Michigan Technology Integration Training Initiative

Michigan Virtual University
Michigan Association for Computer Users in Learning

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Executive Summary

The stated goal of the Michigan Technology Integration Training Initiative was to "reach more than 8,000 teachers with access to quality training focused on technology integration with a student focus. This will be achieved through implementation of the Intel© Teach for the Future program, expansion of the ATA (Ameritech Technology Academy) Scholars program for a third year, as well as through the implementation of a limited number of three-day Teacher Leadership Seminars." The initiative was the result of an intensive and comprehensive push in the state of Michigan to support the use of educational technology in colleges, universities, and in K-12 classrooms. The Technology Integration Training Initiative consisted of three distinct programs, similar in purpose, but different in approach. With funding from the Bill & Melinda Gates Foundation, the three programs were administered by the Michigan Association for Computer Users in Learning (MACUL) and Michigan Virtual University (MVU) in an effort to affect as many Michigan teachers as possible.

Evaluation Questions

Evaluation Question #1: ***What are the stated purposes of the Michigan Technology Integration Training Initiative? What are the components of the programs?***

The Michigan Technology Integration Training Initiative was comprised of three programs, each intended to support teachers' efforts to integrate technology into the curriculum. These included the ATA Technology Academy, Intel© Teach to the Future, and the Teacher Leadership Seminar (3.0). The ATA training focused on curriculum integration and professional development, utilizing a train-the-trainer model to build educational technology capacity in Michigan schools. Curriculum integration was also the focus of the Intel training program, where teachers developed technical skills in the process of designing a major curriculum unit plan. Intel© Teach to the Future also used a structured train-the-trainer model to encourage continued professional development. The Teacher Leadership Seminar was an in-depth training that focused on specific pedagogical and technological strategies intended to facilitate sound classroom integration.

Evaluation Question #2: ***Is there cohesion between and among the three programs?***

An examination of the three programs suggests that there was in fact a reasonable degree of cohesion between and among them. Each adopted a somewhat different approach to achieve the broader goal of relevant and appropriate technology integration, and yet their efforts were mutually supportive. The ATA Technology Academy provided an overview of technology integration during the first day of a two-day program, and the second day focused on professional development, where building teams worked together to design a technology vision and plan for their schools. The Intel and Teacher Leadership Seminar programs were more directly focused on classroom integration, guiding and supporting teachers as they developed the technical and pedagogical skills needed for effective technology integration. Taken together the individual programs

offered Michigan educators several useful options for expanding their technology integration efforts.

Evaluation Question #3: ***To what degree do the programs reflect the practices of the Teacher Leadership Project and other research-proven professional development practices?***

Research on sound professional development and technology integration suggests that several factors are key to ensuring a program's success. These factors include in-depth training that incorporates hands-on learning, collaboration, real tasks, follow-up training and support, time for exploring and planning, strong and supportive leadership, and adequate access to technology. Washington State's Teacher Leadership Project has proved to be a successful model of professional development in establishing many of these conditions and thus can be used as an example for other programs. The three programs that made up the Michigan Technology Integration Training Initiative reflected these conditions to varying degrees. Strengths of the ATA Technology Academy included the requirement that schools participate as teams (to include the building principal) and the emphasis placed on planning and professional development for the best use of technology. Intel proved to be a strong program in terms of the depth of training provided to teachers, which focused on technical skills in the context of unit planning. The Teacher Leadership Seminar offered teachers the opportunity to extend their Intel training by expanding their technical and pedagogical skills. This was accomplished through hands-on learning experiences and collaboration with colleagues. While each of the three programs had specific strengths in the training they offered, they did not match the standard set by the Teacher Leadership Project in terms of follow-up training.

Evaluation Question #4: ***Is there evidence that the programs have been successful in changing classroom teaching through the integration of technology?***

It is clear that the three components of the Michigan Technology Integration Training Initiative are having an impact on the classroom. The focus of the ATA Technology Academy on professional development and planning, accomplished by a collaborative school team, has been particularly useful in furthering the technology efforts of participating schools. Where these schools followed through and implemented their technology plans, integration generally reached the classroom level. Intel and TLS, on the other hand, provided teachers with specific strategies for incorporating technology at the classroom level. Evidence suggests that teachers were beginning to use technology in a variety of ways to support student learning, including writing projects, student presentations, and research. There was also some indication that teachers were becoming more comfortable with teaching strategies that support technology integration.

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INTRODUCTION

Description of the Michigan Technology Integration Training Initiative

The stated goal of the Technology Integration Training Initiative was to "reach more than 8,000 teachers with access to quality training focused on technology integration with a student focus. This was to be achieved through implementation of the Intel© Teach to the Future program, expansion of the ATA (Ameritech Technology Academy) Scholars program for a third year, as well as through the implementation of a limited number of three-day Teacher Leadership Seminars." The initiative was the result of an intensive and comprehensive push in the state of Michigan to support the use of educational technology in colleges, universities, and in K-12 classrooms. A number of specific efforts have been made in this regard, including the development of a technology plan by the State Board of Education, the establishment of telecommunications structures in schools and libraries, and the awarding of grants to innovative teachers. In addition, the Teacher Technology Initiative (TTI) allocated $110,000 to K-12 teachers across the state for hardware, software, Internet access and web-based training. Teachers who benefited from the TTI were required to complete a self-assessment measuring their attitudes and skills in using technology for teaching and learning, the results of which indicated a pressing need for training.

The Michigan Technology Integration Training Initiative consisted of three distinct programs, similar in purpose, but different in approach. Administered by Michigan Association for Computer Users in Learning (MACUL) and Michigan Virtual University (MVU), the initiative provided funding for all three components, which included the ATA Technology Academy, Intel© Teach to the Future, and the Teacher Leadership Seminar. Funds provided by the Bill & Melinda Gates Foundation were used to continue the ATA Technology Academy for a third year, and to support Intel© Teach to the Future and the Teacher Leadership Seminars.

Background

The presence of computers and related technology in K-12 education continues to grow, and it is estimated that there are currently over 10 million computers in schools across the country (Becker, 2000). Student access to these computers is increasing, and in 2001 the student-to-computer ratio nationally was just over 4:1 (Skinner, 2002, p. 1). Access to the Internet is also improving steadily, according to the U.S. Department of Education, and their data indicate that 98% of schools had Internet access in 2000, while 77% of classrooms had such access (U.S. Department of Education, 2001, p. 1). This has resulted in greater student access to Internet-connected computers, which dropped to 6.8 students per connected computer in 2001.

Access does not ensure that technology will make a difference in teaching and learning, however. Administrators of one district's technology integration program commented that "Although teachers now have the advantage of unprecedented access to technology in their classrooms and schools, we find, paradoxically, little evidence to indicate that teachers systematically integrate technology into classroom instruction" (Eastwood, Harmony, & Chamberlain, 1998, p. 1). It has been suggested that technology, and the Internet in particular, has had relatively little impact on education because educators do not maximize its power. It is often used for routine tasks and thus "a most powerful and innovative technology [the Internet] is taken and domesticated, or if you want – trivialized, such that it does more or less what its predecessors have done, only it does it a bit faster and a bit nicer…"(Salomon, 2002, p. 72). Others share this view. According to a recent report on technology and learning, computers "can motivate students to take more interest in and control of their learning" (Allen, 2001, p. 2). On the other hand, "the potential for technology to increase student achievement goes largely untapped" (p. 2).

For their part, teachers often do not feel prepared to integrate technology into the curriculum. According to Meyer (2001), a majority of teachers surveyed reported not being given enough time to learn how to use technology as an instructional tool. Similar concerns were reported in a 1999 study conducted by the National Center for Education Statistics where it was found that only one in three teachers felt prepared to use the Internet for teaching and learning (NCES, 1999). In fact, training and time continue to emerge as critical factors in any successful technology integration program.

The Promise of Technology[1]

Developments in the use of technology reflect the changes in understanding over the last two decades about how the mind works and how children actually learn. Research derived from work in developmental psychology, cognitive psychology, linguistics, and neuroscience and coupled with the philosophical ideas of constructivism (Duffy & Cunningham, 1996) serves as the basis for many of the current beliefs about what and how children should learn in school. "Our understanding of human learning has….evolved based on a wealth of evidence collected over a wide range of different domains and media from which a process based on the passive assimilation of isolated facts to one in which the learner actively formulates and tests hypotheses about the world, adapting, elaborating, and refining internal models that are often highly procedural in nature" (Shaw & President's Committee of Advisors on Science and Technology, 1998). The National Research Council's Committee on Developments in the Science of Learning articulated an idea central to this new understanding of human learning: "A fundamental tenet of modern learning theory is that different kinds of learning goals require different approaches to instruction; new goals for education require changes in opportunities to learn" (Bransford, et al., p. xvi). "These new learning opportunities should take place in learning environments that are student centered, knowledge centered, assessment centered, and community centered…"

[1] Taken from Fouts, J. T. (2000). *Research on Computers in Education: Past, Present and Future.*

Their conclusions suggest that

- Because many new technologies are interactive, it is now easier to create environments in which students can learn by doing, receive feedback, and continually refine their understanding and build new knowledge.
- Technologies can help people visualize difficult-to-understand concepts, such as differentiating heat from temperature. Students are able to work with visualization and modeling software similar to the tools used in nonschool environments to increase their conceptual understanding and the likelihood of transfer from school to nonschool settings.
- New technologies provide access to a vast array of information, including digital libraries, real-world data for analysis, and connections to other people who provide information, feedback, and inspiration, all of which can enhance the learning of teachers and administrators as well as students (Bransford, et al. p. xviii-xix).

