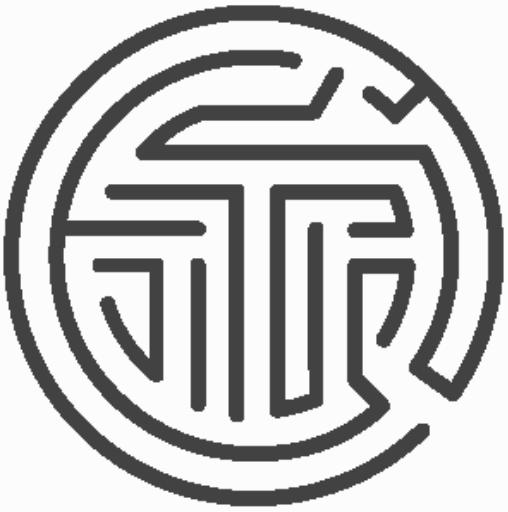
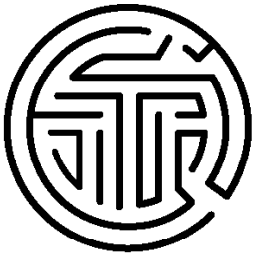


# FORMATIVE EVALUATION OF THE INTEL® TEACH TO THE FUTURE* PRESERVICE PROGRAM

*U.S.*

CENTER FOR CHILDREN & TECHNOLOGY

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



CCT REPORTS
OCTOBER 2003

# FORMATIVE EVALUATION OF THE INTEL® TEACH TO THE FUTURE PRESERVICE PROGRAM

*U.S.*

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# EXECUTIVE SUMMARY

During winter and spring 2003, the Education Development Center/Center for Children and Technology undertook a formative evaluation of the Intel Teach to the Future preservice program. Intel Teach to the Future is a professional development initiative focused on improving K-12 teachers' integration of technology into their classrooms. The program, originally developed for in-service professional development, was introduced to preservice programs in 2001. In the preservice model, teams of faculty from schools of education are invited to attend 32-hour "Curriculum Review" sessions, during which they familiarize themselves with the Intel Teach to the Future curriculum and explore how they might integrate parts or all of the ten-module curriculum into their own existing courses.

The formative evaluation focuses on determining whether and how faculty members are using the curriculum with their preservice students, describes benefits and challenges faculty associate with the experience, and presents preliminary evidence of the impact that program participation may be having on their teaching and use of technology with preservice students.

Key findings from this evaluation include the following:

- Faculty had positive responses to the Curriculum Review: 90% of survey respondents reported that they would "probably" or "definitely" recommend the training to a friend or colleague.
- The large majority of faculty members who complete the training do make use of part or all of the curriculum in their own teaching: 80% of survey respondents reported using at least one module once or more than once since their training.
- Three primary modes of implementation are being used by participating faculty:
  - Using a small number of curriculum modules (one to three) to structure specific activities or class sessions in the context of an education course, particularly curriculum design or content courses.
  - Using all or almost all of the modules (eight to ten modules) as the primary curriculum for an instructional technology course.
  - Offering freestanding workshops to preservice students outside of regular class time to introduce them to specific applications or practices described in the curriculum.
- In some cases, program participation is catalyzing or supporting larger planning processes focused on redesigning how preservice students are introduced to educational technology. This reflects both the presence of other programmatic pressures to address the role of technology in preservice education (such as NCATE reviews and new state requirements for teacher certification) and faculty recognition of this curriculum as both innovative and relevant to their students' needs.

- Faculty members were almost evenly split between those who did and those who did not work with colleagues to create a coordinated approach to integrating this curriculum across multiple courses within a school of education.
- Data indicate key opportunities to strengthen the use of the Intel Teach to the Future curriculum in preservice contexts:
  - Supporting higher-level guidance and coordination of the integration of this curriculum across multiple programs within schools of education
  - Introducing preservice students to the curriculum at a point in their education when they have adequate background knowledge to inform the creation of a unit plan (the central activity of the curriculum) and opportunities to field-test portions of the unit plan in classroom settings, through practicums or other student teaching experiences

# INTRODUCTION

During winter and spring 2003, Education Development Center's Center for Children and Technology undertook a formative evaluation of the Intel Teach to the Future preservice program. Intel Teach to the Future is a professional development initiative focused on improving K-12 teachers' integration of technology into their classrooms.

## About Intel Teach to the Future

Intel Teach to the Future was originally created as a professional development program for in-service K-12 teachers. The program uses a train-the-trainer model to disseminate a 40-hour curriculum focused on using technology in the context of inquiry-oriented and project-based teaching and learning. It also stresses the alignment of curricula and learning goals with standards. The curriculum was prepared by the Institute for Computer Technology (ICT; www.ict.org) and the Intel Corporation. The core of the curriculum is the creation of a unit plan, including student work samples, support materials, and a plan for implementation. The training also discusses pedagogical and classroom management challenges associated with using technology with students as well as how to help students conduct research on the Internet and intellectual property issues. The program uses Microsoft productivity software, with the curriculum providing documentation for use of Windows-based versions of PowerPoint and Publisher to support K-12 students in creating presentations, web pages, brochures and newsletters.

The process is structured through a ten-module sequence:

1. Getting started
2. Locating resources
3. Creating student multimedia presentations
4. Creating student publications
5. Creating unit support materials
6. Creating student websites
7. Creating teacher support materials
8. Creating an implementation plan
9. Pulling unit portfolios together
10. Showcasing unit portfolios

This structure allows K-12 teachers to expand their technical skills in the context of a curriculum development process. By requiring participants to create immediately relevant materials, the curriculum puts the teachers' interests and concerns at the center of the training experience. (For more information about Intel Teach to the Future, visit www.intel.com/education.)

Intel Teach to the Future was designed to address the overarching goal of the Intel Innovation in Education initiatives: To improve math, science, technology and engineering education worldwide. To achieve this end, the program focuses on one of the specific objectives of the Innovation in Education initiatives: To promote the effective use of technology in the classroom.

## About the preservice program

Although Intel Teach to the Future was originally designed to meet the needs of in-service K-12 teachers, managers of the Intel Teach to the Future program were aware of the need to ensure that individuals just entering the profession would also be well prepared to use technology constructively with their students. Consequently, during 2000-2001, Intel project managers decided to offer a slightly different training experience, called a "Curriculum Review," to college and university faculty who teach undergraduate or graduate students studying to become K-12 teachers. Using the same curriculum, senior trainers from the Intel Teach to the Future program offered a 32-hour training to teams of faculty from any school of education that chose to participate. College and university faculty members were invited to familiarize themselves with the curriculum and to think through how they could use it with their own, preservice students (future teachers) to help them tackle the challenges and engage the opportunities involved in using technology with K-12 students. These faculty members agreed to use the curriculum in their teaching, and were encouraged to plan as a group how to distribute the ten modules of the curriculum across various core education courses so that students would be exposed to the curriculum content over an extended period of time and in the context of learning other core content in their area of concentration. Copies of the curriculum were provided at no cost to graduate or undergraduate students whose faculty made use of it in their courses.

## About this evaluation

This report presents findings and recommendations based on data collected between January and June 2003. The primary goal of this formative evaluation was to gain a broad understanding of how the Intel Teach to the Future curriculum was being implemented in schools of education where faculty had participated in Intel's Curriculum Review. A secondary goal was to document faculty responses to the Curriculum Review itself (its usefulness to them, the quality of the trainer, etc.). The Intel Foundation requested this evaluation to complement existing efforts underway at Intel and the Institute for Computer Technology (the non-profit organization administering the program) to document relevant background information about the faculty members participating in the trainings. Because this data on program participation exists elsewhere, this report focuses on the relatively narrow topic of whether and how faculty members are using the curriculum with their preservice students. The report describes the benefits and challenges participating faculty associate with the experience, as well as the preliminary evidence of the impact program participation may be having on their teaching and their preservice students' use of technology.

## Methods

This formative evaluation uses a combination of quantitative and qualitative methods to collect data on program implementation. Blending data collection methods allows us to compare the responses of relatively larger groups of program participants to specific survey questions with more detailed and in-depth information collected from smaller groups of program participants through site visits and interviews and to analyze each of these data sources in relation to one another.

We conducted an online survey of program participants that focused on determining whether and to what extent faculty were following up on their training by using the curriculum in one or more of their courses. The survey also collected a limited amount of data about challenges and benefits faculty members associated with their participation in the program. Additionally we used site visits and phone interviews to (1) build a more specific understanding of how local conditions and priorities were shaping implementation choices and (2) gain a deeper understanding of how faculty members were choosing to integrate the curriculum both into their teaching and into their department or school of education as a whole.

