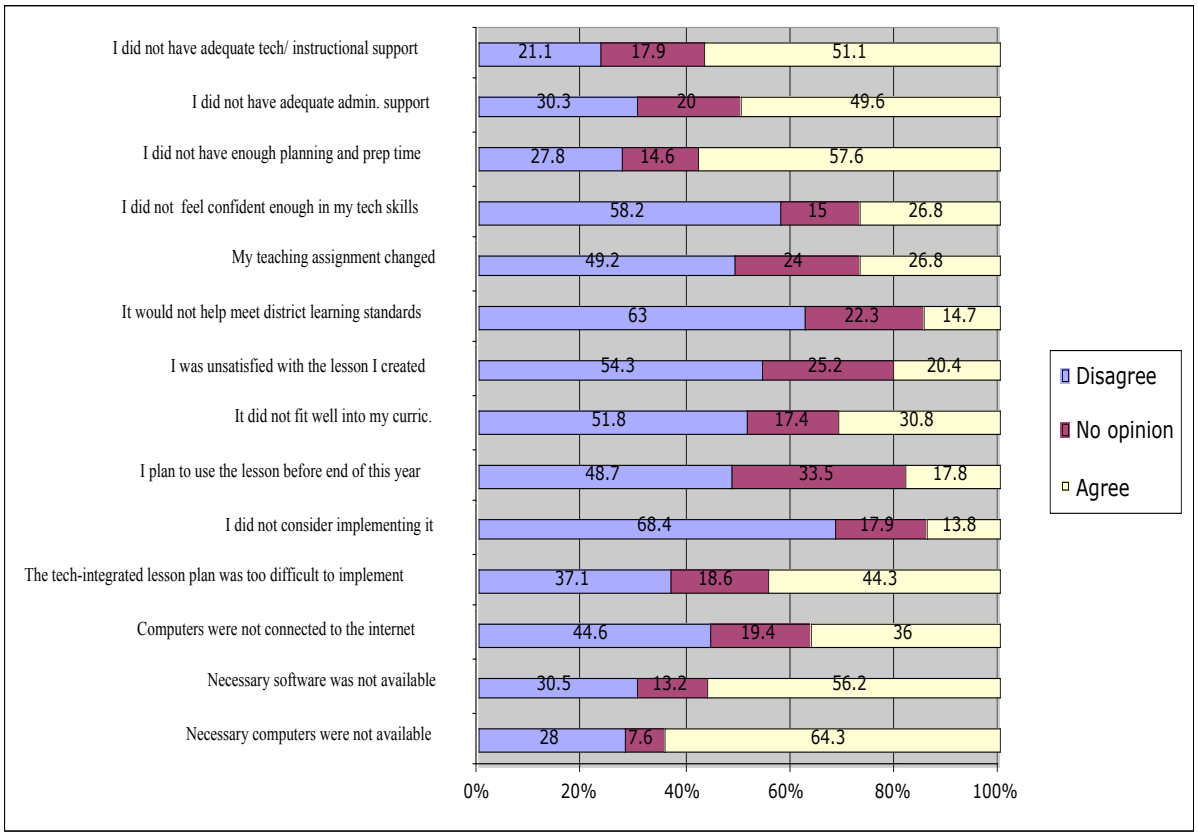

Figure 5. Reasons for not implementing technology lesson or activity

Those teachers who were able to implement a technology-integrated lesson or activity faced challenges as well. The Core Survey asked those teachers who had implemented a technology-integrated lesson to tell us about the challenges they faced in doing so (Figure 6). The challenges they cited resemble those identified by the teachers who did not implement. Access-related obstacles, such as not having enough computers available, were significant for both groups (53% of implementers strongly agree or agree that this was an obstacle, compared to 64% of non-implementers). Various items related to time constraints were also cited as problems by both sets of teachers. Sixty-four percent of respondents who had implemented agreed or strongly agreed that time constraints prevented them from completing the entire lessons, and 51% agreed or strongly agreed that it was difficult to schedule adequate time in their computer labs. Interestingly, two key challenges that non-implementers cited more often than implementers as significant obstacles were administrative and technical/pedagogical support. Fifty percent of non-implementers said they did not receive adequate administrative support, while only 29% of implementers cited lack of administrative support as an obstacle. Likewise, although 51% of non-implementers said they did not receive adequate technical/instructional support, only 32% of implementers saw this as an obstacle. **These findings suggest that administrative and technical/instructional support may be somewhat more influential in determining whether teachers are actually able to implement**

technology-integrated lessons in their teaching. Access to computers is certainly an important factor but perhaps one that can sometimes be overcome. Both groups considered lack of time a major obstacle or challenge, but may not necessarily be one that keeps them from attempting to implement new technology-rich projects.

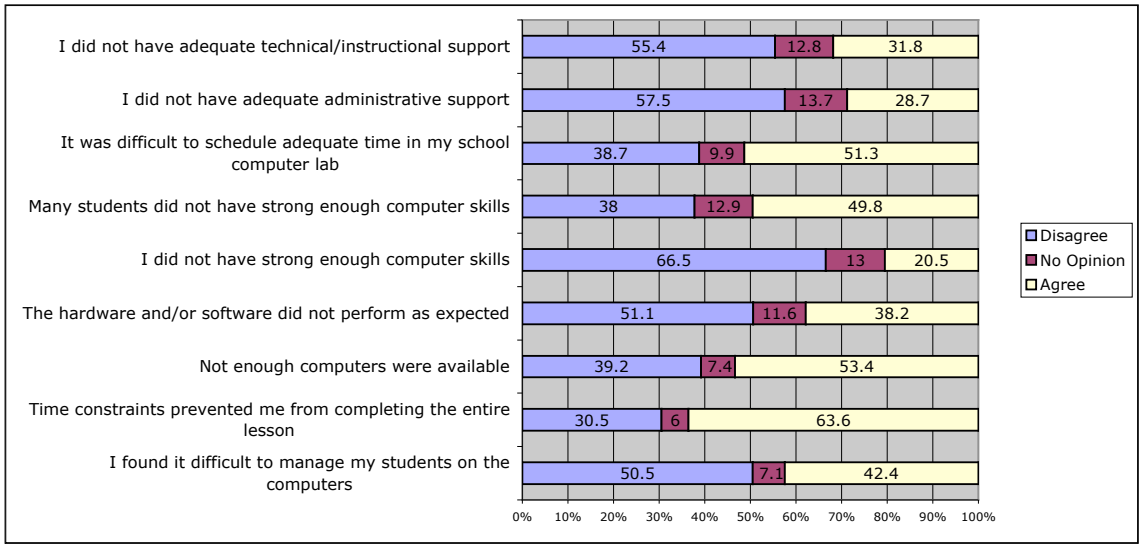

Figure 6. Obstacles faced by teachers who implemented technology lessons

Teachers' perceptions of student response to technology-integrated lessons

We also asked those teachers who did implement a new technology-integrated lesson or activity about student responses to these lessons. As Figure 7 demonstrates, across all of these questions, teachers expressed positive opinions. Respondents agreed or strongly agreed that when implementing these lessons:

- Students were more motivated and actively involved in the lesson (94%)
- Students worked together more often (85%).
- Students helped one another with the technology (86%).
- Student work showed more in-depth understanding than prior, comparable. assignments (75%).
- Student work was more creative that previous, comparable assignments (78%).