Of particular importance to those involved in the field of educational technology is the potential for computers and related technological tools to be used in transforming the classroom, such that a student's educational experience is qualitatively improved. In the past decade, the use of computers has expanded from use primarily as an instructional delivery medium to use as a transformational tool and integral part of the learning environment. In fact, many proponents of the current reform efforts see technology as a vital component of a new educational paradigm in which the curriculum, teaching methods, and student outcomes are reconceptualized (Means, 1994). This view was adopted by the U.S. Department of Education at least as early as 1993. In "*Using Technology to Support Education Reform"* (United States Department of Education, 1993) it was stated that "technology supports exactly the kinds of changes in content, roles, organizational climate, and affect that are at the heart of the reform movement."

Critical Factors in Technology Integration

As more schools across the country commit themselves to some sort of technology agenda, greater efforts have been made to determine the impact of such technology on teaching and learning. Are computers and related technologies being used to transform student learning? Larry Cuban, for one, has argued that computers are a mismatch with the requirements and conditions of teaching (Cuban, 1986, 2000), and even those who are convinced that we are "on the verge of the dawn of a golden age for educational technology" suggest that technology has not yet lived up to its promise (Goldberg, 2002, p. 32). Still, clear patterns are emerging that document the benefits of technology-rich environments, including positive changes in student attitude and behavior, classroom dynamics, student learning, student work, and the role of the teacher.

Teacher Training. The benefits of integrating technology into the curriculum are not the result of simply placing large amounts of technology in the classroom. Researchers are discovering a number of conditions that are critical to a sound technology program, and when such conditions are not met the chance of realizing these benefits is greatly reduced. At the heart of a successful technology integration program is

teacher training. Researchers, administrators, and teachers have found that training in using computers is essential when attempting to infuse technology into the curriculum. According to Becker, "Teachers who have a reasonable amount of technical skill and who use computers to address their own professional needs use computers in broader and more sophisticated ways with students than teachers who have limited technical skills and no personal investment in using computers themselves" (2000, p. 7). A review of research conducted by Sivin-Kachala and Bialo documented the benefits of technology in improving student achievement, students' attitudes, and the learning environment. They observed, however, that "The decisions made by well-trained educators [necessarily] determine the computer's ultimate instructional effectiveness" (1995, p. 17). Other researchers agree. "The focus of integration is on pedagogy- effective practices for teaching and learning. Teachers need to be able to make choices about technology integration without becoming technocentric by placing undue emphasis on the technology for its own sake without connections to learning and the curriculum. For both preservice and inservice professional development, this means providing experiences, primarily in instructional design, media selection, modeling exemplary practices, clinical activities, resource sharing, and extensive and sustained training and practice" (Earle, 2002, p. 10). In an effort to clarify the importance of effective teaching in technology integration, a study was conducted to determine how teachers at various levels of technology use and teaching abilities actually used computers and related technology (Pierson, 2001). Findings indicated that in addition to possessing technical skills, teachers needed to be knowledgeable of content and pedagogy to maximize the potential of technology. Pierson explained her conclusions as follows:

> Researchers (Berliner, 1986; Leinhardt & Greeno, 1986; Shulman, 1986; Wilson, Shulman, & Richert, 1987) agree that expert teachers possess both *content knowledge* and *pedagogical knowledge*, the intersection of which is described as *pedagogical-content knowledge*, or knowledge about specific learning, curriculum, and the various and most useful ways to represent the particular subject matter being taught. The findings of the present study suggest another component to the model, that of *technological knowledge*. This knowledge would include not only basic technology competency but also an understanding of the unique characteristics of particular types of technologies that would lend themselves to particular aspects of the teaching and learning processes. A teacher who effectively integrates technology would be able to draw on extensive content knowledge and pedagogical knowledge, in combination with technological knowledge. The intersection of the three knowledge areas, or *technological-pedagogical-content knowledge* would define effective technology integration (p. 427).

Pierson goes on to propose that "unless a teacher views technology use as an integral part of the learning process, it will remain a peripheral ancillary to his or her teaching. True integration can only be understood as the intersection of multiple types of teacher knowledge and, therefore, is likely as rare as expertise"[2] (p. 427).

[2] "Expertise" or "Exemplary teaching" is defined by Pierson based on a framework from Berliner (1994): "Identifies seasoned teachers who possess the intuition to recognize patterns across unrelated activities and

Time and Support. While teacher training is clearly one of the most important elements in technology integration, other conditions have been identified as well. Time for teachers to collaborate and plan, adequate technical and administrative support, and access to hardware, software, and funding are essential to a sound technology plan. The importance of time cannot be overstated. It has been reported that "82% of teachers said they were not given enough time outside their regular teaching duties to learn, practice, or plan how to use the computers and other technologies" (Meyer, 2001, p. 50). In a study of laptop classrooms, Windschitl and Sahl found that one of the most powerful ways in which teachers increased their proficiency in using technology for teaching and learning was through regular collaboration with their peers (2002, p. 202).

The importance of adequate hardware and technical support is becoming clear as well. When schools do not make provisions for maintaining and replacing technology, the promise of long-term success is greatly reduced. As one group of district technology personnel noted, "It is not surprising that only about five percent of instructional technology programs succeed or endure beyond a three-to-five year period. Several factors erode efforts a district might make to sustain an effective technology program: a focus on hardware rather than on processes, the recurring obsolescence of hardware, a weak planning process that fails to meet the needs of teaching and learning, little or no staff development, and no long-range plan for sustained effort (Eastwood, Harmony, & Chamberlain, 1998, p. 1). The director of technology for one school district suggested that the hardware itself is a barrier to true transformation.

> To have a truly transformational impact on education, technology must become ubiquitous. It must be always available, mobile, and flexible. It must be intuitive, reliable, and user-friendly to the point of being no more difficult to operate than a chalkboard, textbook, or overhead projector. It must be seamless and nearly invisible. At the moment, educational technology isn't any of these things" (Goldberg, 2002, p. 32).

Summary

As schools dedicate more and more resources to technology, questions remain about the impact on teaching and learning. While many believe that progress is being made in developing and implementing effective technology integration programs, there is general agreement among educators and researchers that such efforts are still in their infancy. Goldberg, for one, has suggested that "It may take a few more years for attitudes and technologies to mature to the point that the transformation is possible- but it will happen. Ubiquitous technology will have such an explosive impact on education that its results will become clearly visible to the naked eye, in stark contrast to today's inconclusive empirical studies" (2002, p. 34). And in response to Larry Cuban's contention that computers will play a relatively minor role in changing student learning, Becker acknowledges that

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have contingency plans for the unexpected. Exemplary also describes those few highly motivated learners who interpret their environment in fluid, almost subconscious ways and act in anticipation of what is needed".

> . . . in a certain sense Cuban is correct – computers have *not* transformed the teaching practices of a majority of teachers, particularly teachers of secondary academic subjects. However, under the right conditions – where teachers are personally comfortable and at least moderately skilled in using computers themselves, where the school's daily class schedule permits allocating time for students to use computers as part of class assignments, where enough equipment is available and convenient to permit computer activities to flow seamlessly alongside other learning tasks, and where teachers' personal philosophies support a student-centered, constructivist pedagogy that incorporates collaborative projects defined partly by student interest – computers are clearly becoming a valuable and well-functioning tool (Becker, 2000, p. 29).

Research on educational technology, including qualitative studies, anecdotal reports, program evaluations, and a limited number of relevant quantitative studies, suggests that there are benefits when technology is integrated into the curriculum. Students' attitudes, work products, and learning, as well as classroom dynamics and the role of the teacher are changed when technology is infused into the teaching and learning process (Brown & Rojan, 2002; Brown, Fouts, & Rojan, 2001; Fouts & Stuen, 1997;1999; Stuen & Fouts, 2000; Tiene & Luft, 2001). On the other hand, there is mounting evidence of certain critical conditions that must be met for technology to be successfully integrated into the curriculum (Becker, 2000; Earle, 2002; Eastwood, Harmony, & Chamberlain, 1998; Salomon, 2002). These include teacher training, time to collaborate and plan, administrative and technical support, as well as specific hardware and software applications. The Michigan Technology Integration Training Initiative was designed to train and support teachers throughout Michigan to use technology for the improvement of student learning. The degree to which the program is effective can be measured in part by the degree to which they successfully address these conditions.

EVALUATION DESIGN

The evaluation of the Michigan Technology Integration Training Initiative was designed to assess the various components of the training agenda and the degree to which these components supported Michigan's overall goal of assisting teachers in their efforts to integrate technology into the curriculum.

Evaluation Questions

The following four research questions directed the evaluation:

1. What are the stated purposes of Michigan's Technology Integration Training Initiative? What are the components of the initiative?
2. Is there cohesion between and among the three programs that make up the Michigan initiative?
3. To what degree do the programs reflect the practices of the Teacher Leadership Project and other research-proven professional development practices?
4. Is there evidence that the programs have been successful in changing classroom teaching through the integration of technology?

Data Sources

Data for this evaluation were gathered from several sources including published evaluation reports, descriptive program literature, teacher interviews, and on-site school visits. Specific resources included:

- Ameritech Technology Academy Evaluation: Summative Evaluation Report (2001). Raymond A. Rosenfeld and Carol J. Haddad.

- Ameritech Technology Academy Evaluation: Final Report (2002). Raymond A. Rosenfeld and Carol J. Haddad.

- 2000-2001 Evaluation Report: Intel© Teach to the Future. Center for Children and Technology. Katie McMillan Culp, Shalini Shankar, Andy Gersick, and Sara Pederson.