### Online survey

We conducted an online survey during January and February 2003. Faculty members who had completed an Intel Teach to the Future Curriculum Review by the date the survey was launched received the surveys via email from the primary administrator of the program. A reminder email was sent out nine days after the initial contact. A total of 545 faculty members were contacted; 202 completed the survey (27% response rate). Descriptive statistics, including frequencies and cross tabs, were run on the data using SPSS.

Seventy percent of the survey respondents teach in public universities. The remainder teach in private universities (19%), private colleges (8%), and community or junior colleges (3%). The 202 respondents to the survey represented 84 schools, including 42 public universities (50% of the total), 22 private universities (27%), 13 private colleges (15%) and 6 community or junior colleges (7%). Just over half (54%) of those schools were represented by only one respondent, 11 by two respondents (13%), and 22 by three to five respondents (26%). Six universities (7%) were represented by more than five respondents, with a high of 13 respondents from a public university.

### Site visits

Site visits were conducted at four campuses where faculty members or instructors are actively using the Intel Teach to the Future curriculum. Sites were selected with a goal of maximizing variation in geographical location, size of institution, and number of faculty active in the Intel Teach to the Future program. Because we were interested in seeing a variety of implementation styles within individual schools of education, schools where only one or two faculty members had completed the curriculum were excluded from the sample.

Key topics explored during site visits included the school's existing investment in and approach to teaching with and about technology; the structure and focus of the overall education program for both graduate and undergraduate students, with a particular focus on field experiences; faculty responses to the Curriculum Review experience; how, why, and by whom decisions were made about how to include the curriculum in existing courses; the impact of the introduction of this curriculum on specific courses and on technology's role in the school of education in general; and student responses to the curriculum.

Site visits were two days long at three of the sites and one day long at the fourth. During site visits, two members of the research team interviewed education faculty from a variety of fields, including those who had and had not participated in the Curriculum Review. The researchers observed classes taught by participating faculty, including classes that did and did not make explicit use of the Intel Teach to the Future curriculum. Finally researchers met formally with the deans of the education school and informally with students taking courses in which the Intel Teach to the Future curriculum was being used. Field notes from site visits were recorded and compiled, and key themes were identified through group review.

### *Phone interviews*

A phone interview protocol was developed based on the key themes identified in the evidence collected during site visits. The goal of the phone interviews was to test and elaborate on the findings from the site visits. Phone interviews covered topics similar to those covered in interviews with faculty during site visits. Fifteen instructors from 13 colleges/universities were interviewed about their experiences using the Intel Teach curriculum. All but one of the teacher education programs categorized themselves as teacher preparation programs, most with an elementary education focus. One of the programs was "primarily a research institution," though the faculty members using the Intel materials were non-tenure-track, adjunct instructors in the program. Seven of the schools served between 10,000–25,000 students. Four were smaller, serving less than 10,000 students. Two serve more than 25,000 students.

## *Summary of Findings*

This section will discuss several key themes that arose in this evaluation, drawing on multiple data sources as evidence. A descriptive memo summarizing survey findings was submitted to Intel in March 2003; a full report of frequencies from the survey is included in Appendix A of this report.

### *Faculty responses to the Curriculum Review*

Data consistently demonstrated that faculty responded very positively to the Curriculum Review. Ninety percent of survey respondents would "probably" or "definitely" recommend the Curriculum Review to a friend or colleague (17% and 73%, respectively). Four percent probably would not, and 7% definitely would not. Eighty-three percent of respondents reported that at the end of the training they felt "adequately" or "well" prepared to present the curriculum to their own preser-

vice students (49% and 34%, respectively). Sixteen percent said they felt "somewhat prepared," while 1% reported feeling unprepared.

Survey data suggest that the components of the Curriculum Review faculty found most useful were those that focused on creating concrete examples of K-12 student work (a PowerPoint presentation, a brochure or newsletter, and a web page) and that covered intellectual property issues. Faculty also had very positive responses to their trainers: 76% of respondents rated their trainer as "very effective." (See Tables 1 and 2 for complete reporting of responses to these questions.)

**TABLE 1: HOW USEFUL WERE THE FOLLOWING COMPONENTS OF THE CURRICULUM REVIEW TO YOU?**

| | Not useful | Somewhat useful | Moderately useful | Very useful |
|---|---|---|---|---|
| Fair use & copyright law | 1% | 11% | 28% | 60% |
| Essential & unit questions | 3% | 10% | 33% | 54% |
| Discussing pedagogical topics | 2% | 20% | 35% | 43% |
| Locating, evaluating resources for unit | 2% | 11% | 27% | 60% |
| Creating student multimedia presentations | 2% | 9% | 22% | 67% |
| Creating student publications | 3% | 11% | 4% | 62% |
| Creating teacher support materials | 2% | 9% | 23% | 66% |
| Creating student websites | 6% | 15% | 25% | 55% |
| Creating unit plan support materials | 2% | 14% | 27% | 58% |
| Peer reviewing unit plans | 3% | 20% | 34% | 43% |
| Creating an implementation plan | 5% | 14% | 40% | 39% |

**TABLE 2: HOW SUCCESSFUL WAS YOUR TRAINER AT THE FOLLOWING THINGS?**

| | Not at all | Somewhat | Adequately | Very |
|---|---|---|---|---|
| Exposing participants to scope and sequence of curriculum | 2% | 4% | 17% | 77% |
| Leading participants through unit plan creation | 1% | 7% | 17% | 74% |
| Engaging group in discussion of pedagogical issues | 2% | 7% | 26% | 65% |
| Being well prepared for each day | 0% | 5% | 9% | 86% |
| Overall, how effective was your trainer? | 2% | 7% | 16% | 76% |

Interviews with both participating and non-participating faculty at schools of education were consistent with our survey data, with faculty describing the Curriculum Review in very positive terms. Faculty very often described the curriculum as a tool that helped them met a need they had been aware of, but had not previously responded to. In comments included on surveys, in phone interviews and in discussions during site visits, faculty repeatedly explained that this curriculum was helping them guide their preservice students through the process of thinking about technology in the context of curriculum and learning, and that it would help their department or school move beyond the paradigm of the isolated, stand-alone course about computers and instructional technology.

Though infrequent, reasons for dissatisfaction with the Curriculum Review, or for choosing not to participate in the review, were also consistent across schools. The reasons centered on various fundamental disagreements with the style or approach of the curriculum. For example, the interview data indicate that some faculty members were not interested in engaging with such a fully produced curriculum (the step-by-step instructions, the examples provided, etc.), feeling it was too prescriptive to fit with their teaching approach. A few faculty members, who worked in primarily research-oriented institutions, explained that they expected their students to engage more directly with the research literature on technology integration and pedagogy, in general, and to consider multiple perspectives on these topics.

## *Scope and context of use of the Intel Teach to the Future curriculum in preservice settings*

Faculty members who go through the Curriculum Review are very likely to make use of the curriculum in their subsequent teaching. Eighty percent of survey respondents reported that they have implemented a module from the curriculum, and 45% of the remaining respondents say they have done some other new, technology-rich lesson with their students. These responses were consistent with reports collected through site visits and interviews, during which faculty consistently reported using various parts of the curriculum in a wide range of courses.

**Level of use.** The curriculum is widely implemented by faculty members who attend the Curriculum Review. Eighty percent of survey respondents reported that they had implemented at least one module from the curriculum. Of this group, a significant proportion are using all or almost all of the curriculum; on average, faculty report using "most" or "all" of 5.6 out of 10 modules (SD=3.1). This mean describes a roughly bimodal distribution, with one group of faculty using two to three modules and another large group using nine to ten modules. This distribution is consistent with the two most common implementation strategies, (1) integrating components of the curriculum into either content or curriculum design courses and (2) using all or almost all of the curriculum as the center of an instructional technology course. (See Implementation Strategies below for further discussion.)

**Modules used.** Modules 1 through 4 are implemented most frequently. These four modules include the introductory portion of the course and the three core modules that guide students through the process of creating three pieces of "model student work" – a PowerPoint presentation, a newsletter or brochure, and a website – which are intended to mimic the work of K-12 students. Module 4, "Creating Student Publications," is used most frequently. Seventy-eight percent of faculty members who implemented any module implemented this one. Modules 5, 6, 9 and 10 are least frequently implemented; 41-47% of faculty reported using "all or most" of them. (See Table 3 for a complete reporting of data on this item.)