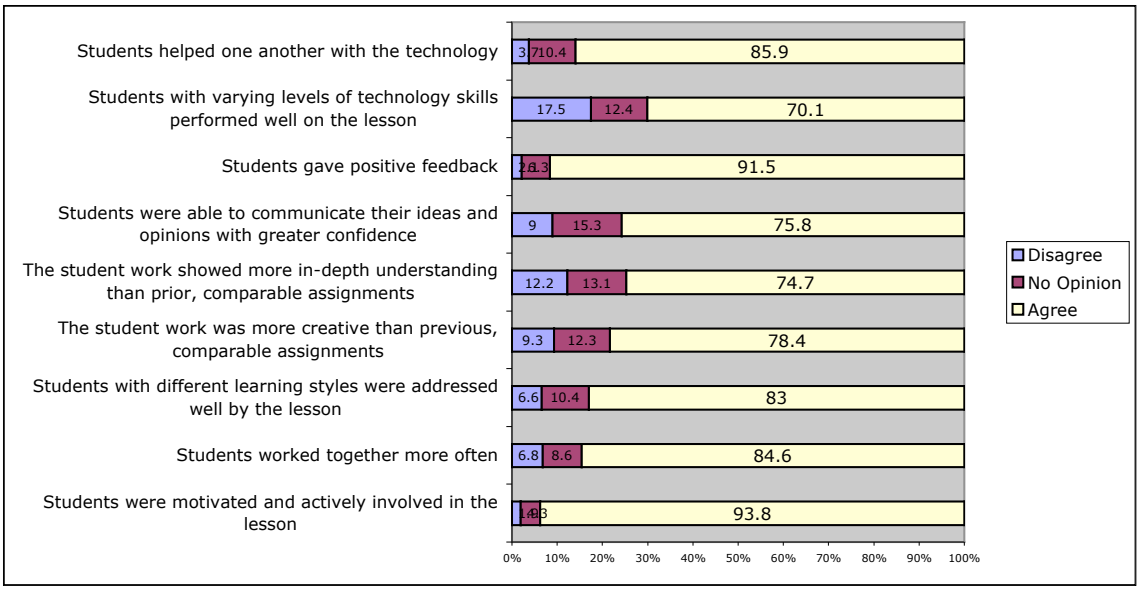

Figure 7. Student responses to the technology lessons or activities

Teacher response to pedagogical strategies presented in training

The Intel Teach to the Future training focuses on both helping teachers with technology integration and introducing participants to project-based pedagogy. We asked teachers about these elements of the program. The majority of teachers (62%) stated that it was "very true" that the program helped them understand how to integrate technology into their teaching, and 36% felt this was somewhat true. Slightly more than half (53%) of the respondents said that it was "somewhat true" that the teaching strategies presented in the training were new to them. Only 12% indicated that it was "not true at all" that the ideas were new. Slightly more than half (53%) of the respondents felt that it was "very true" that these teaching strategies were relevant to their teaching goals and 44% reported that this was "somewhat true." Only 3% felt that this was "not true at all."

We analyzed the relationship between respondents' perception of the relevance of the teaching strategies presented in the training to their teaching goals and how often they implemented their technology-integrated lesson. **We found a very positive association between the degree of relevance and the frequency of implementation**. As Figure 8 illustrates, those respondents who felt that the teaching strategies were relevant to their teaching implemented more often than those who felt they were not relevant. Almost half of the teachers who said that the teaching strategies were not relevant did not implement any technology project. More than a third of respondents who said the teaching strategies were relevant implemented more than once a month. **This finding is significant for understanding what factors motivate teachers to introduce technology into their teaching**.

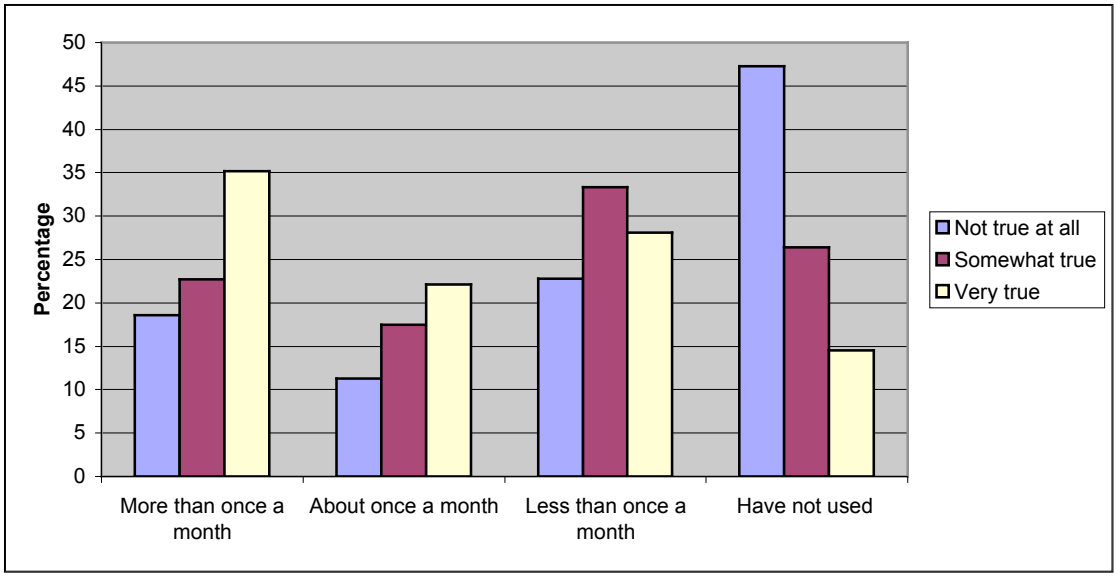

Figure 8. Frequency of implementation by relevance of teaching strategies

In order to better understand whether the program was having an impact on pedagogy, we asked teachers whether they engaged in certain teaching practices more often, less often, or the same amount after they had completed the training. **The responses given by teachers to this question about change in teaching practice suggest that teachers are moving through the initial stages of technology use common among educators.** Often teachers must first integrate technology into their familiar forms of teaching before they can begin attempting more innovative pedagogy. Figure 9 shows that these teachers were presenting to their students using technology (61%), conducting research on the Internet (63%), and accessing Internet resources for lesson planning (63%) more often since the training. Slightly fewer reported engaging more often in those forms of pedagogy more closely associated with project-based learning, such as using rubrics for evaluating student work (47%) and using essential questions to structure lessons (51%). It is notable that the only teaching practice that a considerable number (24%) of teachers indicate they do less often after the training is use a textbook as a primary guide for instruction.

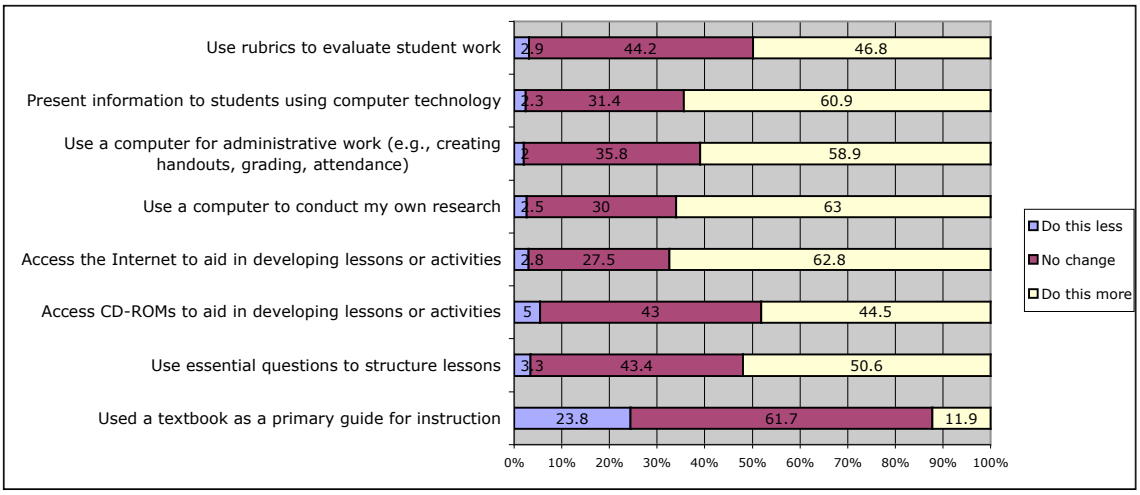

Figure 9. Change in teaching practices

We also wanted to understand what kind of learning opportunities teachers were offering students after they had completed the training (Figure 10). On most of the items, teacher responses were closely split between "no change" and "do this more often," which is quite significant given the difficulty many teachers have in changing their practice, especially in such a short span of time. The items for which more teachers said they "do this more often" than "no change" include having students work on computers to do lessons or activities during their class time, asking students to use computers in non-school settings (home, library, Internet café), having students engage in independent research on the Internet, and having students present to the class. As with the previous question, for the most part, these items represent the more familiar forms of teaching than some of the other items, such as having students review and revise their own work, and allowing them to choose their own research topics. **Again, these findings suggest that teachers are moving through the initial stages of growing comfortable with technology use.** It should be noted, though, that a fairly large number of teachers (from 32-44%) do report doing the less traditional activities more often since the training.