- An Evaluation of Intel© Teach to the Future: Year Two Final Report (2002). Center for Children and Technology. Wendy Martin, Andy Gersick, Hannah Nudell, and Katie McMillan Culp.

- Ameritech Technology Academy website (http://www.ataacademy.org)

- Intel© Teach to the Future website (http://www.intel.com/education/teach/facts.htm)

Site visits and teacher interviews took place in nine western Michigan schools during March, 2003, and included 17 central office personnel, school principals, classroom teachers, and computer teachers. All three programs (ATA, Intel© Teach to the Future and the Teacher Leadership Seminar) were represented.

RESULTS

Evaluation Question #1: *What are the stated purposes of the Michigan Technology Integration Training Initiative? What are the components of the programs?*

The stated goal of the Michigan Technology Integration Training Initiative was to "reach more than 8,000 teachers with access to quality training focused on technology integration with a student focus. This will be achieved through implementation of the Intel© Teach for the Future program, expansion of the ATA (Ameritech Technology Academy) Scholars program for a third year, as well as through the implementation of a limited number of three-day Teacher Leadership Seminars."

The initiative was part of an intensive and comprehensive push in the state of Michigan to support the use of educational technology in colleges, universities, and in K-12 classrooms. A number of specific efforts have been made in this regard, including the development of a technology plan by the State Board of Education, the establishment of telecommunications structures in schools and libraries, and the awarding of grants to innovative teachers. But while teachers were provided with hardware and software, the results of a large-scale survey indicated a pressing need for training in how to use the technology to improve student learning. The Michigan technology initiative was designed to help meet that need, and provided funding for three specific programs: ATA Technology Academy, Intel© Teach to the Future, and the Teacher Leadership Seminar.

ATA Technology Initiative

In 1999 the Ameritech Foundation began funding the ATA Technology Academy, a program intended to provide teachers with ways to use technology more effectively in the classroom. The stated purpose of the Academy is to "increase educators' technology skills for the benefit of Michigan students. The program seeks to help educators integrate the use of technology into their curriculum and instructional strategies. The program is built on a train-the-trainer model." Based on the early success of the ATA and a desire to provide training to more teachers across the state, the Michigan Technology Integration Training Initiative secured funding to train an additional 75 school teams.

The ATA Technology Academy focuses on technology integration and professional development. The importance of teamwork is made clear throughout the ATA application process, which includes a team essay and a commitment to the team process. Prospective applicants are asked to explain their school's readiness "to participate in and benefit from a professional development program emphasizing integrating technology across the curriculum." Teams must include at least one building administrator, preferably the building principal, and all members are expected to act as

leader/change agents in the school. Each team also agrees to provide a minimum of 10 hours of training to building colleagues.

Components of the ATA Technology Academy

Training. Initial ATA Technology Academy training takes place over two days. The first day is devoted primarily to technology, with an emphasis placed on hardware, software, and the rationale for using technology to support student learning. Among the outcomes expected of team members are the following:

- Identify and evaluate what good integration looks like
- Explore uses for Inspiration, HyperStudio, Power Point
- Put research into presentation format

To accomplish these goals, participants are guided through several structured curriculum projects and are introduced to a number of hardware and software products. In addition to such practical sessions, participants consider the appropriate role of technology in education.

The focus of the second training day is professional development. Teams are expected to create an agenda for sharing the fundamentals of technology integration with other building staff members. Their efforts are directed toward the following outcomes:

- Develop a building plan using District, State, and National Standards as guides
- Identify resources for staff to use
- Create a practical plan to use with staff

The final product of the ATA training is a professional development plan to be used for school and/or district level technology in-service.

Follow-up and Support. The ATA Technology Academy provides support for building teams during the year following their training, both in the form of a site visit and online resources. Visiting ATA trainers meet with building teams to discuss their successes and challenges and to review their professional development plans. Additional support and assistance is available to ATA participants through an online clearinghouse of technology-related resources, online courses, a listserv, and a weekly e-mail update (Appendix D). The following course is an example of those available to ATA participants:

> *Technology in the Early Elementary Classroom*
> The course is instructor-led and is targeted to K-3 teachers from ATA schools who wish to increase their skills in using digital cameras, KidPix, and other technologies in the classroom. Lots of practical classroom ideas will be shared. Participants should expect to commit 6-8 hours a week to the class. Teachers are encouraged to sign up with a buddy teacher in their school.

Intel© Teach to the Future

The Intel© Teach to the Future program is described as "a worldwide effort to help teachers integrate technology into classrooms to enhance student learning." The goal of the program is to "provide professional development for classroom teachers, enabling [the teacher] to integrate the use of computers into [their] existing curriculum to meet state and national standards." Intel© Teach to the Future has been offered in numerous locales throughout the United States, and selection into the program is based on successfully meeting several criteria.

The Intel© Teach to the Future program utilizes a train-the-trainer model. Intel participants, referred to as Master Teachers, are typically expected to train a certain number of Participant Teachers from their schools and/or districts as a part of their commitment to the program. In the case of the Michigan technology initiative, each Intel Master Teacher was expected to train a total of 30 Participant Teachers. This PT (Participant Training) consisted of 10 four-hour modules, and a suggested timeline was provided by Intel to ensure that the training was accomplished in a timely manner.

Components of Intel Teach to the Future

Training. Intel© Teach to the Future is a five-day training program that was offered to Michigan teachers at seven sites across the state. A total of 125 teachers took part in the Intel training during the summer of 2002. The 10 four-hour modules are designed to provide each participant with opportunities "to collaborate with other teachers and discuss ideas for both introducing and using technology in their classroom." In addition, teachers have the opportunity to "develop a specific unit based either upon material they are currently teaching or material they would like to teach in the future. The goal in the end is for teachers to have a technology product they can take back to their school, one that allows them to raise the level of excellence in their classroom and meet important learning objectives." The Unit Portfolio is a primary outcome of the Intel training and consists of:

- A Unit Plan with student learning objectives aligned to state standards
- Student Samples
  -A student multimedia presentation sample
  -A student publication sample (newsletter of brochure)
  -A student website sample
- Evaluation tools
  -A multimedia evaluation toll for assessing student learning
  -A publication evaluation tool for assessing student learning
  -A Website evaluation tool for assessing student learning
- A teacher presentation, newsletter, brochure, or Website to support the unit
- Handouts, templates, or tests to support the Unit
- A unit implementation plan

- Classroom management documents
- Works cited documents

Follow-up and support. The Intel© Teach to the Future program provides no formal follow-up training or support, although Michigan did build an opportunity into their initiative through the Teacher Leadership Seminar.

Teacher Leadership Seminar

The third component of the Michigan Technology Integration Training Initiative was the Teacher Leadership Seminar (3.0), offered to Intel Master Teachers as a supplemental training opportunity. The Teacher Leadership Seminar is based on the premise that "effective use of computers in classrooms takes thoughtful integration of technology into classroom curriculum through in-depth professional development opportunities for teachers." Modeled after Washington State's Teacher Leadership Project, the TLS provides an in-depth focus on integrating technology into the curriculum as well as the development of more advanced technical skills. Teacher Leadership Seminar training was available only to those teachers who had completed the Intel training, which ensured a basic level of competency in using technology.

Of those teachers who completed the Intel program, nearly two-thirds continued their training with the Teacher Leadership Seminar. These three-day training sessions were offered at seven sites around the state during the summer and fall of 2002.

Components of the Teacher Leadership Seminar

Training. As the agenda for the Teacher Leadership Seminar indicates (Appendix C), teachers participate in a range of curriculum activities, projects, and technical skill sessions. Emphasis is placed on appropriate and relevant use of technology, and all of the TLS sessions are focused on one overarching and essential objective: Used as a tool, how can technology improve student learning? Skill sessions were held throughout the three-day training seminar, where teachers were assisted in utilizing specific applications. Referred to as either Help Desks or Skill Sessions, these opportunities provided teachers with practical tips and strategies to extend their capabilities.

The TLS builds on prior knowledge and skills by providing teachers with advanced instruction in using basic Office programs such as Word and Excel, as well as basic instruction in using SchoolKit. Teachers learn, for example, how to embed maps into Excel documents so that students can use them to draw and label routes of expeditions.

While the obvious focus of the TLS is technology integration, there is also a strong emphasis placed on teachers as leaders. Participants are asked to reflect on the characteristics of effective leaders and to identify ways in which they, as leaders, might appropriately share their expertise in their buildings and districts.

Follow-up and Support. As part of the Michigan Technology Integration Training Initiative, the Teacher Leadership Seminar actually served as a non-required follow-up to the Intel training.

Taken together, the three components of Michigan's Technology Integration Training Initiative were intended to provide direction and assistance to Michigan teachers in using technology effectively for the improvement of teaching and learning and to provide some level of leadership to building and district colleagues.

Evaluation Question #2: *Is there cohesion between and among the various programs?*

The three programs that made up Michigan's technology initiative were intended, ultimately, to assist teachers in their efforts to integrate technology into the curriculum and to share their expertise with others. And although each program identified a different approach to realize the intent of the initiative, there is evidence to suggest that the programs were strategically similar and mutually supportive. An analysis of program goals, selection criteria, and training opportunities illustrates this cohesion.

Program Goals

The overarching goals of the three programs were similar in that they focused on improving student learning. Likewise, at least at a general level, all three programs stressed the use of technology as a tool and emphasized thoughtful and appropriate curriculum integration. Literature obtained from each of the programs confirmed the importance placed on the judicious use of technology. For example, Intel publicity information states that

> Teachers can learn how, when, and where to incorporate technology tools and resources into their current curriculum. They are instructed on how best to create assessment tools and align lesson plans with state and national standards.