**TABLE 3: PERCENTAGE OF FACULTY USING EACH MODULE OF THE INTEL TEACH TO THE FUTURE CURRICULUM**

| | Used all or most |
|---|---|
| M1 Getting started | 72% |
| M2 Locating resources | 75% |
| M3 Creating student multimedia presentations | 78% |
| M4 Creating student publications | 68% |
| M5 Creating unit support materials | 44% |
| M6 Creating student websites | 47% |
| M7 Creating teacher support materials | 52% |
| M8 Creating an implementation plan | 49% |
| M9 Pulling unit portfolios together | 46% |
| M10 Showcasing unit portfolios | 41% |

Notably, although the modules featuring creating a multimedia presentation, publication or website are among those most frequently used, both survey data and site visits suggest that faculty often do not have students create "model student work." a key feature of the curriculum. The Intel Teach to the Future curriculum is structured around the creation of these "models," which are intended to be adult imitations of the work of a K-12 student responding to an assignment. The intention behind this emphasis on "model student work" is to encourage the in-service or preservice teacher to begin his or her planning from a set of learning goals and with an assessment strategy. The in-service or preservice teacher would then design specific lessons and activities aligned to those goals and consider what learning opportunities or challenges students would encounter using the technology. An example of a piece of model student work would be a newspaper produced by a preservice student mimicking the work of a ninth grader responding to an assignment such as "Show how American Colonists might have first learned about the signing of the Declaration of Independence." In contrast, if a preservice student created a multimedia presentation summarizing the best practices for teaching science in English-as-a-Second-Language classrooms as a final project for a ESL methods course, it would not be a piece of model K-12 student work. (See Table 4 for a summary of responses to a survey question about this topic.)

**TABLE 4: WORK PRODUCTS CREATED IN COURSES WHERE INTEL TEACH TO THE FUTURE CURRICULUM MODULES WERE IMPLEMENTED**

| | Made to present/ share own work only | Made K-12 student sample only | Made both | Made neither |
|---|---|---|---|---|
| Multimedia presentation | 46% | 21% | 23% | 10% |
| Publication | 39% | 24% | 14% | 23% |
| Website | 30% | 19% | 10% | 41% |

These responses are consistent with our observations of curriculum implementations and our discussions with faculty members. While there is clearly some use of the "K-12 student work sample" approach, many faculty members who use modules from the curriculum are not asking their preservice students to create these kinds of products. We interpret this data as reflecting, at least in part, the difference between content or curriculum design courses, in which preservice students are using a small number of modules and are likely not making K-12 student work samples, and instructional technology classes, in which preservice students are moving through most or all of the curriculum and are consequently asked to create K-12 student work samples as part of the overall process of creating a unit plan.

**Students reached and courses targeted for implementation.** This program primarily reaches undergraduate education majors. Survey data show that 95% of faculty reported using the curriculum in courses required for the education major, and 67%, or two-thirds, reported using it primarily with B.A. students.

The curriculum is primarily used in content-specific classes and instructional technology courses, as identified by 39% and 33%, respectively, of survey respondents who had implemented at least one module. Twenty-one percent of survey respondents reported using the curriculum in methods classes, and 11% reported use in practicum or internship courses.

Phone interviews and site visits indicate that instructional technology courses are most often introductory courses reaching students in their freshman or sophomore year (with some exceptions, such as more advanced instructional design classes). Content-specific and methods classes include a range of undergraduates. Practicum or internship courses reach primarily juniors and seniors.

**Patterns of use in different course contexts.** Comparing survey data on courses taught to modules used shows that those teaching educational technology courses used significantly more modules than those who taught content or curriculum design courses ($p<.01$). Other differences are not statistically significant because of their large standard errors–that is, there was more variation among faculty teaching practicum/internship courses and methods courses as to the number of modules they taught. (See Table 5 for a summary of average number of modules, including standard errors, used in each type of course.) When modules that faculty reported using only "a little bit" are dropped from consideration (so that "modules used" reflects only those which they used "most" or "all" of), these relationships hold true at the level of a trend: the pattern is still present but is not entirely statistically significant.

**TABLE 5: MEAN NUMBER OF MODULES USED BY CURRICULAR AREA**

| *Course taught* | *Mean number of modules used (and standard error)* |
|---|---|
| Practicum/internship courses (n=13) | 9.00 (SE=.67) |
| Educational technology (n=41) | 8.98 (SE=.38) |
| Methods (n=21) | 7.86 (SE=.53) |
| Content/curriculum design (n=48) | 7.13 (SE=.35) |

## *Implementation models*

Responses to interview questions about integrating this curriculum into existing courses indicate that faculty members are using the curriculum in varying ways. Faculty are doing everything from replacing an existing course curriculum with this one in its entirety, to adopting the general concept of assigning students to create a technology product, such as a PowerPoint presentation. Considered together, the site visit, phone interview and survey data suggest that there are three primary patterns of curriculum use:

1. *Replacement of prior curricula*. Faculty who take this approach use all or almost all of the curriculum (using 8-10 modules at least "a little bit"). Faculty teaching educational technology courses are most likely to do this, as is a smaller group teaching practicum/internship courses. Many of the faculty teaching these educational technology courses reported shifting to Intel Teach to the Future as the structuring curriculum for their entire course, although some are condensing portions of the Intel Teach to the Future curriculum and including other modules of their own creation. Most, though not all, of the creation of K-12 student work samples by preservice students is happening in these types of settings.

2. *Adaptation of specific modules*. Faculty who take this approach are likely to use most or all of Modules 1-5 and possibly one or two additional modules, usually in content specific or curriculum design courses. Methods faculty are also likely to do this, but there is more variation in the number of modules they use. These faculty members are integrating individual modules into distinct portions of content or methods courses. In these cases, the curriculum was typically used to support the integration of a technology-rich work product into a course that had previously not required students to use technology. For example, in a course focused on methods for teaching Language Arts, a professor plans to have students create a website or a multimedia presentation presenting key themes from a novel commonly taught in middle grades English classes. Another professor had previously focused on technology applications within her science methods courses, but she is now using "bits and pieces" of the curriculum throughout these courses to support students as they create multimedia presentations. Note that these work products are typically not "model student work," but rather they are direct representations of the preservice students' knowledge and ideas.

3. Workshops. This category includes stand-alone events organized by faculty who were interested in sharing Intel resources with their preservice students but who were either less interested or less able to integrate them into existing courses for various institutional reasons. Workshops exposed students to multiple modules of the curriculum but did not attempt to move through the entire sequence. In these cases the curriculum was treated more as an informational resource that students could draw upon or review for their own purposes, rather than as a resource to guide faculty or instructors in the development or modification of their own courses.

## *Faculty perceptions of benefits and challenges of the program*

Faculty members who choose to make use of the Intel Teach to the Future curriculum in their teaching are highly enthusiastic about its quality and relevance to their teaching goals. They report that their preservice students appreciate receiving the curriculum books and consider them valuable references. Some participating faculty, however, encountered obstacles as they attempted to integrate their curriculum, and a relatively small number of participating faculty chose not to make any use of the curriculum. This section discusses some of the key opportunities and challenges that faculty met while attempting to integrate technology into preservice teaching.

**Benefits associated with participation and use of the curriculum.** Faculty members described three types of benefits that they associated with this program:

- Support for preservice students' learning, particularly access to high-quality resources and an opportunity to familiarize themselves with content-oriented, research-oriented uses of technology
- Opportunities for the school or department to strengthen their course offerings and improve the integration of technology across their curriculum
- Support for meeting external requirements for certification and accountability.

In terms of preservice students, the faculty felt strongly that the curriculum book was an important guidebook for their students and that it would be of value to them beyond their work in specific courses. Faculty described the curriculum as providing an image of how technology use could be embedded in content learning that would be highly influential for students who are just being introduced to teaching.

In terms of improving their overall approach to technology integration, faculty consistently described this curriculum as bringing substance to a kind of approach to technology integration that they had previously been interested in but had been unable to implement. In some cases, expertise resided with a small group of faculty, and others did not have the skills or knowledge needed to bring technology-rich activities into their teaching. In other cases, faculty who teach curriculum design or content courses had wanted to integrate technology into their courses, but they did not have any models for how to embed technology-rich activities in a course focused on other content. This curriculum provided them with modules that met this need.

Phone interviews and site visits suggest that Intel Teach to the Future is also helping colleges and universities meet both their own institutional certification requirements and their students' state certification requirements. We met many faculty members who had previously been uninterested in, or resistant to, technology integration but who now were facing pressure from NCATE reviews or state requirements to bring technology into their teaching and were in need of resources to support them. These faculty members perceived the Intel Teach to the Future curriculum as meeting that need and making it possible for them to act on previously vague goals. As one professor said, "I think it is helping us to adhere to state technology standards because it encourages teachers to do it [integrate technology into their students' work] in a very user-friendly way and Intel gives guidelines. If a teacher took the book and a disc on their own, they could just follow it. It is a

gold mine; everything is there." Another professor said:

> *By using the Intel materials we are able to align perfectly with those standards [NCATE and ISTE]. That is one of the reasons I really like the Intel materials…you aren't teaching linearly – I never feel that I am teaching to the test, so to speak, I am teaching students and I really like that. [Previously] you could never really get at what you were trying to get at. This was like finding the Holy Grail – I was looking for something like this for years. It has been thoroughly developed. The whole social dynamic of the class changes when you use it, because students begin to see practical application of how technology can advance learning. My job was made so much easier! The students loved it and were enthusiastic. It is not just teaching the standards – it is teaching them through a natural flow.*

**Challenges experienced.** In response to a survey question about challenges experienced while using the curriculum with preservice students, faculty generally did not report high levels of difficulty in implementing curriculum modules. (See Table 6 for a summary of responses to this question.) Only five of the items were rated as "moderate" or "major" obstacles to implementation by more than 25% of respondents. Three of these five items were technology-related: (1) access to computers for teaching, (2) students' access to computers outside of class, and (3) students' access to software. The other two items were "time constraints" and "students' classroom experience." In interviews, faculty members also discussed time constraints extensively. Many faculty members explained that they did not feel there was enough time within a given semester to cover any new material in a given course. This perceived obstacle has likely influenced, in turn, the decision by some participating departments or schools to cover the entire curriculum within the context of an instructional technology course, rather than spread portions of the curriculum across multiple courses.