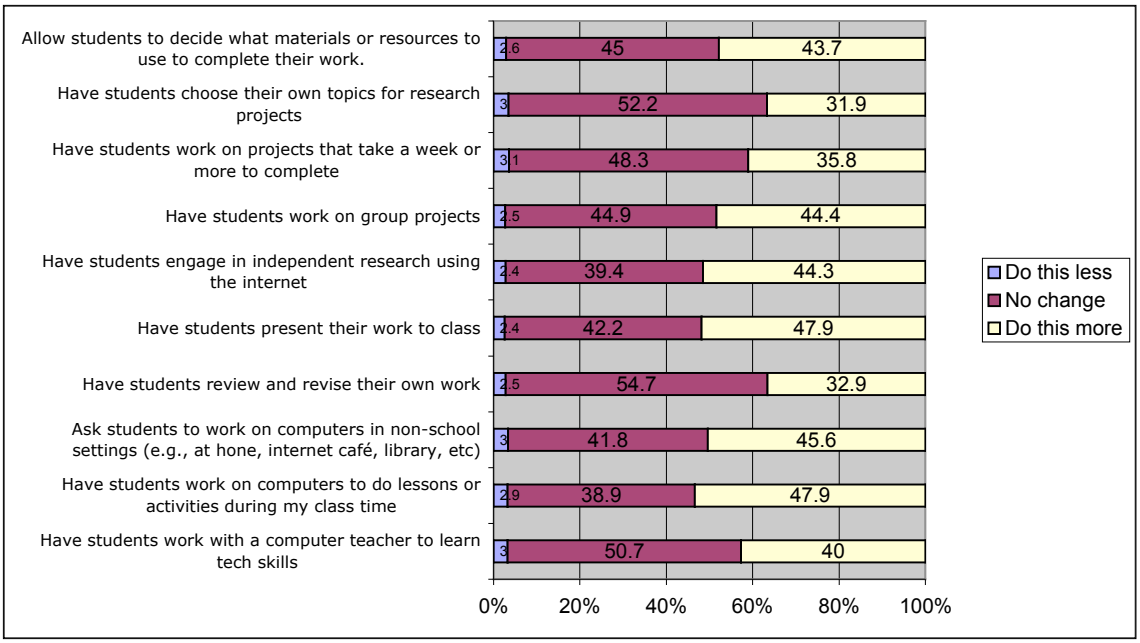

Figure 10. Change in student activities

Summary of Core Survey findings

The overall findings from this initial analysis of Core Survey data from four countries suggests that Intel Teach to the Future is having a notable impact on teachers' use of ICT in their classrooms. The program is encouraging a substantial number of teachers to experiment with new pedagogical strategies. When asked to respond to specific items related to the kinds of teaching and learning taking place in their classrooms since the training, for the most part, teachers responded very positively. For example, a majority of teachers reported that students were engaged in and motivated by the ICT projects, students worked together and helped one another, students' work showed greater creativity and in-depth understanding and students' different learning styles were addressed by these projects. On questions about how they are using ICT to support their instructional practices and the activities and opportunities they offer their students, the survey findings indicate that majorities of teachers are moving through the initial phases of technology integration by using ICT to support more familiar forms of teaching, and relatively large minorities are experimenting with more substantial forms of project-based pedagogy.

The data are also consistent with our conceptual framework, presented in the introduction, which identifies the key factors that teachers report as challenges or obstacles to implementing new ICT projects, such as inadequate infrastructure, lack of administrative or other kinds support (such as technical and instructional) and time constraints. There was a clear relationship between teachers' access to technology, both computer labs and classroom computers, and the frequency of implementation. There was also an equally clear, and perhaps even more interesting, relationship between the frequency of implementation and whether respondents felt the teaching methods presented in the training were relevant to their teaching goals. These findings provide a

useful overview of teachers' experiences with and responses to the program. Additional evaluations, particularly those that make use of qualitative methods, such as focus groups and case studies, will provide more in-depth data that will allow us to better understand many of the issues raised here.

Themes Identified across Countries

As we noted in the introduction, the research in educational technology has indicated that there are four main factors that facilitate effective technology integration in classrooms. These factors are infrastructure, professional development, administrative support and time. Because the key goal of the Intel Teach to the Future program is the improvement of education through the use of project-based ICT in the classroom, we will use these factors to provide a conceptual framework for our findings from evaluation activities to date. Following are some of the major themes we have derived through our analysis of data from a range of sources: the U.S. program evaluation, the evaluation reports submitted by the other countries participating in the program, the Core Survey data, our conversations with program staff and external evaluators, and our site visits to Russia, Mexico, India and China. As we explore these themes, we also include preliminary recommendations for addressing issues related to these themes. Some of these recommendations are programmatic, but many are for evaluation activities that could be used to explore these themes more extensively.

Infrastructure

Having an adequate technological infrastructure is essential for teachers to be able to integrate ICT into their teaching. However, there is no definitive definition of what constitutes "adequate" technical infrastructure. The countries, regions and schools that Intel Teach to the Future reaches are incredibly diverse, with a wide range of ICT capacities. In some cases, teachers in schools that have what might be considered inadequate ICT resources are able to find creative ways of implementing technology-enhanced projects. Likewise, teachers in schools that would, by most standards, be considered technology-rich environments may have difficulty implementing technology-integrated lessons for a host of other reasons.

We recognize that Intel Teach to the Future does not have the resources to build up the technical infrastructures of all of the schools it serves worldwide. However, issues of infrastructure can be addressed by the program and the evaluation of the program, so that limited access to technology does not have to become an insurmountable obstacle and so successful strategies for circumventing infrastructure limitations can be shared with the Intel Teach to the Future community and the larger educational community as a whole.

Explicit guidance in coping with resource limitations

A review of the evaluations that have been conducted thus far of the Intel Teach to the Future program indicates that nearly all teachers are concerned about resource and Internet access limitations, from teachers in South African townships who have to bring their students to a community center to use computers to U.S. teachers with multiple computers in their classrooms. One of the implicit goals of Intel Teach to the Future is to empower teachers to see themselves as capable technology users. One way to create this sense of empowerment is help teachers understand how they can work successfully within the technological constraints they encounter.

Teachers represented in the various evaluations that have been conducted, especially in the programs that are in the early stages, have expressed concern that they will be

unable to make use of the skills and knowledge they may gain from the training because of their limited technical resources. Initial communication about the program and the communication that occurs during trainings may not be explicit enough in articulating that Intel Teach to the Future is designed to help teachers integrate project-based ICT curriculum *within the given ICT environments in which they work.* Although the training currently touches on infrastructure conditions of the participants, it could more directly acknowledge the specific kinds of access participants have and provide examples of how teachers around the world have learned how to deal with a wide array of situations.