Goal statements about the Teacher Leadership Seminar are similar.

> The Teacher Leadership Seminars provide Master Teachers an opportunity to extend their technology integration skills and learning. At the Teacher Leadership Seminars, Master Teachers will explore technology integration using a variety of instructional models and through hands-on activities.

Finally, ATA Technology Academy program literature states that theirs is a staff development program designed to "increase educators' technology skills for the benefit of Michigan students. The program seeks to help educators integrate the use of technology into their curriculum and instructional strategies."

Selection Criteria

There were obvious differences in the selection practices of each program. For example, the ATA program required participants to be part of a school team made up of teachers and at least one administrator. On the other hand, the Intel and TLS training programs are geared toward individual teachers. Those teachers who participated in the Teacher Leadership Seminars were Intel trained Master Teachers and thus were subject to Intel© Teach to the Future selection criteria.

Technical competency was addressed in the selection process as well. Teams participating in the ATA program were required to have at least one member who was technologically competent, meaning that one team member used word processing, electronic mail and web browsers on a regular basis. Teachers selected for the Intel program were asked to show competency in Microsoft Windows, Microsoft Office, e-mail, Internet navigation, and integration of computer technology with existing curriculum.

In addition, each program stipulated certain hardware requirements for selected teachers (classrooms) and schools. ATA guidelines called for buildings to have Internet access for web browsing and e-mail service, at least one computer in each participating classroom, and computers available for instruction or a computer lab for instruction.

For acceptance into the Intel program, districts or schools were asked to meet the following criteria:

- The Intel program must be in alignment with the district and school's technology goals and plans
- The district/ school must agree to provide a PC lab with a minimum of 16 high-performance PCs (Office 2000 Professional or Microsoft XP with Publisher) with Internet access for Participant Training.
- Participant Teachers must have access to an Internet-connected PC with Microsoft Office 2000 Professional or Microsoft Office XP and Publisher for use during their training.
- The district/ school must ensure that by the end of the training, all Participant Teachers have access to an Internet-connected PC in their classroom for student and teacher use and that ongoing technical support is provided.

Components of Training

Program differences become most apparent when comparing the specific elements of each training course. Day one of the two-day ATA Technology Academy gave participants an overview of technology including hardware, software, and peripherals such as PDAs, digital cameras, and microscopes. In addition, basic guidelines and tips for integrating technology into the curriculum were covered. The instruction included hands-on involvement for participants as well as instructor modeling. Day two was spent developing a technology plan and professional development agenda for the building.

The Intel program consisted of five days of in-depth training regarding the use of hardware, software, and peripherals to support the curriculum. The focus was on technology, and particular attention was given to web design. Each teacher left the training with a substantive and comprehensive unit plan to be used with students in the classroom.

The Teacher Leadership Seminar provided a rigorous three-day course focused on the infusion of technology into the curriculum to support and enrich teaching and learning. Research on the effective use of technology along with technical tips and curriculum projects provided teachers with a variety of strategies for maximizing the potential of technology.

Was there cohesion between and among the three programs? An examination of goals, selection criteria, and specific training content suggests that the programs were generally interrelated and mutually supportive. The overarching program goals were consistent, certainly, in that they encouraged thoughtful and appropriate technology integration. Additionally there was overlap in the expectation that each trained teacher and/or administrator would share their expertise beyond their own classroom. The primary difference was in the approach taken by the individual programs.

Each program conformed to the overall intent of the Michigan Technology Integration Training Initiative, yet each presented a distinctly different opportunity for the state's teachers. The ATA Technology Academy was a logical starting point for schools interested in developing a strategic, building-wide vision for integrating technology into the curriculum. The program provided the impetus for teams to develop a school-wide technology agenda based on their particular resources and needs. However, it was incumbent on the school team to ensure that the plan was implemented so that it would impact individual classrooms.

Intel was somewhat different in that it was intended to first develop individual teachers' technology skills and then to build a critical mass of technology expertise through extensive professional training. The Teacher Leadership Seminar was the "icing on the cake," as one teacher commented. It offered teachers the opportunity to strengthen their technology skills and to improve their curriculum integration efforts. And although teachers were encouraged to share their expertise at the building level, there were no formal requirements to do so. Rather, the TLS focused almost exclusively on the actual process of curriculum integration.

Michigan educators were able to select from several different programs as they attempted to further the judicious use of technology in classrooms, schools, and districts. The three programs that made up the Michigan Technology Integration Training Initiative were by and large cohesive and consistent in terms of their overall goals. Differences existed in the approach and in the strategies employed by each program, and it was left to individual teachers and administrators to decide on the most appropriate program for their situation.

Evaluation Question #3: *To what degree do the programs reflect the practices of the Teacher Leadership Project and other research-proven professional development practices?*

As the use of educational technology increases in schools across the country, efforts to determine its impact on teaching and learning continue. A growing body of research on technology integration, as well as research on proven professional development models suggests that certain conditions increase the likelihood that such programs will be successful. These conditions include sound training; time for exploring, planning, and collaborating; technical support; administrative support; and access to powerful technology. Although the presence of these conditions does not ensure that a given teacher will be successful, the absence of any of them will make it more difficult to achieve success. An example of one highly successful professional development program for technology integration is the Teacher Leadership Project.

The Teacher Leadership Project

Funded by the Bill & Melinda Gates Foundation, a group of 27 teachers from schools across Washington State began the Teacher Leadership Project in 1997. This core group was instrumental in defining a vision for the TLP, and based on that vision they developed a model for creating technology-rich classrooms and integrating technology into the curriculum. Their initial efforts were promising, funding was increased, and since then the project has expanded considerably. During the 1998-99 school year 185 teachers were selected to participate in the program, and 215 more were brought on board for the 1999-2000 school year. An additional 1,000 teachers from grades K-12 received training during the 2000-2001 school year. Funding of the program ended after the final cohort of 1,000 teachers was trained in 2002-2003.

Teachers selected for the program received $9,000. for the purchase of hardware to meet specific standards outlined in the parameters of the grant. For K-2 classrooms this included a minimum 1000 lumen portable projector, visual/desktop presenter (could include a combination of document camera and projector or all-in-one solution), three classroom computers, and one printer capable of handling the demands of three computers. For grade 3-12 classrooms the funding provided one multimedia computer for every four students, a printer, and a presentation device. As part of their grant teachers were also provided with Office software, the Encarta Reference Suite, and SchoolKit (for Windows users). In addition, each participant was given a personal laptop computer and was required to participate in 11 days of training over the course of their first year in the program. Training sessions were intended to help teachers develop their technical skills, design curriculum that utilized technology and was aligned with the state's Essential Academic Learning Requirements, and identify leadership opportunities for sharing their knowledge and skills.

Evaluations of the TLP have shown it to be a successful model of professional development (Brown & Rojan, 2002; Brown, Fouts, & Rojan, 2001; Dean, 2000; Fouts &

Stuen, 1999; Stuen & Fouts, 2000). Teachers have been consistently enthusiastic about the depth and content of the training sessions, and have reported important changes to teaching and learning following their TLP training experience. For example, over three-fourths of participating teachers agreed or strongly agreed that

- It would be difficult to accomplish my learning objectives without the technology
- Technology integration in my classroom improves student learning
- Technology integration has changed my role as a teacher
- Students in my classroom focus on learning, not on the technology
- I can easily explain how technology improves or enriches any lesson in which it is used
- Integrating technology into the curriculum is a natural component of my teaching

Support can be found in the literature for a training model such as the TLP. Critical conditions for success include a focus on curriculum and pedagogy (Becker, 2000; Earle, 2002; Pierson, 2001; Salomon, 2002), time for collaboration (Earle, 2002; Eastwood, Harmony & Chamberlain, 1998; Salomon, 2002; Windschitl & Sahl, 2002) and follow-up training (Earle, 2002; Eastwood, Harmony, & Chamberlain, 1998; Franklin, 2001). Teachers themselves have indicated that training and access to equipment are critical to successful integration, as is adequate technical support. Functional equipment without training is only superficially useful, and training without sufficient and/or functional equipment makes the process of integration much more cumbersome, if not impossible (Brown & Rojan, 2002; Brown, Fouts, & Rojan, 2001; Stuen & Fouts, 2000). Furthermore, "Teachers need opportunities to observe models of integrated technology use, to reflect on and discuss their evolving ideas with mentors and peers, and to collaborate with others on meaningful projects as they try out their new ideas about teaching and learning with technology" (Ertmer, 1999, p. 54).

A comparison of traditional and research-proven professional development practices (Figure 1) further illustrates these conditions (Newmann & King, 2000).

Figure 1

Traditional Professional Development Practices	Research Proven Professional Development Practices
Brief workshops, conferences, university or extension courses	Sustained opportunities to learn, experiment, and receive advice and feedback
Little or no follow-up activity	Opportunities for long-term feedback and follow-up activities
Individual participation	Team effort with professional peers within and outside the school

The Michigan Technology Integration Training Initiative

To what degree does the Michigan initiative establish the conditions of a sound technology integration training model? An examination of the programs in terms of the following three critical factors – training, follow-up and support, and access to technology – addressed this question.

Training. It has become increasingly clear that in-depth training, with a focus on content and pedagogy, is at the heart of successful professional development programs. Furthermore, teachers must be actively involved in the training, must engage in meaningful tasks, and must be given opportunities to collaborate. The three programs that made up the Michigan Technology Initiative provided this type of training to varying degrees.