**TABLE 6: TO WHAT EXTENT WAS EACH OF THESE ISSUES AN OBSTACLE FOR IMPLEMENTATION**

| | Not an obstacle | Minor obstacle | Moderate obstacle | Major obstacle |
|---|---|---|---|---|
| Recruiting students for the course | 94% | 3% | 2% | 1% |
| Managing students on computers | 49% | 32% | 17% | 3% |
| Managing software | 35% | 44% | 19% | 2% |
| Time constraints | 16% | 29% | 29% | 27% |
| Access to computers | 48% | 20% | 17% | 16% |
| Students' access to computers outside of class | 37% | 34% | 21% | 7% |
| Students' access to software | 42% | 29% | 21% | 8% |
| Getting tech support | 50% | 28% | 15% | 7% |
| Own computer skills | 55% | 34% | 8% | 4% |
| Students' computer skills | 25% | 53% | 19% | 3% |
| Students' classroom experience | 30% | 38% | 24% | 9% |
| Students' knowledge of pedagogy | 31% | 44% | 20% | 5% |
| Alignment of curriculum and goals | 60% | 27% | 12% | 1% |

The obstacle to successful implementation of the curriculum that faculty discussed most in interviews was students' limited classroom experience. The faculty explained that the limited background knowledge undergraduate education majors typically have about issues such as curriculum, standards, and lesson planning made it difficult for these students to really benefit from the process of developing a unit plan. While this challenge was discussed by faculty teaching a wide range of courses, it was particularly prominent in instructional technology courses. Faculty explained that students who have not yet had any field experience (have not taught, or possibly even observed in a classroom) find it difficult to have an accurate sense of what content or activities to focus on when developing a unit plan. This challenge loomed largest for instructional technology courses because they are often taken in the first semester of a students' education coursework. Freshmen typically do not have prior education coursework or personal experience to ground them in ideas of curriculum development, instruction, or classroom management. Additionally, these courses were most frequently the ones that made use of the entire unit planning process laid out in the curriculum, leaving professors with a group of students who are intended to move through a substantial curriculum planning process but who have few, if any, images or models to draw upon as they create a unit plan.

Some faculty teaching instructional technology courses were focused primarily on teaching the technical process of creating products, such as multimedia presentations or newsletters. These faculty members did not feel that specific knowledge of typical curricular topics or activity sequences for a particular grade level was needed in order to learn strong technical skills from the process of creating the student work samples as described in the curriculum. Some faculty explained that, even though this approach was "imperfect," they were comfortable with it as it gave students a strong basis for seeing technology as a tool to support engaged, sustained content learning in their future coursework. As one professor explained: "We are often the lead course that students take that has anything to do with lesson planning. These kids have not been in the classroom and yet have to create these lessons plans, so it is kind of crazy." Another professor said, "The hardest part about integrating the technology [using this curriculum] is coming up with the essential questions. These students don't know how to pick a topic. They don't know the content well enough."

A final obstacle described by faculty in interviews was finding a comfortable fit between the specific type of technology use described and supported in the curriculum and the faculty members' own priorities for their teaching. More specifically, we often heard from faculty that the main reason they or their colleagues might have chosen not to use the curriculum was because they felt there was a poor fit between the orientation or focus of a particular course and the perspectives on teaching and technology emphasized in the Intel Teach to the Future curriculum. This conflict was articulated, for example, in discussions we had with faculty members who wanted to maintain a focus on a particular body of theoretical questions and knowledge in their courses and who did not feel that the hands-on approach of this curriculum would fit well with that model. In a similar vein, some faculty wanted to maintain a specific focus on a particular approach to an issue—such as teaching reading, or understanding how students learn math concepts—and felt that this

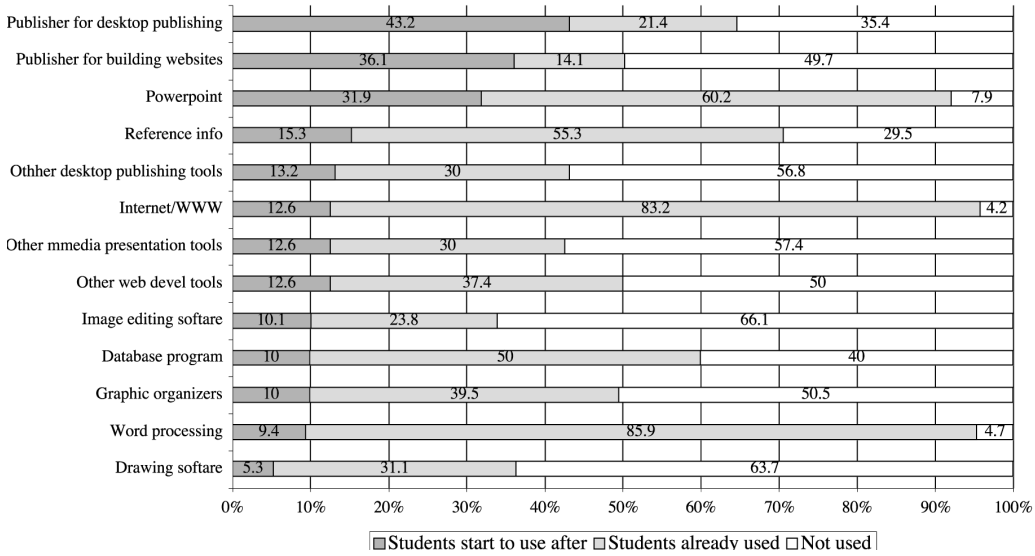
curriculum was too broad and practice-oriented to suit the focus of such a course.

## Initial evidence of impact on participating faculty

While the focus of this study was to provide formative feedback to the program team about whether and how faculty were making use of the Intel Teach to the Future curriculum in their teaching, we also collected data that allow us to describe some of the ways this program has spurred changes in how instructional technology is planned for and used in schools of education that have been active in the program. Our findings suggest that program participants are making changes in multiple areas. These changes include how participants use technology with their students; the pedagogical concepts and practices they address with their students; and how they collaborate with their colleagues, particularly around curriculum planning, both within individual courses and across programs.

**Use of technology with preservice students.** Survey data demonstrate that faculty who follow up on their Curriculum Review and use portions of the Intel Teach to the Future curriculum in their courses are using the software tools featured in that curriculum more frequently than they did before. Additionally, between 10 and 15% of respondents report using a range of other software tools in their teaching for the first time since participating in this training. (See Table 7 for details.)