One consistent issue that program staff in the countries we have visited have raised is the issue of the digital divide, particularly as it pertains to urban and rural areas. In countries such as Russia, Mexico and China, the inequalities in infrastructure between urban schools and rural schools are extreme, and can seem on the surface to create obstacles impossible for teachers to overcome. These countries and others with similar challenges could use their evaluations to focus on schools and regions with particularly challenging infrastructure conditions. By designing targeted case studies that explore how Intel Teach to the Future participants deal with the limited ICT environments in which many of them work, these studies could provide useful information that would allow program staff worldwide to better understand the needs of participants and construct realistic expectations among themselves, Master Teachers (MTs) and Participating Teachers (PTs) of what the program can achieve.

Showcasing/investigating creative implementations

Many of the Intel Teach to the Future programs around the world, and the overall Intel Teach to the Future program, have made a point of showcasing teachers who create innovative, project-based ICT lessons and activities. By highlighting examples on the Intel Teach to the Future website, and offering awards to teachers in some countries, the program has sought to reward teacher innovation. However, there are many ways to conceptualize innovation and creativity. For teachers working under challenging infrastructure conditions, simply implementing their unit plans once a year is an impressive achievement. In order to explicitly address and acknowledge the infrastructure conditions teachers experience, the worldwide program and the specific country programs could begin to recognize creative, innovative implementation solutions as well as innovative projects in their award programs and on the Intel Teach to the Future web site. These examples would focus on how teachers learn to cope with challenges in order to bring their new skills and knowledge into their classrooms. By collecting these stories for the web site and through the awards programs, program staff, senior trainers and Master Teachers would have a resource to draw upon for helping new participants conceptualize implementation and see what it looks like in a diverse array of classrooms.

Professional Development

As we stated in the introduction, the main factor in successful ICT integration that Intel Teach to the Future addresses is, obviously, professional development. Through nearly every means by which we have been able to analyze the program (surveys, site visits, the U.S. evaluations, evaluation reports from the different countries) teachers have been overwhelmingly positive about the training they receive through this program. They

are equally positive about their experiences in the classrooms when they begin to implement the project-based pedagogy and ICT curricula they learn about and develop in the training. The themes we explore below are ways in which programs either have or could supplement the basic professional development to potentially enhance the program's impact.

Master Teacher follow-up and support

Master Teachers are the key to sustainable impact for Intel Teach to the Future. MTs throughout the world serve as the conduits for communication between program staff and participant teachers, and are the best resource for identifying the needs of teachers and tailoring program activities to support them in their efforts. For this reason, it is likely that programs that include strategies for keeping MTs involved and invested in Intel Teach to the Future will meet with greater success. Programs in some countries, such as India, are making deliberate efforts to provide ongoing professional development and support to their MTs. The data from surveys and interviews with MTs indicate that they feel that one of the best things about the Intel Teach to the Future is that it gives them an opportunity to collaborate with peers. Creating ongoing opportunities for MTs to meet with and learn from each other is likely to be welcomed. In addition, because MTs are the people who will be in charge of delivering further professional development to participant teachers, their skills must be updated on a regular basis. Because many country programs do not have any systematic plans for MT follow-up and support, documenting the activities of the MTs groups in India and tracking the kinds of support MTs can then offer teachers as a result would make the benefits of including MT follow-up more evident for other education managers as they develop the programs in their own countries.

Guiding students in analyzing, synthesizing, and presenting information effectively

Feedback from teachers in various countries has suggested that teachers need additional guidance in helping students make effective use of information resources. Although teachers observe that students are very engaged in project-based ICT lessons, they are concerned that students are not always capable of analyzing and synthesizing the information they access or of presenting their work in ways that show that they really understand the material. Many teachers are not accustomed to having their students working with a wide variety of information resources or with evaluating student ICT products, so introducing students to the idea of "media literacy" or "information literacy" may not be in their instructional repertoire. However, there has been a good deal of research and curriculum development in this area that could be used in follow-up trainings for MTs and PTs, or which at least could be made available on the Intel Teach to the Future web site for teachers to access.

Administrative support

One factor in the ICT implementation equation that the Intel Teach to the Future program has not addressed fully is administrative support. This may be due in part to the fact that the program was developed in the U.S. Although administrative support is certainly a significant factor in the success of ICT implementation in U.S. schools (much

of the research on which we base this conceptual framework was conducted in the U.S., and EDC's own research has focused on the importance of administrative support), U.S. teachers, relatively speaking, may have greater flexibility in integrating innovative projects than teachers in other countries (although this may be less true today than it has been over the last decade). In addition, greater access to technology in the U.S. and other developed countries may make administrative support less crucial, since teachers with classroom computers or regular access to computer labs may not be as reliant on administrators to give them opportunities to implement their projects. However, even in the U.S. evaluation of Intel Teach to the Future we found that administrative support contributed to the sustainability and institutionalization of program goals.

Because Intel Teach to the Future is committed to adapting its program to meet the local needs of all of the countries it serves, it is essential for program design and evaluation to reflect the relative importance of administrative support in the success of ICT implementation. Some programs (such as those in Pakistan and India) have already established mechanisms that address administrative support. Below we describe how these developments can be investigated and built upon.

Administrator workshops

In our visits to different countries, especially in China and India, we observed that the program was having a notable impact in those schools that had strong leadership and support from the principal. Administrators in these schools helped establish for teachers the conditions that could allow for sustained impact, such as designating time in the school day for teachers to plan for technology integration. The India program has started mandating that administrators in schools participating in Intel Teach to the Future attend workshops about the program. Case studies focused on these workshops and on the ensuing activities of administrators who participate could prove a rich resource for information about how to educate administrators so that they are invested in the program and in the effective use of ICT for teaching and learning.

Enhancement of administrator workshops

Evaluations conducted by EDC of other technology professional development programs have found that administrators have very different needs from teachers when it comes to technology professional development. Just as the Intel Teach to the Future program addresses issues of significance to teachers in order to make the training relevant and useful, administrator professional development must also directly address issues that are important and relevant to them. It may not be particularly useful for administrators to participate in the same training in which teachers participate. Rather, administrator workshops could focus on what good technology integration looks like, how to use technology tools to accomplish administrative goals, such as developing technology plans, accessing information for school improvement, and creating effective presentations for staff meetings or for reporting to education officials.

Hierarchal evaluation

Schools are dynamic and complex organizations made up of interrelated components and levels. It is essential to take into consideration the interactions among these

components. Administrative support requires that many actors at different levels of the educational community work together to build supportive environments for teachers. In order to examine the complexities of this issue, an evaluation can take a "systems approach." This means that evaluators must look into multiple levels of the education system to understand how certain decisions have an impact on local administrative and teaching practice, and conversely how local teaching and administrative practices may influence higher-level decision-making. For example, in India changes are being made to the national exams that will make it more desirable for teachers to use project-based learning in their teaching. This may be one of the reasons why many schools have embraced Intel Teach to the Future. By undertaking a multi-level evaluation, programs may be better able to understand the local, regional and national context in which their program is situated, how aspects of that context affect the program, and how the program may be helping to shape the context.

Time

Not only is time identified in the research literature as a significant factor in the successful integration of ICT in education, but data from surveys, interviews and focus groups conducted in evaluations of this program indicate that time constraints present significant obstacles to Intel Teach to the Future participants. On the surface, time constraints may appear to be an obstacle that a program such as Intel Teach to the Future cannot be expected to overcome. Obviously, Intel Teach to the Future cannot generate more time in the day for teachers. However, the evaluation conducted of the program reveals that there are, in fact, ways to address the issue of time in the program design, and additional evaluation could shed even more light on ways in which programs in different countries are attempting to deal with time constraints.

School-based Master Teachers

As we learned in the U.S. evaluation, MTs can be an invaluable resource for participant teachers working in the same school. Often, the reason teachers are unable to find the time to implement project-based ICT is because they do not have the necessary support for planning and for dealing with technical problems. Administrative support can help alleviate time pressure if principals designate time in the school day or week for teachers to plan their ICT-enhanced lessons, but having the support of school-based MTs can also help teachers utilize time more effectively by providing technical and pedagogical assistance when they need it. The India program requires that all schools that participate in the program have school-based MTs. A focused case study on the ways in which these MTs assist their peers and help create supportive communities by, for example, offering ongoing training or collaborative groups, could provide information about the effectiveness of this program design.