Follow-up and support. Another critical factor in effective technology integration is ongoing collaboration, support, and training. One of the most valuable elements of the Teacher Leadership Project, according to participating teachers, was the six days of follow-up training they received. Two-day sessions in October, January and April followed a rigorous five-day summer training. The follow-up sessions gave teachers an opportunity to present questions and problems that emerged as they integrated technology, to share successful curriculum projects, to discuss student management strategies, and to explore curriculum applications.

Access to technology. Even with sound training and satisfactory support, teachers' efforts to improve teaching and learning through technology will be limited unless they have access to functional equipment. As noted by Becker (2000), the type and frequency of classroom technology use is strongly influenced by the student to computer ratio. Generally it has been found that a 4:1 student to computer ratio is essential to significantly impact student learning over time.

ATA Technology Academy

As part of the Michigan Technology Integration Training Initiative, the ATA Technology Academy provided a two-day training program designed to "guide four person teams from individual buildings in helping schools to convert professional development theory into practice. Teams create a professional development plan to train teachers . . .to use technology effectively to enhance student learning . . .it's all about the application and integration of technology in the classroom to support academic achievement" (ATA Technology Academy brochure, 2003).

Training. The ATA training addressed two primary objectives: curriculum integration and professional development. The first day was an overview of curriculum integration where instructors modeled curriculum projects and shared examples of hardware, software and related technologies (PDAs, digital cameras, and video hardware, for example). Opportunities for in-depth, hands-on participation in curriculum development were necessarily limited. Interviews with ATA participants revealed mixed

reviews of this aspect of the training. For some the day was very useful, and they appreciated learning about new products and the ways in which they might be used in the classroom. Others, however, would have preferred that more time be given to the process of technology integration than to discussions of hardware, new products, and "glitz." Similar findings emerged from a previous outside evaluation of ATA. "These educators were enthusiastic about integrating technology in the curriculum but didn't feel properly trained to do so and were somewhat uncertain about its potential impact on student academic success" (Rosenfeld & Haddad, 2001, p. 4).

The goal of the second training day was to have each school team develop a technology plan, taking into account their specific needs, available resources, and staff readiness. ATA instructors facilitated this process, and time was provided for discussion and collaboration. Based on interviews and evaluation results, it appears that this was a valuable component of the ATA training. For example, although teachers did not leave with all the skills necessary to immediately integrate the curriculum, they were able to address the need for further training in their school plans. ATA team members were, in fact, extremely positive about the focus on planning and leadership. And according to teachers and administrators alike, the requirement that each team have administrative representation was critical. As one principal commented, "I was reluctant to go to the training, but once I got there I was sold." He has since, according to teachers at his school, taken the lead in supporting and implementing their technology plan. A teacher from another school reflected on the benefits of team participation: "Experiencing the process of integrating tech tools with a building team was extremely powerful. Time to plan with your building team was built into the process and helped us focus on building goals as a team . . .ATA gave a wide range of possibilities for the building teams to integrate technology into their district. It wasn't a strict model to adhere to but a flexible process for buildings to personalize to their needs and curriculum."

Follow-up and support. The ATA Technology Academy provided support and follow-up to building teams in several different ways. First, representatives of ATA conducted a site visit to each participating school. The purposes of these visits were to check on implementation of the technology plan, to offer assistance as necessary, and to provide additional resources. The response to these site visits was generally positive, and team members were particularly appreciative of any new resources such as curriculum ideas and websites. It appears that less emphasis was placed on monitoring the school plan. According to an outside evaluation of the site visits, "There was more interest in hardware and software issues than integration of technology into the school curriculum" (Rosenfeld & Haddad, 2002, p. 5). Still, the visits were an important link between ATA Technology Academy trainers and school participants and were viewed favorably by ATA team members.

In addition to site visits, ATA participants had access to regular e-mail update messages (Appendix D), the ATA listserv, an ATA online clearinghouse, and the ATA resource CD. Both evaluation and interview data suggested that the e-mail updates were beneficial, but that other resources were used relatively infrequently.

It is important to note that the ATA Technology Academy addressed the issue of support during the application process. Teams were asked to reference "the existence of a building technology infrastructure" as well as any "support available to the team by others in their district [such as] a district technology director, curriculum director, or media specialist." Although this did not ensure that every school received adequate technical support, it did, at the very least, require teams to consider the availability of internal assistance.

In any case, both teacher interviews and evaluation reports suggested a need for additional training. According to a 2001 evaluation report, " . . .It seems important then that there be sufficient follow-up and support activities to continue to assist the ATA Scholars in their school activities beyond the initial year of the ATA program" (Rosenfeld & Haddad, 2001, p. 10). A similar recommendation was made in the 2002 report: "There are numerous points in the evaluation that clearly suggest greater attention is needed in providing follow-up activities for the educators in their capacity as trainers as well as classroom teachers" (Rosenfeld & Haddad, 2002, p. 13). To their credit, ATA has addressed the need for follow-up training with the addition of ATA II (Summer, 2003), described as "an advanced level of professional development for teams that have participated in the program in Years One, Two or Three (or who can demonstrate that they possess technology integration and training skills comparable to ATA scholars)."

Access to technology. Teams applying for ATA training were required to meet program guidelines related to technology and Internet access. As stated in their literature, "The building in which the team works must have Internet access for web browsing and e-mail service, have at least one computer in each participating classroom, and have computers available for instruction or a computer lab where instruction can occur." Some classrooms reached a 4:1 student-to-computer ratio, but more typically teachers had access to a working computer lab for instruction along with one or more computers in individual classrooms. Teachers appreciated having lab access and in some cases saw distinct advantages to working in such a situation. On the other hand, nearly all believed that their integration efforts would be more effective with additional classroom-level computers.

Additional Considerations

A goal of the ATA program was to train team members to be "change agents" in their schools, helping others to "become more techno-savvy and to assess the technology skills of other educators and the technology capability of the school." They did this through one-on-one assistance, staff meeting presentations, in-service days, and beyond-school workshops. Both on-site school visits and previous evaluation data indicate that most teams do in fact meet their 10-hour training obligation. Still, the goal of having teachers function as change agents proved difficult for some ATA team members who did not always feel adequately prepared to assume the role of trainer. This was definitely related to a given teacher's level of prior experience with technology. In any case, when schools *were* successful in leveraging the training it was due in large part to a principal's commitment to the building technology plan. Where the principal and/or the district was

willing to set aside time in staff meetings or during in-service days for ATA team members to teach and assist, the plan was much more likely to be realized.

Intel© Teach to the Future

The goal of the Intel© Teach to the Future program is " for teachers to have a technology product they can take back to their school, one that allows them to raise the level of excellence and meet important learning objectives" (Program Overview, 2002, Intel). In Michigan this was accomplished over five days during which teachers explored and designed a unit plan tailored to their classroom curriculum objectives while at the same time developing their technical skills.

Training. The Intel program offered teachers comprehensive training in technology integration. Over the course of their five-day class, Intel participants learned a wide range of technical skills as they developed a major unit plan. Teachers were impressed with the expertise of the instructors and with the quality of the teacher-created class materials. And while the course was an "overwhelming" experience in terms of the time and work commitment, teachers in the end were genuinely pleased with their skill development. Teachers also appreciated the time they were given to develop and discuss their unit plans. An examination of the Intel training agenda suggests that participants were indeed introduced to a wide variety of programs and skills, and results of outside evaluations indicate that teachers have been consistently pleased with their training. Furthermore, it has been shown that Intel-trained teachers feel prepared to use their training to support teaching and learning. For example, earlier evaluations of the Intel program reported that "Eighty-eight percent of participants felt "moderately" or "very well" prepared to support their students in using technology in their schoolwork at the end of their training, and 88% felt "moderately" or "very well" prepared to integrate technology into their curriculum/integrate technology into the grade or subject level they teach" (Martin, Gersick, Nudell, & Culp, 2002, p. i).

Intel participants were given in-depth training in using various hardware and software applications in the context of curriculum development. Still, some concern has been expressed in previous evaluations about the effectiveness of the training in connecting technology to student learning goals. Specifically it has been noted that

> . . . teachers typically had difficulty acting on suggestions to think critically about the differences among the software tools and tailor their student work projects and learning goals accordingly. We interpret this as being, in large part, a reflection of the relatively low level of experience most of these teachers had with the relevant technologies. With little of their own experiences as users of these technologies to draw on, it was difficult for many of these teachers to appreciate distinctions among the capabilities and distinctive strengths or different software applications, particularly those they were least familiar with. Consequently, rather than acting as a catalyst to incite teachers to think about how to match technology tools to learning goals, the multiple pieces of the unit plan template (presentation, newsletter, and web page) very often became make-work activities used only as

> opportunities to develop technical skills with the various programs . . .” (Culp, Shankar, Gersick, & Pederson, 2001, pp. 17-18).

It is important to note that this issue has been addressed to some degree, as noted by the evaluators:

> Recent revisions to the Intel Teach to the Future curriculum were designed to address this exact problem by providing teachers with more explicit evidence of the unique capabilities of each type of software . . . However, our observations indicate that the issue for teachers may be less about understanding the qualities of each piece of software than about articulating more clearly the kinds of learning goals that might be associated with these different types of work products (Culp, Shankar, Gersick, & Pederson, 2001, pp. 17-18).