**Table 7: Software used with students before/after training**

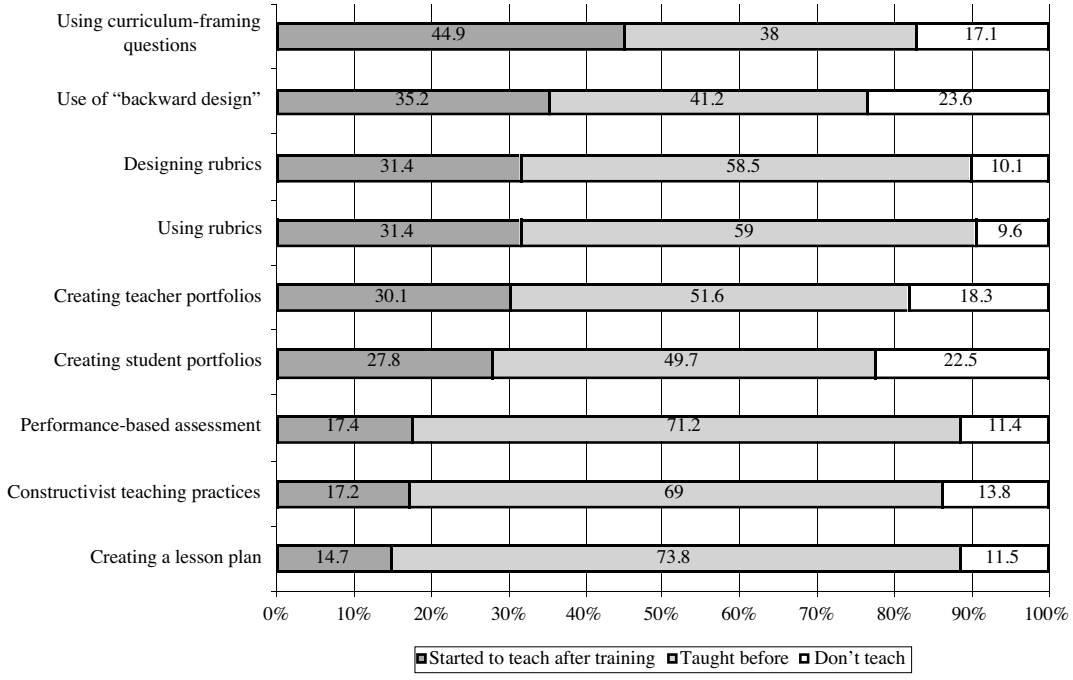



**Discussion of pedagogy with preservice students.** A considerable number of faculty members reported that they have begun to teach specific pedagogical concepts and practices that are featured in the Intel Teach to the Future curriculum that they had not previously included in their courses. When asked what they liked most about the Intel modules, faculty members frequently chose to discuss the focus the curriculum places on structuring unit plans around "essential ques-

tions" or, more broadly, the particular pedagogical approach embedded in the curriculum. For example, one faculty member said that she had wanted to address pedagogy in her technology courses for some time, but she didn't know how to do it until she was exposed to this curriculum.

More specifically, our survey data suggest that a considerable number of faculty members are now explicitly teaching some of the pedagogical strategies covered in the curriculum that they did not previously cover in their courses. For example, over a third of survey respondents reported that, since participating in the training, they are now teaching about "curriculum-framing questions" (45%) and "using backward design" (35%) for the first time. Almost a third have also begun teaching the concepts related to using portfolios and rubrics to guide assessment that are covered in the curriculum. Other pedagogical concepts and practices included in this item were already being taught by approximately 70% of respondents, and consequently a smaller percentage of respondents reported teaching these concepts for the first time. (See Table 8 for details.)

**Table 8: Teaching about New Concepts and Practices**




**Collaboration and curriculum planning.** Faculty frequently reported that after participating in the Curriculum Review, they engaged in a range of curriculum planning activities with colleagues. These included reworking individual courses, reconsidering the distribution of technology use across the curriculum within a particular program, and creating new courses. For example, at one large state university, the instructional technology curriculum was entirely reworked to take advantage of the Intel Teach to the Future curriculum. At this school, the curriculum was divided across a sequence of two courses, with more skill-oriented portions of the Intel Teach to the Future curriculum incorporated into an introductory course and the unit-planning activities

included in an advanced course. This new sequence was also aligned with other course sequences, so that by the time undergraduate education majors took the advanced technology course, they had taken their methods courses and were better prepared to engage in the unit planning process. Portions of the curriculum were also integrated into two of the core methods courses, so students worked through the entire curriculum in the course of the four courses (two in technology and two in methods).

Several large private universities had no educational technology course sequence in place prior to their involvement in Intel Teach to the Future. At these schools, faculty initially chose to integrate the curriculum into a range of courses, all of which had included technology standards in their goals but had not previously emphasized technology use. For the 2003-2004 school year, however, these universities are introducing educational technology courses that will address both technology skills and integration and will draw in part on Intel Teach to the Future.

## *Coordinating Intel Teach to the Future with other programs*

It is important to note that in addition to their participation in the Intel Teach to the Future program, many universities that decided to modify their approaches to teaching preservice students about using technology in the classroom were influenced by NCATE reviews and by their own involvement in Preparing Tomorrow's Teachers to Use Technology (PT3) grants. In many cases, Intel Teach to the Future dovetailed well with other institutional pressures and priorities driving universities to revisit and strengthen their educational technology programs.

Building bridges between Intel Teach to the Future and PT3 was a particularly common strategy. In 1999, the U.S. Department of Education made its first round of grants under this program–funding 225 universities or consortia (which often included K-12 districts, other universities, training organizations, etc.) with a goal of "[supporting] high-quality reforms in teacher preparation programs for the purpose of increasing the knowledge, skills, and abilities of prospective teachers to use technology efficiently in their future teaching practices." It was clear in both site visits and interviews that many of the schools participating in this program, particularly the large public universities, are deeply involved in PT3 efforts. Faculty members participating in Intel Teach to the Future were encouraged to use this curriculum in concert with their own PT3 efforts, and we found that PT3 programs had often created alliances or partnerships among universities and public school districts that offered fertile ground for well-planned implementations of this curriculum. For example, at one university, a PT3 grant had allowed for a significant expansion of a professional development school relationship between the university and the local school district. Also the lead faculty from the PT3 program had made a significant effort to use the Intel Teach to the Future curriculum with students during their practicum semester in the various professional development schools.

We also found evidence that the preservice version of Intel Teach to the Future can help schools of education respond to growing pressures from state and federal legislatures to meet higher and more stringently defined certification requirements. Among these pressures is the need to demonstrate that teachers are being prepared to use technology effectively to support their stu-

dents' learning in core content areas. Also as participating faculty pointed out to us, they are accountable for the development of assessment portfolios and the practice of standards-based lesson planning. These responsibilities are imperatives to new state certification processes relevant to many of the schools involved in this formative evaluation. A number of universities have used the high level of alignment between the Intel Teach to the Future curriculum and the ISTE technology standards as a key piece of evidence to demonstrate that their students were meeting state certification requirements regarding technology integration (in part because many states use the ISTE standards as their own standards for technology integration). These schools are also beginning to apply the unit plans that students develop for Intel Teach to the Future as the basis for ongoing electronic portfolios, which eventually become a centerpiece of each teacher's certification process.

## Discussion

This formative evaluation strongly indicates that many faculty members who participate in Intel Teach to the Future Curriculum Reviews respond positively to the experience and make extensive use of the curriculum to teach preservice students. The curriculum is being used as an enhancement or replacement in relatively traditional instructional technology courses, and also to enrich and expand the use of technology in other education subjects, including content, methods, and practicum courses.

Use of this curriculum varies widely from school to school. Faculty are demonstrating high levels of motivation and creativity as they pursue integration strategies, which include blending portions of the Intel Teach to the Future into their own courses, coordinating use of the curriculum across course sequences, and in some cases, reworking their entire approach to teaching preservice students about educational technology. Regardless of their particular approach to using the curriculum, participating faculty describe their goals in ways that are highly consistent with the core concepts of the curriculum, including students' direct use of the technology, linking technology use to sustained project work and original student research, and aligning technology use with local and state learning standards.

The evaluation suggests that only one of the central concepts of the curriculum seemed to be especially difficult to transfer to the preservice context. This was the notion of creating a unit plan, and particularly the associated model K-12 student work. This process is central to the in-service curriculum, which focuses teachers on thinking about student-driven, rather than teacher-driven, uses of technology, and which makes it easier for in-service teachers to bring what they learn in the training back to their classrooms. Most of the courses, however, in which faculty are engaging their preservice students in this unit plan development process (as opposed to using individual modules for specific activities) are first- or second-semester instructional technology or curriculum design courses that mainly serve college freshmen. Faculty have good reasons for making extensive use of the curriculum in these contexts, such as the general consistency of this curriculum with their existing goals for the courses, or the need to update and improve existing courses. But the unit-planning aspect of this curriculum was originally designed for in-service

teachers, and so it assumes a certain level of prior knowledge and experience that these students have not yet gained. For example, many preservice students we spoke with were not yet familiar with topics such as how to develop age-appropriate topics, learning goals, and activities, the specifics of state and local content learning standards, or how to anticipate and plan for classroom management issues.

In contrast, we discovered several examples of universities that were making a specific effort to coordinate their preservice students' use of this curriculum with the later stages of their program. In some cases this meant embedding the Intel Teach to the Future curriculum in more advanced educational technology courses, so that students had completed more basic technical skills courses and their basic education requirements (such as methods and curriculum design courses). In several other cases, universities with professional development school programs were using the curriculum with preservice students as they moved through their practicum experience and worked directly in classrooms for at least a few hours each week. In some cases these preservice students were able to try out a portion of their unit plans with K-12 students. Prior research suggests that, as with in-service professional development, this experience of implementing the unit plan is likely to be important to the program's long-term impact.

## Recommendations

- *Consider how to support or reframe the process of creating K-12 student work samples.* The process of creating student work samples is central to the learning experience for in-service teachers participating in this program. Most preservice students, however, particularly during the early stages of their programs, do not have the background knowledge they need in order to make informed decisions about how to mock up, for example, either a third grader's report on what insects eat or an eighth grader's presentation of the results from air quality tests she conducted in the community. There are many possibilities for either supplementing or slightly modifying the curriculum so that preservice students could be exposed to the same key messages about technology use as their in-service counterparts, but through a version of this experience for which they are better prepared.