Incentives

Not only do teachers find it difficult to have time to implement their Intel Teach to the Future units, but they also have difficulty finding time to participate in the program. The time commitment required of MTs is even more onerous than the significant commitment required for PTs. Data from evaluations of this program suggest that

incentives for PTs and MTs are essential to the success of the program, especially when the program is just beginning. PTs and MTs in countries such as the U.S., Russia and South Africa have observed that the training is very time consuming, and there is little reason why they would be involved with the program without specific incentives for them. Relying on teachers' interest in technology and improving their skills is not enough. In some cases, it is difficult for teachers to attend trainings because of transportation problems and family commitments. In mature programs, MTs and PTs come to see the value of the training, the methods and the use of technology, but this is not self-evident from the start. Once aspects of the program become institutionalized within schools, incentives may be less necessary, but this will not happen unless there is a critical mass of MTs and PTs who complete the program and are committed to its goals.

Evaluation issues

The themes explored above are related to the theoretical framework based on the research literature. Below, we look at some specific issues related to the evaluations that are taking place or may take place worldwide and offer some recommendations specific to these evaluations.

Core survey

A standardized survey is an important mechanism for gathering consistent data from Intel Teach to the Future participants all over the world. However, there are some technical challenges related to the Core Survey that will need to be resolved. After initial delivery of these data, three key issues have come to light:

1. It has become apparent that keeping the Core Survey questions as intact as possible, and only changing the order when absolutely necessary, is crucial to efficient and successful reporting and analysis. For example, there are certain questions that are related to other questions and ask for respondents to skip questions based on their responses. The data will not be comparable if respondents are not given the same instructions for skipping to different questions, so these questions can not be moved to different areas of the survey.
2. Some of the evaluators and education managers are not aware of the Core Survey data entry form. This document was part of the overall Core Survey package, along with the formatted and unformatted Core Survey and the Coding Key, but apparently some program staff either did not receive all of these materials or were not adequately informed of their purpose. Communication about the materials and processes required for the worldwide evaluation is in need of improvement. We will use the Education Summit as an opportunity to clarify the materials and processes related to the Core Survey administration, data collection and reporting.
3. The process of designing and distributing the survey, providing feedback and receiving and analyzing the data has made it clear that it would be most efficient for us to be in direct contact with the evaluators when discussing technical aspects of the evaluation and the instrumentation. Although we realize that language issues may make this difficult, whenever possible, it would be beneficial for us to communicate directly with evaluators so that the process of instrument development, analysis and reporting can be streamlined.

Case studies

After reviewing a number of the evaluation plans set forth by different evaluation agencies, we observed that when the plan calls for qualitative methods, the selection of case study schools is usually focused on finding schools that are representative (demographically, geographically, socio-economically) of the whole population of participating schools. This is not a problem in itself, but representativeness is not the only valid criteria for selecting schools for case studies. We need to encourage program staff and evaluators to be creative about school or district/region selection and consider sampling strategies that are most appropriate to the questions they seek to answer. Because of limited resources, the case studies should be designed to collect the information that is most relevant for learning about and improving the program. Program staff need to think about the key goals of their particular program and investigate those cases that are best suited to provided them with data about whether those goals are being achieved. For example, if one of the main goals of Intel Teach to the Future in a certain country is to help provide more girls with the opportunity to make use of technology in education, then case studies could focus specifically on what is happening in girls' schools that have a significant number of Intel Teach to the Future trained teachers. If one of the goals of the program is to help close the digital divide between students in urban and rural areas, contrasting case studies could be conducted at a rural school with very limited access to technology and an urban school with greater access. These kinds of cases may not be representative of the schools in general that are being reached, but they may be important to target for case studies because they can highlight issues that might not arise at other schools.

Pre-service survey

Program staff and evaluators from a number of countries have expressed the desire to have a standardized pre-service survey, much like the end-of-training and Core Surveys. Currently there is no systematic way to look at the pre-service program, nor is the pre-service program defined uniformly across all countries. Education managers and evaluators would appreciate receiving instruments for use in evaluating the pre-service component. The development of such as instrument would rely heavily on the involvement of evaluators, program staff and perhaps faculty in programs around the world, because the existing instrumentation developed for looking at pre-service in the U.S. is in need of refinement and, regardless, would not be appropriate for many of the other pre-service programs.

Documentation of program designs

Short of direct local observation, probably the richest source of information about the Intel Teach to the Future program comes from the program staff. Staff members have first-hand knowledge of the kinds of challenges the program faces in a variety of environments, and techniques that have been used to solve those problems. Although there is copious documentation in various forms about the program, we are not aware of any systematic process for capturing the knowledge that program staff have acquired and using it for program improvement, staff professional development and contributing to the

knowledge base. We believe that systematic documentation and analysis of how the program has evolved would provide a valuable resource for program staff and the research community in general. This kind of evaluation would involve the use of a standardized protocol and survey that would investigate issues of adaptation and implementation.

Establishing realistic and meaningful criteria for success

After visiting a number of countries and reviewing evaluation findings from additional countries, it seems that it would be beneficial to start a conversation among program staff about how to define overall success, criteria for success, and specific indicators of success in ways that allow for meaningful and realistic evaluation of the program. As we discovered in the U.S. evaluation, much of the real impact of the program is in its ability to facilitate small but important developmental steps toward technology integration and to promote reflection on technology use among large numbers of participants, rather than radical transformations. When both proximal (near) and distal (far) indicators of success are identified, evaluations can be designed so that subtle and gradual transitions can be captured.

The examples of teacher and student work presented to us during our site visits and the projects granted awards and space on the Intel Teach to the Future web site are impressive. Intel Teach to the Future staff should certainly use their evaluations to understand the conditions that need to be put in place to support this kind of work. However, exemplary projects are not the only manifestations of program success, and may not even be the best way to illustrate the true breadth of the accomplishments of Intel Teach to the Future. Highly informative evaluations can be designed that explore the gradual process of change that may not always involve the most striking achievements, but can shed light on the range of positive experiences Intel Teach to the Future trained teachers are having in their schools and classrooms.

Country Evaluation Summaries

Over the past nine months we have been in communication with most of the education managers responsible for implementing Intel Teach to the Future. As we noted above, the various countries are at different stages of program implementation and evaluation. Below we provide brief summaries describing the evaluations plans, materials, and, in some cases, findings for the twenty countries from which we have received information.

Asia

Pakistan

AC Nielsen is conducting the Intel Teach to the Future evaluation in Pakistan. The evaluation design includes both quantitative and qualitative methods. The quantitative methods include two end-of-training surveys and the Core Survey. Pakistan has regularly submitted its end-of-training survey data to EDC each quarter. The Core Survey will be administered face-to-face to 330 Master Teachers. The qualitative methods involve a series of three focus groups with eight Master Teachers, which have been completed.

The key findings from the focus groups in Pakistan reveal that many of these MTs had no prior experience with technology, and even those who did had not used it in their teaching. They responded positively toward their training. In particular, they liked the methodologies presented, the idea of using technology as an educational tool, the fact that the training was "hands-on" and practice-based, and the opportunity to collaborate with their peers. In particular, they noted that the ideas conveyed in the training could help with creating presentations for classroom teaching, for student assessment, for providing additional opportunities for weaker students to review the material, and for encouraging students to conduct independent research and share information. They also felt that the skills they learned would help them with various administrative and instructional tasks, such as researching and preparing materials for instruction and maintaining student records. Their major complaints about the course were related to time. They suggested that it would help if they could be released from their classes in order to participate in the trainings. They suggested that the training would be strengthened if it provided subject-specific information about integrating ICT. They also suggested the program would be strengthened if there were some instruction regarding the hardware as well as the software because teachers are often faced with hardware problems that they do not know how to resolve. The obstacles they cited included lack of technical resources, lack of time designated in the school day for ICT use, and lack of administrative support (particularly in government schools). When asked about the resources they would like made available on the Intel web site, they suggested subject-specific materials, lesson plans from other teachers, a directory of other teachers in the program, a technical support areas for addressing technical problems, links to useful research and information about new Intel workshops.