Nevertheless, there is evidence that the Intel training program does have an impact on schools and districts. As noted in a previous evaluation report:

> Focusing on integration rather than basic skills, districts have started to think about what different types of professional development they can provide to better accommodate where teachers are in their abilities to successfully incorporate technology. For example, in response to the Intel© Teach to the Future training, one district revised a summer institute it runs to provide technical training for teachers. In the past, the summer institute entailed learning discrete technology skills and software applications. However, the district staff member in charge of designing the institute reported, ‘This year it’s “Come and let’s see where you are in your curriculum and in your standards-based use of technology, and let’s see how we can help you use the appropriate technology to help you move forward”. I’m sure the Intel program was not the sole reason, but it really heightened our awareness and showed us that the emphasis needs to be on the curriculum and not just on the technology’” (Martin, Gersick, Nudell, & Culp, 2002, p. 29).

The report continues, “As more teachers in the district have gone through Intel training there has been a push for similar professional development options. Teachers who have participated in Intel© Teach to the Future are now no longer satisfied with inadequate professional development options previously offered by their districts” (p. 29). And finally, the authors noted that “A supportive environment is essential if teachers are going to adopt new ideas and approaches to incorporating technology . . .There is evidence that, at the very least, districts are becoming more aware of different ways to develop technology plans and provide appropriate support for teachers” (p. 30). In effect, the Intel program has allowed schools and districts to effectively leverage the training such that they build in a strong support system.

Follow-up and support. The Intel© Teach to the Future program does not include any follow-up training. However, the Michigan Technology Integration Training Initiative did offer the Teacher Leadership Seminar (3.0) as an optional follow-up training for Intel Master Teachers. Interviews with teachers who took the TLS were

extremely positive. This was particularly true for teachers who attended a TLS training session in the fall after their summer Intel training. As one teacher commented, the TLS "brought it all together." Another called it "the best in-service I've ever had . . .The opportunities to collaborate and share, the curriculum ideas and tech tips, and the discussions of appropriate use of technology were awesome." Still, teachers felt that even more follow-up training would be useful. Evaluators of the Intel program have also discussed the need for continued training. "In order for teachers to make a sustained investment in both classroom technology integration and inquiry-or project-based learning, they will need continued support, increased technical resources, and further professional development" (Martin, Gersick, Nudell, & Culp, 2002, p. 34).

Access to technology. Districts and schools were required to agree at the time of application that they would support participating Intel teachers with specific hardware, software, and technical assistance. For example, it was the responsibility of the district or school to ensure that each participating Intel Master Teacher have available a PC lab with "a minimum of 16 high-performance PCs with Internet access in which the Participant Teachers will be trained." The computers were to be equipped with Microsoft Office 2000 Professional or Microsoft XP, including Publisher. Furthermore, each district or school was required to provide necessary technical support.

Teachers trained in the Intel program were thus guaranteed at least a certain level of technology access and support. Beyond this, funding from the Bill & Melinda Gates Foundation provided each participating Michigan Intel Master Teacher with an additional $2500 grant. This money was to be used to bring the teacher's classroom to a "minimum technological standard" according to the following list of priorities:

- First, create a 4:1 student to networked multimedia computer ratio within the Master Teacher's classroom
- Second, provide a classroom presentation system
- Third, provide at least one classroom printer

Additional considerations

Intel-trained Master Teachers were generally very positive about their training, especially those who elected to take the TLS course as a follow-up. Still, interviews with Master Teachers indicted that while they were pleased with the training, they were also kept extremely busy with their various teaching and technology responsibilities. As stipulated by Intel, each Master Teacher was required to provide Intel training to an additional 30 teachers in the two years following their own training. Specifically, they were asked to provide the 40-hour training program to 15 Participant Teachers during the first year and to another 15 Participant Teachers during the second year. Master Teachers felt obligated as well to teach at least part of their unit plan, to develop additional integrated lessons, and in some cases to provide technical assistance to colleagues. These commitments, along with their regular teaching responsibilities, left them little time for collaboration, planning, or reflection. As one teacher reported, "I have been so busy

teaching the Intel classes that I haven't had time to teach my unit plan *or* to use the computers in other ways with my students."

Teacher Leadership Seminar

The Teacher Leadership Seminar was included in the Michigan Initiative as an optional three-day follow-up for Intel Master Teachers. The course offered teachers an opportunity to discuss, explore and plan integrated lessons at a deeper level. As one program organizer noted, the TLS gave teachers

- time to collaborate on technology integration
- a broader perspective on using educational technology from two experienced curriculum professionals
- an opportunity to "cement" and expand their Intel training

Training. The Teacher Leadership Seminar centered all activities, projects and discussions on using technology as a tool to improve student learning. Skills were taught in the context of classroom lessons. The training employed hands-on learning, provided time for collaboration and sharing, and required teachers to give thoughtful consideration over the course of the three days to the appropriate and relevant use of educational technology. Instructors were themselves classroom teachers with a strong background in technology integration. And although the three days were intense, teachers reported a high degree of satisfaction with the experience.

Additional considerations

Teacher Leadership Seminar courses were offered at different times and locations around Michigan. Feedback from teachers suggested that the program had the greatest impact when it was offered *after* the start of the school year. Several reported that meeting in late September or October gave them an opportunity to bring "real questions, real problems, and real products" to the group. As one teacher explained it, "After I actually tried some of the Intel ideas with my students, I had questions about the integration process, such as how to manage students. My TLS training gave me a chance to talk to other teachers and to our instructors . . . it was really helpful to be able to collaborate *after* experimenting in the classroom a little bit. We also had a chance to share things that were going well. It was great."

Summary

The three programs that made up the Michigan Technology Integration Training Initiative each reflected certain elements of sound professional development models as documented in the research literature. For example, the ATA Technology Academy required team participation, encouraged collaboration, and facilitated the development of a technology vision and plan. ATA also required that one team member be a building administrator and used a train-the-trainer model to build capacity. These factors were all important in establishing a positive climate for technology integration. On the other hand,

the ATA training was relatively brief and offered only limited follow-up support. Furthermore, it seems unlikely that teachers new to technology integration could leave this two-day training with the necessary skills to act as change agents, nor to immediately integrate technology in their own classrooms.

The Intel© Teach to the Future program provided teachers with a comprehensive training opportunity that developed technical skills within the context of a curriculum unit. Intel Master Teachers were guaranteed at least a certain level of access to technology based on commitments made by their participating school and district. A challenge for Intel Master Teachers was the degree to which they were required to share their expertise. The commitment to teach 80 hours of classes to 30 teachers over two years was somewhat daunting, especially as they attempted to integrate the curriculum in their own classrooms.

The Teacher Leadership Seminar, like ATA and Intel, received positive reviews from participating teachers and administrators. Several teachers, in fact, suggested that this was a very useful culmination to their training.

The Michigan Technology Integration Training Initiative offered educators across the state several sound opportunities to further their efforts to use technology effectively in the classroom. Together and individually the programs incorporated time for collaboration, team participation, hands-on curriculum development experiences, real tasks, and a focus on the improvement of student learning. Moreover, both ATA and Intel stipulated that participants' schools meet certain hardware and software requirements. Intel Master Teacher participants were also given $2500 each to bring their classrooms to a minimum technological standard. This was helpful in addressing the important issue of technology access. Both ATA and Intel would benefit from additional follow-up training and support, although the Teacher Leadership Seminar provided some teachers with such an opportunity.

Evaluation Question #4: *Is there evidence that the programs have been successful in changing classroom teaching through the integration of technology?*

Based on program evaluation data and teacher interviews, there is evidence that the three programs have, in fact, had an impact on teaching and learning at the classroom level, albeit to varying degrees. For example, ATA trained teachers expressed a greater degree of comfort with technology, particularly the use of the Internet, and they were more inclined to have their students use word processing, Internet searches, and presentation software (Rosenfeld & Haddad, 2002, p. 8). Intel trained teachers increased their use of technology in the classroom as well, often in the implementation of their curriculum units. Interview responses from TLS participants indicated that they were taking their training back to the classroom, often in the form of student research, writing, and presentations.

Teachers also reported that students showed greater motivation and involvement at school when they had access to technology. Students were more inclined to complete writing assignments when they could edit and revise on the computer, and research was often not even seen as "work." Teachers also observed that students collaborated more often, that they did more peer sharing, and that they seemed to be better problem-solvers when they worked in a rich-technology environment. These observations are reflective of positive student outcomes identified in the research. According to Jarvela, "When students are able to work on interesting and challenging tasks, they participate in creating their own learning goals. The learning process thus becomes personally meaningful to them. The higher levels of motivation that result promote progressive advances in cognitive engagement and application of learning to real-life problems" (2001, p. 44).

ATA Technology Academy

ATA-trained teachers reported using word processing, Internet searches, database management, presentation software, and digital cameras most often, while their students used primarily word processing, Internet searches, and presentation software. Several examples of student work were shared during site visits including language arts webs (Inspiration), country and famous person reports utilizing Internet research, and summaries of Power Point presentations. Teachers also shared ways in which they used their computers for webquests, Accelerated Reader, and STAR reading assessments. It was clear that computers provided not only the motivation, but also the means for students to engage in challenging, hands-on lessons.

In the case of ATA, a key to successful classroom integration was the involvement and support of school leaders in implementing the team-developed building plan. One teacher, a participant of ATA, Intel, and the TLS, provided a useful distinction between ATA and the other two programs and the importance of leadership: "I found that ATA was not as valuable as the other programs for developing technical skills or for learning how to use technology in the curriculum. Still, ATA was absolutely critical in getting our principal on board with technology. Once we came back from the ATA training, our principal was completely supportive of all our efforts. I was even given time at the monthly staff meetings to provide technology training."