- *Recruit administration-level program participation.* This evaluation demonstrates that this curriculum has a role to play in many different types of education courses, but that not all participating universities have conducted a specific planning process to coordinate use of the curriculum across multiple programs or courses of study. Administrators can, potentially, play a role in guiding and encouraging this planning process, but they have not, to date, been significantly involved with the program. The dean of the school of education at one university told us, "I wasn't aware of this program, until it was already underway. If I had known about it, I could have made it a required activity or led an effort to coordinate the use of the curriculum across different program areas. As it is, the program is working great within the instructional technology group, but it will never spread to the content area faculty." While faculty-level program leaders may still be very necessary to the program, in order to ensure that Intel Teach to the

Future has the best possible opportunity to spread within whole schools of education, deans or associate deans of education need to be invited into the program and asked to play a leadership role around the implementation process.

- *Encourage and support the creation of bridges between the in-service and preservice programs.* For this program to have a lasting impact on preservice students, every effort should be made to give them opportunities to use their unit plan materials with K-12 students. Embedding Intel Teach to the Future in the practicum experience, which occurs at the end of the education major, and is currently in effect in a small number of participating universities, is a promising strategy and should be encouraged.

  Further, many preservice students who have gone through Intel Teach to the Future move on to do practicums in schools where many experienced teachers have also participated in the in-service version of the program. We believe these teachers have a great deal to offer each other and could, by working together, increase their own expertise and create rich learning experiences for their students. At this time, there are no systematic efforts underway, that we are aware of, to coordinate or support such collaborations.

  Building on these potential partnerships between novice and expert teachers would create opportunities for both individual universities and Intel to maximize the program's impact for the preservice and the in-service candidates; increase the visibility of the Intel Teach to the Future within individual schools and districts; and create a model for sustained, sequential professional development for classroom teachers. Each of these issues is a major challenge, and we believe that some schools of education would be able to build important model "bridge" programs that could be of great interest to others and could potentially have a high level of impact on both the preservice and in-service participants.

- *Inform recruitment strategies with more data on successful implementation contexts.* This evaluation provides initial indications that the Intel Teach to the Future curriculum may be most successfully implemented (meaning, used with a large number of preservice students with adequate opportunities to benefit from the experience) in universities with large, practice-oriented (as opposed to research-oriented) undergraduate student bodies; mature and well-supported professional development school collaborations with local school districts or similar university/school partnerships focused on practicum teaching experiences for preservice teachers; and administrative leaders in place who are able and willing to guide a coordinated implementation of the curriculum across multiple programs or fields (such as methods, curriculum planning, and content courses). However, there is much more to be learned about the particular kinds of schools of education and the particular types of courses that can make the best use of this curriculum and have a lasting influence on their preservice students' use of technology in their future teaching. We recommend further formative study of preservice students' experiences of this program. We also recommend a broad review of the types of teacher preparation programs available in the U.S. and those reached to date by this program with a goal of conducting more informed and systematic outreach to schools of education for future participation.

# APPENDIX A: FREQUENCIES FROM INTEL TEACH TO THE FUTURE PRESERVICE SURVEY

**Section I:**

## *About your Intel® Teach to the Future Faculty Training/Curriculum Review*

2) When did you attend an Intel Teach to the Future Faculty Training/Curriculum Review?

| YEAR TRAINED | N | % |
|---|---|---|
| 2000 | 9 | 4.6 |
| 2001 | 25 | 12.8 |
| 2002 | 131 | 66.8 |
| 2003 | 31 | 15.8 |
| **Total** | 196 | 100.0 |

3) How useful was each of the following components of the faculty training/curriculum review in helping you learn how to integrate technology into your teaching practices?

| | RESPONSE | NOT USEFUL | SOMEWHAT USEFUL | MODERATELY USEFUL | VERY USEFUL | TOTAL |
|---|---|---|---|---|---|---|
| Fair use & copyright law | N | 2 | 22 | 54 | 116 | 194 |
| | % | 1.0 | 11.3 | 27.8 | 59.8 | 100.0 |
| Essential & Unit Questions | N | 5 | 20 | 66 | 107 | 198 |
| | % | 2.5 | 10.1 | 33.3 | 54.0 | 100.8 |
| Discussing pedagogical topics | N | 3 | 40 | 69 | 86 | 198 |
| | % | 1.5 | 20.2 | 34.8 | 43.4 | 100.0 |
| Locating & evaluating resources for unit | N | 4 | 21 | 54 | 120 | 199 |
| | % | 2.0 | 10.6 | 27.1 | 60.3 | 100.0 |
| Creating student multimedia presentations | N | 4 | 18 | 44 | 133 | 199 |
| | % | 2.0 | 9.0 | 22.1 | 66.8 | 100.0 |
| Creating student publications | N | 6 | 22 | 47 | 124 | 199 |
| | % | 3.0 | 11.1 | 23.6 | 62.3 | 100.0 |
| Creating teacher support materials | N | 4 | 18 | 45 | 132 | 199 |
| | % | 2.0 | 9.0 | 22.6 | 66.3 | 100.0 |
| Creating student websites | N | 11 | 30 | 49 | 109 | 199 |
| | % | 5.5 | 15.1 | 24.6 | 54.8 | 100.0 |
| Creating unit plan support materials | N | 3 | 27 | 53 | 116 | 199 |
| | % | 1.5 | 13.6 | 26.6 | 58.3 | 100.0 |
| Peer reviewing unit plans | N | 6 | 40 | 68 | 85 | 199 |
| | % | 3.0 | 20.1 | 34.2 | 42.7 | 100.1 |
| Creating an implement'n plan | N | 10 | 29 | 81 | 79 | 199 |
| | % | 5.0 | 14.6 | 40.7 | 39.7 | 100.0 |

4) Think about the trainer who led your faculty training/curriculum review and his/ her leadership of the training as a whole. In your opinion how successful was the trainer in:

| | EXPOSING PARTICIPANTS TO SCOPE ADN SEQUENCE OF CURRICULUM | | LEADING PARTICIPANTS THROUGH UNIT PLAN CREATION | | ENGAGING GROUP IN DISCUSSION: PEDAGOGICAL ISSUES | | WELL PREPARED FOR EACH DAY | |
|---|---|---|---|---|---|---|---|---|
| Response | N | % | N | % | N | % | N | % |
| Not at all | 4 | 2.0 | 2 | 1.0 | 4 | 2.0 | 0 | 0.0 |
| Somewhat | 7 | 3.5 | 13 | 6.5 | 14 | 7.0 | 9 | 4.5 |
| Adequately | 35 | 17.6 | 34 | 17.1 | 52 | 26.1 | 18 | 9.0 |
| Very | 153 | 76.9 | 150 | 75.4 | 129 | 64.8 | 172 | 86.4 |
| Total | 199 | 100.0 | 199 | 100.0 | 199 | 100.0 | 199 | 100.0 |

5) Overall, how effective was your trainer in facilitating your experience of this training?

| RESPONSE | N | % |
|---|---|---|
| Not at all | 3 | 1.5 |
| Somewhat | 13 | 6.5 |
| Adequately | 32 | 16.1 |
| Very | 151 | 75.9 |
| Total | 199 | 100.0 |

6) How well prepared did you feel to present material from this curriculum to your students?

| RESPONSE | N | % |
|---|---|---|
| Unprepared | 2 | 1.0 |
| Somewhat prepared | 32 | 16.1 |
| Adequately | 97 | 48.7 |
| Well prepared | 68 | 34.2 |
| Total | 199 | 100.0 |

7) How helpful were these aspects of the curriculum review in preparing you to teach portions of this curriculum yourself?

| | OBSERVING SENIOR TRAINER'S TECDHNIQUE | | TIPS PROVIDED BY SENIOR TRAINER | | NOTES ON LEADING CLASSES FROM MODULE | | FACULTY RESOURCES IN IN BINDER/ CD-ROM | | TALKING WITH OTHER FACULTY MEMBERS | | CREATING OWN UNIT PORTFOLIO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | N | % | N | % | N | % | N | % | N | % | N | % |
| Not helpful | 12 | 6.0 | 15 | 7.6 | 6 | 3.0 | 0 | 0.0 | 12 | 6.1 | 10 | 5.5 |
| Somewhat helpful | 73 | 36.7 | 72 | 36.4 | 74 | 37.4 | 53 | 27.0 | 76 | 38.6 | 48 | 26.5 |
| Very helpful | 114 | 57.3 | 111 | 56.1 | 118 | 59.6 | 143 | 73.0 | 109 | 55.3 | 123 | 68.0 |
| Total | 199 | 100.0 | 198 | 100.0 | 198 | 100.0 | 196 | 100.0 | 197 | 100.0 | 181 | 100.0 |