China

The evaluation of China's Intel Teach to the Future program has been conducted over the past year by the Ministry of Education. There are a number of components to the evaluation in China. First, the MOE administers both the end-of-training survey and Core Survey, with an additional 2 questions of specific interest to China's program staff. China has just completed the Core Survey data collection, and will be submitting these data to EDC by the end of December. The second component of the China evaluation is more formative in nature. Program staff make visits to schools in various provinces and regions and use a standard protocol to document the program activities taking place. These visits also include interviews with the local RTA leader and forum discussions with MTs. The China Intel Teach to the Future evaluation also has principal and student surveys that gather feedback on the program from these groups, a self-evaluation form for MTs, and a "best unit plan" award program, which enables the program staff to collect examples of exemplary teacher work. The Core Survey administration and data collection were just completed by the MOE. These data are now being analyzed.

India

The evaluation of the Intel Teach to the Future program in India is being conducted by IMRB. So far the evaluation is comprised primarily of three different surveys. The first is the EDC end-of-training survey, which India administers regularly. The second survey is the EDC Core Survey plus many additional questions, some of which are open-ended, others of which ask for demographic data, and still others that probe teachers on aspects of their teaching environment. The third survey is one given to principals in participating schools. This gathers demographic information, information related to school infrastructure, teacher responses to the program, and principals' reactions to the program. Like the teacher survey, this includes both open-ended and closed questions.

The findings from the principal survey indicate that there is a high level of support for Intel Teach to the Future. Principals give high ratings to the quality of the program, and report that ICT usage has increased in their schools, although this increase is higher in urban regions than rural ones. Principals feel that the program is relevant to and can help improve the quality of education. Again, these responses are higher among urban principals. The challenges they identified included problems with technology access and time to implement the new projects. Access to the Internet is particularly low in rural areas, with only 26% of rural teachers able to access the Internet, and 19% of students.

The findings from the teacher survey indicate that there is a high level of satisfaction with the program, and that teachers' use of ICT has increased. In addition, teachers have very positive responses to the pedagogical as well as the ICT elements of the program, particularly collaboration among students, students presenting their work to their peers and students conducting independent research with the use of ICT. The survey indicated that the teaching strategies presented in the training were both new and relevant to large majorities of the teachers (from 85%-95%). Nearly all teachers felt that student were more motivated and engaged when using ICT in the classroom (96% in urban areas and 98% in rural areas). The problems identified with successful implementation by all teachers included lack of time for implementation, students' poor computer skills and the fact that all of the materials were in English. In rural areas, teachers also cited lack of

access to technology as a significant obstacle. Teachers in both urban and rural areas indicated that they received support from their principals in the use of ICT.

Philippines

SEAMEO INNOTECH is conducting the evaluation in the Philippines. This evaluation consists of the Core Survey with additional questions, including open-ended questions. Most of the respondents to this survey were MTs. We will be receiving the raw data from this survey soon, and will integrate it with the data from the other countries.

The findings from this survey indicate that MTs rated their computer skills more highly after they completed the training and that their frequency of computer use increased after the training. The survey data also reveal that roughly a third of the respondents made use of their manuals and CDs more than 10 times since the training. Fifty-six percent of the teachers said that they implemented technology lessons with their students at least once a month. Large percentages were highly positive about students responses to their ICT projects: 86% said that the students were motivated and engaged in the work; 86% said that the students helped each other; and 80% said that student work was more creative when they participated in their new technology-integrated projects. Most of the respondents (75%) felt that the teaching methods presented in their training were relevant to their teaching goals. They also reported using many of these teaching strategies in their teaching, such as using essential questions to structure lessons (68%), having students work in groups (64%) and allowing students to conduct their own research (61%). When asked how they would improve upon the program, respondents mentioned finding time within the school day for the training, providing follow-up training, and providing teachers with examples of work creating by fellow Intel Teach to the Future teachers.

Australia

We have a proposal from the Consulting and Development Unit of the Faculty of Education at Deakin University to conduct the evaluation of Intel Teach to the Future in Australia. The proposed work will focus on the states of New South Wales and Victoria and will be both formative and summative. Deakin proposes seven stages of work.

Stage 1- Information Gathering: Clarification and information gathering; and collection of MT baseline data.

Stage 2 – Senior Trainer/Master Trainer Program: Observation of the ST/MT program; information gathering from the senior trainers; and administration of the post training MT survey.

Stage 3 - Master Trainer/Participant Teacher Training: Observation of selected training (four case studies); administration of post training PT survey; interviews with MT (4 case studies – Victoria and 3 case studies – NSW); classroom observation/student discussions; interviews with principals (4 case studies – Victoria and 3 case studies - NSW); interviews with regional/district personnel (4 case studies – Victoria and 3 case studies – NSW); and ongoing communication (case studies).

Stage 4 – Final MT Core Survey.

Stage 5 - Attendance at MT Workshop (Victoria and NSW)

Stage 6 - Final PT Core Survey

Stage 7 – Final Report

The proposal also includes detailed plans for sampling, data analysis, and reporting.

Thailand

Thailand's program and evaluation are in their infancies. The Thailand Education Development Alliance (TEDA) has submitted a proposal to conduct the evaluation of Intel Teach to the Future, focusing on four major activities: (1) data collection and analysis of schools status; (2) observation of the ST-MT and MT-PT training to collect data and better understand the curriculum; (3) end-of half-year evaluation; and (4) compilation, data analysis and recommendations. Grounded in current educational theory and the status of schools in Thailand, TEDA is proposing a formative evaluation that will provide constructive feedback to the program for better integration into the schools of Thailand.

The proposal seems well grounded in current theory and knowledge of the educational system. TEDA distinguishes between traditional and reformed educational practices. They discuss challenges to using technology, current practices, and how Intel Teach to the Future is likely to contribute.

TEDA plans to begin with analysis and data collection of school status, initial site visits, and a study of the curriculum. They then will observe MT-PT training, followed by the end-of-half-year evaluation. They have included a detailed sampling plan as well as a data analysis plan for both qualitative and quantitative data.

South Korea

Researchers from the Chunchon National University of Education are conducting the evaluation in South Korea. This year the evaluation has focused primarily on the administration of the Core Survey, which has nine additional questions (including an open-ended question) and 4 additional options within questions from the Core Survey. The administration of the survey will be web-based. We expect to receive Core Survey data from South Korea at the end of December. The South Korea evaluation also utilizes the end-of-training survey, and we regularly receive these data from South Korea.

Japan

Nikkei Research is conducting the evaluation of Intel Teach to the Future in Japan. The evaluation currently consists of the Core Survey and the end-of-training survey. We regularly receive end-of-training data from Japan, and we recently received the Core Survey data from Japan, so we were able to include these in our analysis reported here.

The Core Survey data show that about one quarter of the respondents report implementing a new technology lesson more than once a month, 15% have done so about

once a month, 26% implement less than once a month; and about one third have not implemented a new technology lesson. Ninety-nine percent of teachers report having access to a computer lab, and 99% of these have Internet access. However, the vast majority (84%) do not have classroom computers. There were few teachers who said it was "not true at all" that the teaching strategies presented in the training were relevant to their teaching goals. However, only 21% said that this was "very true." The obstacles more teachers who did not implement identified as the reasons for this were related to time constraints rather than infrastructure issues. However, interestingly, lack of access to technology was one of the most commonly cited obstacles among those who had implemented.