In another case, an ATA team included a reluctant principal and three teachers. Despite initial reservations on the part of the principal, the training proved so motivating that the team went back and set immediately to work implementing their plan. The principal dedicated portions of staff meetings and in-service days to ensure that all staff members understood the plan and felt comfortable with the direction being taken by the school. Moreover, training in integrating technology into the curriculum was provided to teachers based on their needs. Finally, the principal followed through on provisions in the technology plan aimed at securing adequate resources for teachers, including hardware, software and technical support. The result was a school where teachers were enthusiastic about the potential of technology and where it was being used on a regular basis to provide meaningful and engaging learning experiences for children. Teachers were able to articulate the ways in which their students benefited from having access to technology,

and student work provided evidence of ways that technology was being used for research, for presentations, and for word-processing. In contrast, the ATA program had relatively little impact at another school where the principal was uninvolved in the initial training and showed virtually no commitment to the plan. Neither did this principal provide direction for the team, which eventually "fell apart" according to one teacher. As a result the school moved much more slowly in its efforts to use educational technology, and the impact on teaching and learning has been quite limited so far.

One of the most important findings in two previous ATA evaluation reports related to the need for additional training in *how* to integrate technology effectively into the curriculum. As evaluators noted, " Educators are using technology most heavily for low complexity activities while it is widely believed that greater effectiveness or impacts will be achieved by focusing on high complexity tasks. Although an increase in the use of technology for all types of tasks was seen over the course of two to three years, greater support may be needed to assist teachers in focusing their efforts on these high complex activities" (Rosenfeld & Haddad, 2002, p. 13). Furthermore, "Teachers are using technology at a higher frequency for their own classroom activities than they are having their students use the technology. Greater focus may be needed upon student-focused learning objectives" (p. 14). This finding is not surprising. Research indicates that it often takes teachers several years to become comfortable with technology integration. In fact, as they begin the process of integrating the curriculum it is not unusual for teachers to use technology to support more traditional lessons and strategies rather than to dramatically change their instruction. Significant shifts in pedagogy to accommodate educational technology often take place over several years, as teachers see the results of group projects, students-as-teachers, and teachers as facilitators. As Pierson noted, successful technology integration depends on the intersection of content knowledge, pedagogical knowledge, and technological knowledge (2001). This being the case, it is critical that training programs address the issue of pedagogy in the integration process.

Intel© Teach to the Future / Teacher Leadership Seminar

There is fairly strong evidence that teachers who completed the Intel© Teach to the Future program and also the Teacher Leadership Seminar have taken their training into the classroom. Interviews with teachers about their efforts gave insight into their various activities. One teacher who completed both Intel and TLS used her new skills to facilitate two curriculum projects, both of which her students found motivating and challenging. This teacher also made regular use of Accelerated Reader and SchoolKit software to provide enrichment for her students. In another case, an elementary computer lab teacher who had completed both Intel and TLS described the impact of her training on students. "When teachers plan research projects or reports, they work with me to figure out the technology component of the lesson. My training has been extremely helpful in identifying appropriate and relevant resources, in helping students gather information, and in supervising their final presentations." Beyond that, she taught an ongoing after-school computer class for interested students.

The three components of the Michigan Technology Initiative have, in fact, had an impact on teaching and learning in the classroom. The ATA focus on professional development, accomplished by a collaborative school team, has been particularly useful in furthering school and district technology efforts. Intel and TLS, on the other hand, have provided teachers with specific strategies for incorporating technology at the classroom level. Taken together, these efforts have been instrumental in furthering Michigan's Technology Integration Training Initiative.

CONCLUSIONS AND RECOMMENDATIONS

The Michigan Technology Integration Training Initiative was comprised of three distinct programs: ATA Technology Academy, Intel© Teach to the Future, and the Teacher Leadership Seminar. The ultimate goal of each program was to assist Michigan teachers in their efforts to use educational technology for the improvement of student learning, although the approaches taken to meet this goal were somewhat different. The ATA Technology Academy focused on guiding school teams in the development of a technology plan as they attempted to identify specific needs, resources, and product information. Teams then returned to their schools to act as change agents, to implement the plan, and to share their expertise with others. Still, research suggests that sustained, in-depth training increases the likelihood that it will have an impact on teaching and learning. The two-day ATA Technology Academy is a relatively short professional development opportunity that necessarily limits the degree to which topics can be explored. It thus is extremely important that these schools build sound and ongoing training opportunities into their school technology plans.

The Intel© Teach to the Future program is "a worldwide effort to help teachers integrate technology into classrooms to enhance student learning" (http://www.intel.com/education). The Gates grant was requested in part to fund the Intel training program for a two-year period in Michigan. In Michigan, as in other locales, the five-day program aimed to develop teachers' technical expertise in the context of a curriculum unit plan. Teachers were given time for exploring and planning, and collaboration was an important part of the process. Upon returning to the classroom, teachers were encouraged to integrate technology in the form of their unit plan and other technology-enriched lessons. In addition to their work in the classroom, Intel Master Teachers were required to provide a 40-hour training program to 30 of their colleagues, thus creating a cadre of skilled teachers.

The Teacher Leadership Seminar was included in the Michigan Technology Integration Training Initiative as an optional follow-up training for teachers who completed the Intel training. The TLS was a three-day course that provided teachers with opportunities to expand their curriculum integration skills. The training stressed appropriate use of technology as a tool to support teaching and learning.

The Bill & Melinda Gates Foundation provided funding for the Michigan Technology Integration Training Initiative to train more teachers in technology integration through the ATA Technology Academy, Intel© Teach to the Future, and the Teacher Leadership Seminar. Taken together the three components of the initiative have provided sound professional development options for Michigan educators, although not all teachers participated in all three training programs. Designed as "train the trainer" models, it was expected that the teachers who completed these programs would not only impact classroom teaching and learning but would also build capacity in their schools and districts. Evidence suggests that this goal is being met. The ATA Technology Academy

provided training to 225 teams during the summer of 2002 and expects to continue this training in 2003. As well, 125 teachers received Intel training during 2002, and nearly two-thirds of those teachers took advantage of the Teacher Leadership Seminar.

Recommendations

The following recommendations are made in an effort to address both the strengths and limitations of the three programs.

- Professional development research acknowledges the importance of teamwork and collaboration in ensuring the success of school improvement efforts. In their research on the integration of laptop technology into the curriculum, Windschitl and Sahl found that one of the most powerful ways in which teachers increased their proficiency in using technology for teaching and learning was through regular collaboration with their peers (2002, p. 202). To that end, it is important for any technology training program to emphasize collaboration, teaming, and sharing. The potential for schools to move forward in developing and implementing viable technology plans is clearly strengthened by the team approach employed by ATA.

- Results of this and other evaluations have recognized the importance of strong leadership at the building level in undertaking school reform measures. The ATA program has wisely required a school leader, preferably the school principal, to be one of the team members. This requirement, as stipulated in application materials, should be upheld as strictly as possible to maintain the integrity and longterm success of the ATA training.

- The emphasis of the ATA program is clearly on professional development and capacity-building. Less attention is given to the process and specific strategies for integrating the curriculum. It is important for participants to understand the need for in-depth and ongoing training in technology integration and to build such training into their school technology plans.

- Previous evaluation reports of ATA Technology Academy and Intel© Teach to the Future have recommended the need for follow-up training and support. Research suggests that education reforms are often relatively simple to embrace and yet difficult to sustain. In fact, some evidence indicates that it can take three to five years of support and continuing education to ensure that reforms become part of the fabric of the school. “Perhaps the greatest challenge of training lies in recognizing that the need for it never ends. Just as computer and Internet connections require continual upgrades to function at their best, human resources must also be updated to stay current and functional” (Franklin, 2001, p. 5). The follow-up visits and resources provided by ATA are useful and are appreciated by team members. Any additional training and support that can be offered would almost certainly strengthen teachers’ efforts.

- The intent of the ATA training is, in part, to equip teachers and principals to return to their buildings and serve as *change agents*, and yet there is some evidence that they do not feel adequately prepared for this role. If this is indeed a key objective of the training, it is incumbent on trainers to make sure team members are given direction and the skills necessary to fulfill this obligation.

- While Intel© Teach to the Future offers an in-depth training that integrates technical expertise and curriculum development, teachers suggested the need for more time during the week for collaboration, sharing, and for working on their unit plans. Perhaps the structure of the program could be modified to some degree to include one or two evening or overnight sessions. Based on the success of the Teacher Leadership Project, the benefits of funding this extra time are seen time and again in process and product outcomes.

- Given the positive feedback from teachers who participated in the optional Teacher Leadership Seminar follow-up sessions, it is clear that requiring TLS participation would maximize the impact of the Intel training and provide an important opportunity for follow-up and support. Taken together the two programs provided teachers with in-depth technical training and practical experience in teaching an integrated curriculum.

- Each of the three programs strives to support and improve student learning through the appropriate use of technology. It is critical that this remain the focus of the ATA Technology Academy, of Intel© Teach to the Future, and of the Teacher Leadership Seminar. Technology training for teachers must address the development of technical skills and sound pedagogy such that technology is used as a tool to enrich and extend the work of teachers and students. As Pierson noted, "unless a teacher views technology use as an integral part of the learning process, it will remain a peripheral ancillary to his or her teaching. True integration can only be understood as the intersection of multiple types of teacher knowledge . . ." which she defined as the intersection of technological, pedagogical, and content knowledge (2001, p. 427).