8) Would you recommend this training to a friend or a colleague?

| RESPONSE | N | % |
|---|---|---|
| Definitely not | 13 | 6.7 |
| Probably not | 7 | 3.6 |
| Probably yes | 32 | 16.5 |
| Definitely yes | 142 | 73.2 |
| Total | 194 | 100.0 |

**Section II:**

## *About Your Class*

9) Have you implemented some or all of a module from the Intel Teach to the Future curriculum since you participated in a curriculum review?

| RESPONSE | N | % |
|---|---|---|
| Yes more than once | 100 | 50.3 |
| Yes, once | 58 | 29.1 |
| No | 41 | 20.6 |
| Total | 199 | 100.0 |

10) If you have not implemented any modules, why not?

| | RESPONSE | YES | NO | TOTAL |
|---|---|---|---|---|
| Did not consider implementing | N | 2 | 39 | 41 |
| | % | 4.9 | 95.1 | 100.0 |
| Implementing in current semster | N | 11 | 30 | 41 |
| | % | 2.6 | 73.2 | 100.0 |
| Review/training too late in school year | N | 13 | 28 | 41 |
| | % | 31.7 | 68.3 | 100.0 |
| Computers not available | N | 7 | 34 | 41 |
| | % | 17.1 | 82.9 | 100.0 |
| Software not available | N | 2 | 4.9 | 41 |
| | % | 4.9 | 95.1 | 100.0 |
| Computers not connected to internet | N | 0 | 41 | 4 |
| | % | 0.0 | 100.0 | 100.0 |
| Modules too hard to implement | N | 0 | 41 | 41 |
| | % | 0.0 | 100.0 | 100.0 |
| Did not fit into curriculum | N | 5 | 36 | 41 |
| | % | 12.1 | 87.6 | 100.0 |
| Other | N | 16 | 26 | 42 |
| | % | 38.1 | 61.9 | 100.0 |

11) Have you implemented some other new technology-rich lesson or activity with your students since your training?

| RESPONSE | N | % |
|---|---|---|
| Yes | 19 | 45.2 |
| No | 23 | 54.8 |
| Total | 42 | 100.0 |

13) Is this a required course, either for a degree or for a certain concentration?

| RESPONSE | N | % |
|---|---|---|
| Yes | 150 | 94.9 |
| No | 8 | 5.1 |
| Total | 158 | 100.0 |

14) On average, how many students are in this class?
(This table presents measures of central tendency. Only teachers who implemented a module at least once are included in this analysis.)

| SAMPLE SIZE | MISSING CASES | CENTRAL TENDENCY | | | DISTRIBUTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Median | Mode | Standard Deviation | Minimum | Maximum | Percentiles 25th | 50th | 75th |
| 158 | 8 | 34.73 | 23.50 | 20.00 | 47.92 | 5.00 | 350.00 | 16.75 | 23.50 | 30.00 |

15) What degree program are most of these students enrolled in? (If necessary, check more than one.)

| RESPONSE | N | % |
|---|---|---|
| BA | 106 | 67.1 |
| MA | 17 | 10.8 |
| M.Ed. | 32 | 20.3 |
| MS | 7 | 4.4 |
| MAT | 8 | 5.1 |
| Ph.D/Ed.D. | 0 | 0.0 |
| Associates Degree | 3 | 1.9 |

Total N for this series of items was 158 (all those who implemented a module at least once). Respondents could check more than one answer on this item.

16) What is the schedule for this class?

*Days per week:*

| SAMPLE SIZE | MISSING CASES | CENTRAL TENDENCY | | | DISTRIBUTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Median | Mode | Standard Deviation | Minimum | Maximum | Percentiles 25th | 50th | 75th |
| 144 | 57 | 1.56 | 1.00 | 1.00 | 0.82 | 1 | 5 | 1.00 | 1.00 | 1.00 |

*Minutes at a time:*

| SAMPLE SIZE | MISSING CASES | CENTRAL TENDENCY | | | DISTRIBUTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Median | Mode | Standard Deviation | Minimum | Maximum | Percentiles 25th | 50th | 75th |
| 89 | 112 | 138.90 | 150.00 | 180.00 | 67.91 | 15.00 | 480.00 | 90.00 | 150.00 | 180.00 |

Note that there are a lot of missing cases here. Many teachers responded with the number of weeks over which the course was taught rather than the number of minutes per session.

17) About how frequently is the course offered?

| RESPONSE | N | % |
|---|---|---|
| Every term | 107 | 68.2 |
| More than once a year | 16 | 10.2 |
| Once a year | 32 | 20.4 |
| Less than once a year | 2 | 1.3 |
| Total | 157 | 100.0 |

20) Do you coordinate your use of Intel Teach to the Future with any other faculty members' use of this curriculum?

| RESPONSE | N | % |
|---|---|---|
| Yes | 69 | 44.2 |
| No | 87 | 55.8 |
| Total | 156 | 100.0 |

**Section III:**

## *Implementing the Intel® Teach to the Future curriculum*

*In this final section, please answer questions about specific classroom experiences with reference to the class you just described.*

21) Please indicate how much of the following Intel Teach to the Future modules you integrated into this course:

| | RESPONSE | NONE | A LITTLE | MOST OF IT | ALL OF IT | TOTAL |
|---|---|---|---|---|---|---|
| M1: Getting started | N | 8 | 34 | 52 | 56 | 150 |
| | % | 5.3 | 22.7 | 34.7 | 37.3 | 100.0 |
| M2: Locating resources | N | 6 | 31 | 66 | 42 | 145 |
| | % | 4.1 | 21.4 | 45.5 | 29.0 | 100.0 |
| M3: Creating Student publications | N | 7 | 26 | 57 | 80 | 150 |
| | % | 4.7 | 17.3 | 38.0 | 40.0 | 100.0 |
| M4: Creating resources for unit | N | 17 | 32 | 55 | 49 | 153 |
| | % | 11.1 | 20.9 | 35.9 | 32.0 | 100.0 |
| M5: Creating unit support materials | N | 18 | 51 | 54 | 28 | 151 |
| | % | 11.9 | 33.8 | 35.8 | 18.5 | 100.0 |
| M6: Creating student Web Sites | N | 44 | 37 | 37 | 34 | 152 |
| | % | 28.9 | 24.3 | 24.3 | 22.4 | 100.0 |
| M7: Creating teacher support materials | N | 28 | 45 | 51 | 27 | 151 |
| | % | 18.5 | 29.8 | 33.8 | 17.9 | 100.0 |
| M8: Developing plans for implementation | N | 27 | 50 | 49 | 25 | 151 |
| | % | 17.9 | 33.1 | 32.5 | 16.6 | 100.0 |
| M9: Putting unit portfolios together | N | 38 | 44 | 43 | 26 | 151 |
| | % | 25.2 | 29.1 | 28.5 | 17.2 | 100.0 |
| M10: Showcasing unit portfolios | N | 51 | 38 | 39 | 23 | 151 |
| | % | 33.8 | 25.2 | 25.8 | 15.2 | 100.0 |

22) Which of the following products did some or all of your students create when you taught portions of the Intel Teach to the Future curriculum?

| | MULTIMEDIA PRESENTATION | | DESKTOP PUBLISHED STUDENT SAMPLE PUBLICATION | | STUDENT SAMPLE WEBSITE | |
|---|---|---|---|---|---|---|
| Response | % | N | N | % | N | % |
| Did not create | 15 | 10.1 | 33 | 22.8 | 56 | 40.6 |
| Made to present/share own work only | 68 | 45.9 | 57 | 39.3 | 42 | 30.4 |
| Made K-12 student sample only | 31 | 20.9 | 35 | 24.1 | 26 | 18.8 |
| Both present/share and student sample | 34 | 23.0 | 20 | 13.8 | 14 | 10.1 |
| Total | 148 | 100.0 | 145 | 100.0 | 138 | 100.0 |

23) The following statements are about challenges you may have faced while leading this course For each item below, select the choice that best represents your experience.