Taiwan

Researchers from the National Taiwan Normal University are conducting the evaluation in Taiwan. This year the evaluation consisted of the end-of-training survey and the Core Survey. We receive quarterly end-of-training data from Taiwan. In addition, we received the Core Survey data from Taiwan and were able to use those in the analysis here in this report.

The Taiwan Core Survey includes 12 additional questions. The findings from these additional questions indicate that nearly all of the respondents (94%) report that the reason that chose to participate in the training was to learn how to integrate technology into their teaching. Most teachers (90%) have access to computer labs and nearly all of these (99%) have Internet access. However, half of the teachers have no classroom computers, and 43% have only one computer in their classroom. A little over half of the teachers stated that they implemented part of their unit plans; 38% said they did not implement them at all. Twenty-eight percent stated that they did not implement any new technology project.

The items most teachers agreed were obstacles to implementation included lack of access to hardware and software, time constraints and lack of administrative and technical/instructional support. Most of the teachers who responded (81%) to the survey do not work in a school with a MT. Over half of the respondents reported that they discuss technology with their peers more often since the training, and they assist their peers more often with technology integration.

EMEA

South Africa

Neil Butcher and Associates are conducting the evaluation of Intel Teach to the Future in South Africa. The South Africa evaluation is happening in two stages. The first stage of the evaluation, which focuses on implementation, has already taken place, and the report was submitted. This report presented findings from initial site visits to 8 schools in 3 provinces. The 2004 evaluation plan calls for a second visit to each of these schools, as well as regular phone interviews with the facilitators (Master Teachers) to receive updates on the program implementation. The evaluation also includes administration of the end-of-training survey and Core Surveys, which will begin in 2004.

Findings from the initial case studies show, first of all, the diversity of school environments in which the program is being implanted—from a group of rural schools whose only access to computers is at a community center to a well-resourced private urban school. Because this initial visit was conducted before teachers had been able to participate very much in the training, it reflected the expectations that teachers had of the program, and their apprehensions. Many felt that this training was providing an essential service to their teaching communities, but they were concerned that their skills and the resources available to them would not be adequate for them to take full advantage of the training. Even teachers in the well-resourced school, who noted that they have quite a large number of computers expressed concern that they rarely have the time to use them. Of particular concern to both participant teachers and facilitators was the lack of incentives for participating in and delivering the training. It is very difficult for some of these teachers to attend trainings because of lack of transportation. Because the training is so time-intensive, many felt that without incentive participation would be limited and inconsistent even among teachers with the desire to learn ICT skills. A number of teachers also felt that the curriculum lacked enough locally relevant examples and was too oriented toward American teachers and the American education system and . Many stated that the materials provided by the program, such as the CD-ROM, were very useful.

Germany

The Intel Teach to the Future evaluation in Germany, conducted by researchers from Dillingham University, has been going on for a number of years. Evaluators working with program staff in Germany developed and administered their own survey for the past two years, and have reported their findings each year to EDC and Intel. These surveys provide information about the teachers participating in the program, their technology skills, their access to technology in their schools, and their reactions to the pedagogical and technological aspects of the training. They have recently translated both the Core Survey and the end-of-training survey into German and have submitted drafts of these to EDC. The evaluators will begin administering these in 2004. The German evaluation also includes an evaluation of its pilot online training program

The findings from the survey conducted in Germany indicate that the teachers participating in the training have a fair amount of experience with technology, and nearly all of them have home computers. Most do not have classroom computers, but they do have access to computer labs. More than half of the respondents reported that although the education system did offer ICT training in their areas, it was not enough, and that they did not feel these trainings were tailored to provide them with appropriate pedagogical support for implementing ICT in their teaching. A large majority had favorable opinions of the quality of their Intel Teach to the Future Master Teacher and the overall Intel Teach to the Future curriculum. Ninety percent of teachers said that they would enroll in the course again. Teachers reported higher skill levels after the training. A large percentage (89%) felt that the training would encourage them to integrate technology more in their teaching, and 70% claimed that they were motivated to change their teaching practice after the training was completed.

Russia

The Russian evaluation is very comprehensive, covering many aspects of the program. The evaluation team comes from an organization called RELARN, a group of educational specialists. They have conducted their own surveys. Participant teachers and Master Tutors are given surveys at the beginning and end of their training. The evaluators in charge of administering the surveys also attend training sessions and interview Master Tutors and Participant Teachers. One of the evaluators also uses electronic communication with participants to collect the stories about teachers' experiences implementing their new materials. There is also a self-examination survey for staff who run the various training centers. The evaluation group is also conducting a case study of the program in the town of Toliatti, which is the first town to establish a regional training center. The Russian Intel Teach to the Future program initially relied on the use of only a few training centers in major urban areas, which made it difficult for teachers in more remote locations to attend. This case study will shed light on the process of establishing regional Intel Teach to the Future training centers, and will provide information that program staff can use to establish future centers. The Russian evaluation also includes analysis of the unit plans that teachers develop in order to assess the quality of the training. The evaluators recently translated the end-of-training survey and the Core Survey into Russian, and will begin administering those in 2004. What makes this evaluation design particularly useful is that the evaluators are working in partnership with program staff, and maintain ongoing communication with them. Evaluation findings are used in a formative way, helping staff make decisions in order to improve the program.

The findings from the Russian survey show that teachers have very positive responses to the training overall. They rate the quality of their Master Tutors highly, and also highly rate the opportunity to collaborate with peers. The survey indicates that before the training, only 29% of teachers integrated IT into their teaching, but after the training 70% reported doing so. Eighty-five percent were encouraging their students to use ICT in their work after the training, and 70% reported that they consulted with their colleagues on the use of ICT after the training. Most teachers (64%) reported using project-based learning in their classrooms after participating in Intel Teach to the Future. The main complaints about the program were that the training was not conducted locally (this problem is now being addressed by program staff) and that the trainings are comprised of teachers who have very different levels of ICT skills.

Ireland

Researchers from the University of Limerick and researchers from University College Cork conducted the evaluation in Ireland. We have received a report from the University of Limerick, and are expecting the report from University College Cork very soon.

The Ireland program administers an end-of-training survey, which contains the international questions as well as additional questions about participant demographics, teacher practice and obstacles to technology use. This end-of-training survey is very much like the one used in the U.S. We regularly receive end-of-training data from Ireland. This program also has a teacher follow-up survey, very much like the one that has been used in the U.S. The follow-up survey has many questions similar to the Core Survey, but it is not the Core Survey, and, therefore, the data can not be aggregated with

the international data. The Ireland program began administering its follow-up survey before the Core Survey was created, so they were not able to adapt this. The Ireland evaluation also includes interviews with Participant Teachers, Master Tutors, IT advisors and two Participant Teachers who did not complete the course. The evaluators are also conducting observations of the training.

The findings from the evaluation indicate that teachers have a very positive reaction to their training; 95% say that the information they gained through the training would help them integrate ICT in their classrooms, and 96% would recommend the training to a friend or colleague. Only 38% stated in the follow-up survey that they had implemented their unit plan. A quarter (26%) of those who had not done their unit plans in their classrooms stated that they had created the unit plan too late in the year to implement it, and 17% that they did not have adequate technology available. Other obstacles to integration included lack of time in the curriculum, lack of technical support and lack of Internet access. In the follow-up survey, teachers continued to have a positive response to the training. Seventy percent stated that the Intel Teach to the Future training had been "very useful" and 27% said it was "somewhat useful." More than 80% of participants felt that the CD-ROM resource was useful, and 87% of tutors and participants felt that the manual was useful.

United Kingdom

A final report from the U.K. was issued in July of 2003, and authored by Penni Tearle and Patrick Dillon of the University of Exeter. This comprehensive report highlights the three major research activities that Intel Teach to the Future undertook. The first activity was a critical review of the printed materials used in the program. The second activity was the administration of a survey distributed to teachers, "Key Trainers," and tutors. The final research activity was a set of case studies of various institutions (schools, higher education institutions, and school centered teacher training) that provided initial teacher training.