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Appendix A ATA Training Agenda

ATA Summer 2002 Workshops
Day One: Integrating Technology

8:00		Registration/Continental Breakfast PowerPoint Introductions
9:00	Whole Group	Orientation: Overview of ATA Project Introduction to Building Professional Development Plan Creed PowerPoint
9:30- 11:30	4 Lab Groups 6-7 teams in each lab (according to code on name tag)	Tech Integration Lab William Tell Overture Lab Lesson
11:30- 12:30	Tables by school size	*Lunch & Conversation: Technology Successes*
12:30	Whole Group	*Team Pictures Outside*
12:45- 2:45	4 Lab Groups 6-7 teams in each lab (according to code on name tag)	Research Lesson Plans Lab William Tell Overture Lab Lesson (Administrators Session-45 minutes)
2:45-3:00		*Break*
3:00-5:00	Teams 3-4 teams each station	Tech Showcase Snacks at all stations 8 stations @ 14 min each + 1 passing minute 12 people in each station Begin at the station assigned to you (name tag code) Move to the new station at the signal

Dinner: With your team at one of the local restaurants.

Evening homework: Discuss with your team how you can use what you learned today with your building?

ATA Summer 2002 Workshops
Day Two: Integrating Technology

8:00		Hotel Check-Out Continental Breakfast You Know You're a Real Teacher…
9:00	Whole Group	Housekeeping and Announcements Set tone for PD Day Discuss homework Drawing for fabulous prize
9:45- 11:45	4 Lab Groups 6-7 teams in each lab (according to code on name tag)	Professional Development Planning Lab William Tell Overture lab Lesson
11:45- 12:45	Tables by career	*Lunch & Conversation*
12:30	Whole Group	*Team Pictures Outside*
12:45- 2:45	4 Lab Groups 6-7 teams in each lab (according to code on name tag)	Professional Development Resources Lab William Tell Overture Lab Lesson
2:45-3:45	Individual teams	Team Planning Time Turn in building plan
3:45-4:15	Whole group	*Wrap Up* *Drawing for Wonderful prizes*

Appendix B Intel© Teach to the Future Agenda

Intel Teach to the Future
Course Syllabus

Course Title: Intel Teach to the Future: Integrating Technology into the Curriculum

Description: This class covers the integration of computer technology into the classroom

Expectations:
-Attend all sessions of the class
-Develop a unit plan that integrates computer technology tools into the classroom and curriculum (word processing, multimedia, web pages, publications)
-Develop student samples of computer tools as used in the classroom
-Develop teacher support materials and documents to support technology integration into the curriculum and classroom
-Discuss and share various pedagogical questions related to integrating technology into the curriculum and classroom
-Discuss teaching strategies and best practices for integrating technology into the curriculum and classroom

Syllabus: 10 sessions; 45 total in-class hours

Session One:
-View presentation
-Participate in scavenger hunt
-Create program folder
-View/discuss unit plan template
-View portfolio rubric and Bloom's taxonomy
-View unit portfolios
-Correlate/compare complete unit portfolio from the class cd-rom with the portfolio rubric
-View "introducing my unit" presentation
-Take copyright quiz and view copyright presentation and discuss responsibilities related to copyright

Session Two:
-Review Session One
-Participate in pedagogical discussion of technology integration
-How to use search engines and directories
-How to use Microsoft Encarta
-How to locate Internet resources
-How to create citations using Microsoft Word

Session Three:
-Review Session Two
-Participate in pedagogical discussion of technology integration
-View and discuss student sample PowerPoint presentations
-Plan and develop storyboards for student PowerPoint presentations
-Create student sample PowerPoint presentations
-Evaluation of student PowerPoint presentations
-Revisit unit plans
-View and discuss sample presentation evaluation tools
-Create evaluation/rubric tools for multimedia presentations

Session Four:
-Review Session Three
-Share student presentations and evaluation tools
-Participate in pedagogical discussion of technology integration
-View student sample publications using Microsoft Publisher
-Create student publications using Microsoft Publisher
-Evaluation of student Publisher publications
-Revisit unit plans
-Create evaluation/rubric tools for publication documents

Session Five:
-Review Session Four
-Share student publications and evaluation tools/rubrics
-Participate in pedagogical discussion of technology integration
-View sample support materials for using technology in the classroom
-Create unit support materials
-Revisit unit plans
-View student web site samples
-Plan student web sites

Session Six:
-Review Session Five
-Share student web site plans
-Participate in pedagogical discussion of technology integration
-Consider Microsoft Publisher as a web site creation tool
-Create student web sites
-Evaluate student web sites
-Revisit unit plans
-Create and/or modify evaluation tools to assess student web sites

Session Seven:
-Review Session Six
-Share student web sites
-Participate in pedagogical discussion of technology integration
-Create teacher web sites, multimedia presentations, or publications
-Organize program folders
-Use PowerArchiver to compress files

Session Eight:
-Review Session Seven
-Discuss how to write CD-ROMs, share files, and use online storage sites
-Share unit support materials that have been developed during the class
-Participate in pedagogical discussion of technology integration

Session Nine:
-Review Session Eight
-Showcase unit portfolios and all related web sites, multimedia presentations, and publications
-Participate in pedagogical discussion of technology integration

Session Ten:
-Review Session Nine
-Create implementation plans and management documents for integrating technology into the classroom and curriculum

Appendix C Teacher Leadership Seminar Training Agenda

Teacher Leadership Seminars
Funded by the Bill & Melinda Gates Foundation

The Teacher Leadership Seminar schedule is as follows:

Day 1

8:30 AM	Continental Breakfast
9:00 AM	Introductions
10:00 AM	Interactive Cross-Curricular Activity
12:00 PM	Lunch
1:00 PM	Interactive Cross-Curricular Activity, continued
3:00 PM	Break
4:30 PM	Research Discussion
6:00 PM	Dinner
7:00 PM	SchoolKit.com
8:30 PM	Homework

Day 2

7:30 AM	Continental Breakfast
8:15 AM	Sharing of Homework
9:00 AM	Interactive Cross-Curricular Activity
12:00 PM	Lunch
1:00 PM	Interactive Cross-Curricular Activity, continued
3:00 PM	Break
4:30 PM	Article Discussion
6:00 PM	Dinner
7:00 PM	Evening Learnings
8:30 PM	Homework

Day 3

7:30 AM	Continental Breakfast
8:15 AM	Sharing of Homework
9:00 AM	Interactive Cross-Curricular Activity
12:00 PM	Lunch
1:00 PM	Interactive Cross-Curricular Activity, continued
3:00 PM	Closing

 Revised 1/24/02

Appendix D ATA E-Mail Update Message

AT A Glance, November 1, 2002

Holiday Lesson Plans and Resources for Every Month of the School Year

http://www.cloudnet.com/~edrbsass/edholiday.htm

Lesson Plans demonstrating math and physics concepts, such as algebra and friction, through sports.
http://www.sportsfigures.espn.com

The Lessons Plans Page collects over 1,000 ready-to-use lesson plans, primarily at the elementary level, that were developed by students and faculty at The University of Missouri. This site serves elementary school teachers, pre-service teachers, and parents.
http://www.lessonplanspage.com

Copyright

An interactive activity to quickly learn about copyright issues on the WWW. Visitors view 11 questions students, teachers, and parents may have about using Web images, sound records, and text in papers, presentations and Web projects.
http://www.cyberbee.com/cb_copyright.swf

Get a Laptop

K-12 teachers can apply to receive a fee, fully load laptop via the Teacher Laptop Foundation, with the help of many corporate and individual sponsors, fulfills its mission of "helping teachers obtain the technology tools needed to educate students in the 21st century." Selected teachers will also receive free lifetime Internet access and tech support.
http://www.teacherlaptop.org

Appendix E Teacher Leadership Seminar Curriculum Lesson

Exploratory Project
Team Task

Purpose:
Allow teachers to work collaboratively on a project while exploring and discovering the tools of the technology that will be used to achieve the goals.

Essential Questions:
What qualities does your country have that would entice the Widget company to relocate there?

What information will be needed about our country that would be necessary for the Widget Company to make a decision? e.g culture, government, economy, resources, etc.

Goals:
- Teachers will experience collaborative project based learning;
- Technology skills will be developed during the learning activity;
- Teachers will experience the learning motivation that choice provides; and
- Teachers will complete and present a project to the whole group.

Project:
Teachers will work in groups to represent themselves as a country within the Pacific Rim. The Widget Company is planning to expand its base of operation to include a Pacific Rim location. Each country (team) will need to prepare a compelling proposal that will educate the Widget Company on the many features of this country that would make them an attractive economic partner.

Step 1: Opening Activity:
Emphasize that every person in a collaborative working group brings a level of expertise and knowledge that can contribute and enhance the learning process. Introduce the collaborative project as a discovery learning mode that will leave each group with many choices in both direction of content as well as means of product creation. Rely on the current skills you have as well as feel free to delve into new territories. Be as creative and innovative, as time and tools will allow. Allow each team to choose which Pacific Rim country they would like to represent. Each team will present their proposal at the end of the session.

Task:
Each team will represent one of the Pacific Rim countries that the Widget Company of Washington State has begun to investigate as a potential expansion site for their company. The Pacific Rim countries have been asked to create a compelling introduction of your country to the Widget Company. You are quite certain that the Widget Company has little knowledge of your country and the purpose of this presentation is to educate the Widget Company about the many advantages your country would offer in producing the Widget Company's product and why you would make a good economic partner. Your team may select the Pacific Rim country of your choice to represent.

Guiding Questions:
What information will be needed about our country that would be necessary for the Widget Company to make a decision? e.g. culture, government, economy, resources, etc.

How will the information be gathered?

How will the information be presented?

Will this compelling proposal be one document or several?

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