| | RESPONSE | NOT AN OBSTACLE | MINOR OBSTACLE | MODERATE OBSTACLE | MAJOR OBSTACLE | TOTAL |
|---|---|---|---|---|---|---|
| Recruiting students | N | 145 | 5 | 3 | 1 | 154 |
| | % | 94.2 | 3.2 | 1.9 | .6 | 100.0 |
| Managing students on coputers | N | 73 | 47 | 25 | 4 | 149 |
| | % | 49.0 | 31.5 | 16.8 | 2.7 | 100.0 |
| Managing software | N | 53 | 67 | 29 | 3 | 152 |
| | % | 34.9 | 44.1 | 19.1 | 2.0 | 100.0 |
| Time constraint | N | 24 | 45 | 45 | 41 | 155 |
| | % | 15.5 | 29.0 | 29.0 | 26.5 | 100.0 |
| Access to computers | N | 74 | 31 | 26 | 24 | 155 |
| | % | 47.7 | 20.0 | 16.8 | 15.5 | 100.0 |
| Students' access to computers | N | 58 | 53 | 33 | 11 | 155 |
| | % | 37.4 | 34.2 | 21.3 | 7.1 | 100.0 |
| Students' access software | N | 64 | 45 | 33 | 12 | 154 |
| | % | 41.6 | 29.2 | 21.4 | 7.8 | 100.0 |
| Getting tech support | N | 76 | 42 | 23 | 10 | 151 |
| | % | 50.3 | 27.8 | 15.2 | 6.6 | 100.0 |
| Own computer skills | N | 84 | 52 | 12 | 6 | 154 |
| | % | 54.5 | 33.8 | 7.8 | 3.9 | 100.0 |
| Student computer skills | N | 39 | 82 | 29 | 5 | 199 |
| | % | 25.2 | 52.9 | 18.7 | 3.2 | 100.0 |
| Students' computer skills | N | 45 | 57 | 36 | 13 | 151 |
| | % | 29.8 | 37.7 | 23.8 | 8.6 | 100.0 |
| Students' classroom experience | N | 45 | 57 | 36 | 13 | 151 |
| | % | 29.8 | 37.7 | 23.8 | 8.6 | 100.0 |
| Students' knowledge of pedagogy | N | 47 | 67 | 30 | 7 | 151 |
| | % | 31.1 | 44.4 | 19.9 | 4.6 | 100.0 |
| Alignment curriculum and goals | N | 92 | 42 | 18 | 2 | 154 |
| | % | 59.7 | 27.3 | 11.7 | 1.3 | 100.0 |

24) How much of an obstacle is each of the following to the integration of technology into your teaching in general?

| | RESPONSE | NOT AN OBSTACLE | MINOR OBSTACLE | MODERATE OBSTACLE | MAJOR OBSTACLE | TOTAL |
|---|---|---|---|---|---|---|
| Technology access at college/university | N | 114 | 40 | 19 | 18 | 191 |
| | % | 59.7 | 20.9 | 9.9 | 9.4 | 100.0 |
| Inadequate software in classroom/lab | N | 102 | 47 | 22 | 19 | 190 |
| | % | 53.7 | 24.7 | 11.6 | 10.0 | 100.0 |
| Tech support | N | 104 | 53 | 22 | 10 | 189 |
| | % | 55.0 | 28.0 | 11.6 | 5.3 | 100.0 |
| Planning time | N | 73 | 63 | 33 | 18 | 187 |
| | % | 39.0 | 33.7 | 17.6 | 9.6 | 100.0 |
| Coordination of instructional content among faculty | N | 87 | 65 | 26 | 11 | 189 |
| | % | 46.0 | 34.4 | 13.8 | 5.8 | 100.0 |
| Flexible classroom time | N | 94 | 46 | 33 | 16 | 189 |
| | % | 49.7 | 24.3 | 17.5 | 8.5 | 100.0 |
| Administrative support for tech integration | N | 135 | 34 | 13 | 10 | 192 |
| | % | 70.3 | 17.7 | 6.8 | 5.2 | 100.0 |
| Student motivation for tech courses | N | 114 | 55 | 20 | 3 | 192 |
| | % | 59.4 | 28.6 | 10.4 | 1.6 | 100.0 |
| Faculty motivation to offer tech courses | N | 96 | 61 | 28 | 7 | 192 |
| | % | 50.0 | 31.8 | 14.6 | 3.6 | 100.0 |
| Opportunities for tech prof development | N | 114 | 48 | 22 | 7 | 191 |
| | % | 59.7 | 25.1 | 11.5 | 3.7 | 100.0 |

25. Which of the following types of software and related technologies do you sometimes ask your students to use, either during your classes or to prepare for your classes?

| | RESPONSE | NEVER | STUDENTS USE BEFORE | STUDENTS USE AFTER | TOTAL |
|---|---|---|---|---|---|
| PowerPoint | N | 15 | 115 | 61 | 191 |
| | % | 7.9 | 60.2 | 31.9 | 100.0 |
| Publisher for desktop publishing | N | 68 | 41 | 83 | 192 |
| | % | 35.4 | 21.4 | 43.2 | 100.0 |
| Publisher for building websites | N | 95 | 27 | 69 | 819 |
| | % | 49.7 | 14.1 | 36.1 | 100.0 |
| Internet/ WWW | N | 8 | 159 | 24 | 191 |
| | % | 4.2 | 83.2 | 12.6 | 100.0 |
| Word processing software | N | 9 | 164 | 18 | 191 |
| | % | 4.7 | 85.9 | 9.4 | 100.0 |
| Other multimedia presentation tools | N | 109 | 57 | 24 | 190 |
| | % | 57.4 | 30.0 | 12.6 | 100.0 |
| Other desktop publishing tools | N | 108 | 57 | 25 | 190 |
| | % | 56.8 | 30.0 | 13.2 | 100.0 |
| Other web development tools | N | 95 | 71 | 24 | 190 |
| | % | 50.0 | 37.4 | 12.6 | 100.0 |
| Database program | N | 76 | 95 | 19 | 190 |
| | % | 40.0 | 50.0 | 10.0 | 100.0 |
| Reference info (CD/ROMs) | N | 56 | 105 | 29 | 190 |
| | % | 29.5 | 55.3 | 15.3 | 100.0 |
| Drawing software | N | 121 | 59 | 10 | 190 |
| | % | 63.7 | 31.1 | 5.3 | 100.0 |
| Image editing software | N | 125 | 45 | 19 | 189 |
| | % | 66.1 | 23.8 | 10.1 | 100.0 |
| Graphic organizers | N | 96 | 75 | 19 | 19 |
| | % | 50.5 | 39.5 | 10.0 | 100.0 |

26) Intel Teach to the Future aims to introduce students to a range of pedagogical techniques and tools, not only to technology. Has the Intel Teach to the Future curriculum helped you to teach the following concepts or practices to your students?

| | RESPONSE | TAUGHT BEFORE | TEACH NOW | DON'T TEACH | TOTAL |
|---|---|---|---|---|---|
| Creating a lesson | N | 141 | 28 | 22 | 191 |
| | % | 73.8 | 14.7 | 11.5 | 100.0 |
| Designing rubrics | N | 110 | 59 | 19 | 188 |
| | % | 58.5 | 31.4 | 10.1 | 100.0 |
| Using rubrics | N | 111 | 59 | 18 | 188 |
| | % | 59.0 | 31.4 | 9.6 | 100.0 |
| Using curriculum-framing questions | N | 71 | 84 | 32 | 187 |
| | % | 38.0 | 44.9 | 17.1 | 100.0 |
| Creating teacher portfolios | N | 96 | 56 | 34 | 186 |
| | % | 51.6 | 30.1 | 18.3 | 100.0 |
| Creating student portfolios | N | 93 | 52 | 42 | 187 |
| | % | 49.7 | 27.8 | 22.5 | 100.0 |
| Performance based assessment | N | 131 | 32 | 21 | 184 |
| | % | 71.2 | 17.4 | 11.4 | 100.0 |
| Use of "backward design: | N | 75 | 64 | 43 | 182 |
| | % | 41.2 | 35.2 | 23.6 | 100.0 |
| Constructivist teaching practices | N | 120 | 30 | 24 | 174 |
| | % | 69.0 | 17.2 | 13.8 | 100.0 |

27) Some Intel® Teach to the Future participants have suggested that their participation in the program has had an impact on the role they assume in their department. Please indicate the degree to which you agree or disagree with the following statements regarding the program's impact on your professional experiences.

| | RESPONSE | STRONGLY DISAGREE | DISAGREE | AGREE | STRONGLY AGREE | TOTAL |
|---|---|---|---|---|---|---|
| Few Colleagues aware | N | 38 | 66 | 45 | 30 | 179 |
| | % | 21.2 | 36.9 | 25.1 | 16.8 | 100.0 |
| Confer more with ITTF faculty | N | 25 | 45 | 64 | 35 | 169 |
| | % | 14.8 | 26.6 | 37.9 | 20.7 | 100.0 |
| Confer more about tech issues | N | 27 | 43 | 74 | 29 | 173 |
| | % | 15.6 | 24.9 | 42.8 | 16.8 | 100.0 |
| Taken on tech troubleshooting role | N | 37 | 55 | 44 | 26 | 162 |
| | % | 22.8 | 34.0 | 27.2 | 16.0 | 100.0 |
| Taken on tech leadership role | N | 24 | 36 | 53 | 30 | 143 |
| | % | 16.8 | 25.2 | 37.1 | 21.0 | 100.0 |