Findings from the research indicate that Intel Teach to the Future was generally well received and that it meets a range of needs for teachers as well as student teachers. It was found that the program addresses a need for the development of basic ICT skills, but that the level of the program was targeted for individuals with limited ICT knowledge, skills, and experience.

The research further found that the flexibility of the program was an important characteristic. Most key trainers and institutions, in fact, adapt the program to particular needs.

In terms of specific programmatic feedback, the research indicated that the paper materials were clear and easy to follow. Most respondents felt that the program was relevant to their teaching, but it lacks subject-specific materials. Positive characteristics include the face-to-face interactions, small group size, and the work at your own pace structure. The program helped to increase teachers' confidence. The major piece of negative feedback was that the program was very time consuming. Teachers were reluctant to devote after school hours or weekends to such training. Simply, the out of school hours were too difficult and an undesirable characteristic. There also was a

concern that Intel Teach to the Future was one among many other programs available that address the need to develop ICT skills.

Israel

The evaluation report from Israel was written in July of 2002 by researchers from the Achva College of Education. The methods used were two questionnaires, one asking teachers about their expectations for the program, and another asking them to assess the program. A first finding is that MT's gave the program higher evaluations than did PT's. Findings indicated that there were two main reasons for participating in the program. A first reason was to learn effective integration of technology into educational practices. The second reason was for personal reinforcement and empowerment. The main benefits for participating in the program were to expand teacher knowledge of technological tools for instruction, gain exposure to innovation, satisfy curiosity, and acquire instructional tools.

The Israeli evaluation attempted to measure the degree to which the program was implemented and rated its implementation as medium to high. Issues such as teacher knowledge, infrastructure, and support were noted as factors in the degree to which the program was implemented.

Satisfaction with the program was reported as high for both MT's and PT's. Intel Teach to the Future seemingly added value to teachers' knowledge of tools, increased their skills, and their ability to teach effectively.

Italy

The program in Italy has started administering the end-of-training survey. We received end-of-training data from Italy for Q3-04.

Latin America

Costa Rica

Two independent evaluators (Sylvia Nuñez and Wendy Jimenez) submitted an evaluation report for Intel Teach to the Future in Costa Rica in July of 2003. The evaluation identified the following significant achievements of the Technical Assistants: (1) increase in abilities and technological skills; (2) more interest in the computer field; (3) clarification of vocational aspects in the short term (career choice), mostly in the computer area; (4) improvement in social skills (expression of ideas, explanation of concepts, interaction with others and public speaking); (5) increase in self-esteem, more self-confidence in themselves and their skills (decrease in anxiety, fear and nervousness); (6) social, community, and family recognition; and (7) development of values and attitudes such as patience, tolerance, perseverance, respect, and solidarity.

The most important limitations of the program were found to be: (1) little time to do training activities; (2) inadequate infrastructure and poor condition of computer resources and Internet connections; (3) very large groups; and (4) handing in licenses to just one teacher per group.

The evaluators proposed the following solutions: (1) extend and redistribute time in the activities during the modules; (2) improve the infrastructure and condition of

computer resources – mostly Internet; (3) use previous diagnostic of knowledge for group leveling; and (4) make smaller groups with more flexible schedules.

Additional findings included improvements in pedagogy and an understanding of constructivism. It was also found that teachers received social and institutional recognition based on their association with the program and Intel.

Brazil

Intel Teach to the Future was introduced in Brazil in June of 2001. The goal for 2003 was to train 20,000 teachers in seven states. We have received a document from the Carlos Chagas Foundation that reports on the pilot assessment of the program in Brazil. Initial results indicate that the program has impacted teacher values and beliefs about the use of technology in education, as well as their ability to integrate technology into their teaching activities. The program provides an opportunity to acquire new knowledge of technology and teaching tools. However, the amount of change in pedagogical practice is affected by four factors: (1) access; (2) infrastructure; (3) support by the school; and (4) teacher's prior knowledge of technology. It was found that teachers who use Intel Teach to the Future have better technological infrastructure in their schools, go to the lab more often, have higher levels of education, and had more prior knowledge of technology before the training. Differences were found between public and private schools. Private schools provide more administrative support for the program than do public schools. Income apparently is an intervening variable between types of schools.

Most respondents believe that Intel Teach to the Future is useful, but there are still difficulties in using the technology. Infrastructure seems to be a major issue. More than half of the respondents have no computers in their classrooms, and more than one-quarter have no Internet access in their schools. These facts limit the extent to which the program can be implemented. Further, there was not enough time to sufficiently cover the amount of materials in the program. There simply was too much information. A further finding about the course materials was that respondents thought they were easy to access and understandable. However, this was influenced by the teacher's level of prior knowledge of technology. Teachers with prior knowledge found the materials easier to use, than those without prior experience. Respondents also reported that they found the pedagogical theory somewhat new.

Mexico

Concierto, an independent research firm that has previously conducted an extensive evaluation for the MOE in Mexico, is conducting the evaluation in Mexico. The evaluation involves a review of state and federal documents (which include web-based as well as paper documents) related to ICT planning and infrastructure in Mexico, an administrator survey, site visits to schools participating in the program, interviews with participants and the administration of the end-of-training survey and Core Survey. The program in Mexico intends to administer the surveys online, and is currently developing the technical infrastructure to enable web-based survey administration.

Argentina

Currently, the evaluation in Argentina consists of the end-of-training survey and the Core Survey, which has been translated into Spanish. We regularly receive end-of-training survey data each quarter from Argentina. No additional questions were added to the Core Survey for Argentina.

Conclusion

Evaluation findings to date suggest that Intel Teach to the Future is a valuable professional development program for teachers working in a broad range of contexts. The program provides ongoing and continuous support for the development of teacher skills and knowledge in project-based learning and general ICT literacy, which initial evaluation findings indicate is crucial to its success. Intel Teach to the Future has learned from the limitations of past programs that provided substantial hardware and software to educational institutions but gave little or no thought to how to support the long-term use of those resources. Instead, its personnel have invested enormous energy in nurturing long-term and sustained relationships with governmental and educational stakeholders in order to allow the program to take hold and flourish.

There is considerable variation among the countries represented in this report regarding the maturity of their Intel Teach to the Future programs, and in the structure and design of their programs. EDC and Intel Teach to the Future program staff need to ensure that evaluation is used to help all of us understand what success can look like in a variety of cases. Because of the unique constraints, challenges and opportunities experienced by participants in each country, program effectiveness must be defined and described locally, with specific contextual factors taken into consideration. At the same time, program-wide definitions of success need to be further articulated so that program staff and evaluators in countries around the world can create evaluation designs that have at their foundation evaluation questions derived from consistent large-scale goals.

Despite the substantial differences across sites, many commonalities exist. Particularly striking is the pervasiveness and continuity of the factors that facilitate or hinder technology implementation. The same four factors–infrastructure, professional development, administrative support, and time–emerge time and time again as the variables within schools as systems and learning organizations that make a difference in teachers' ability to integrate technology into their teaching.

Future work and, perhaps, targeted case students will focus on these factors and emerging themes to help tease out the most influential variables and the interactions among them that enable programs like Teach to the Future to meet objectives and attain global impact. Those objectives may range from one student in a rural community in India, Australia, or Russia preparing an in-depth report on a particular topic to a pedagogical transformation of not just a classroom but an entire school in China. Effectiveness must be measured in proximal, rather than distal steps. Intel Teach to the Future has laid crucial groundwork to allow each country's program to be evaluated on its own terms, and our understanding of these evaluations to date suggests that, over time, we will be able to document and describe how each site moves ahead. In doing so, we look forward to helping the Intel Teach to the Future program create a comprehensive knowledge base that can serve as a resource for program staff and participants worldwide.

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