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B. Executive Summary

Project title: Learning Generation Award number: (P342A990271-00)
The University of Kansas Center for Research; Ronald Aust Principal Investigator

Project Overview

Learning Generation is a systemic model for engaging educators in generating solutions to integrate technology throughout the teacher education experience. This project uses a multifaceted implementation with: enhanced technical infrastructure, ongoing technical support, technology enriched field experiences, programmatic reform and innovation cohorts. Ideal cohorts include teacher education and liberal arts faculty, pre-service student(s), practicing teachers and K-12 students. Cohort development evolves through seven stages: 1) genesis, 2) consultation, 3) planning, 4) initiation, 5) action, 6) assessment and 7) celebration. The cohort innovations are as diverse as the abilities, needs and creativity of each group. The innovations have included strategies for tracking current events, web-based media to learn international dialects and communication technologies to improve collaboration among teacher education interns, their advisors and cooperating teachers.

Background and Origins

The University of Kansas (KU) is a major research institution with a national reputation for academic excellence, offering programs in 14 major colleges and professional schools. The University of Kansas School of Education (KUSoE) is fully-accredited through NCATE, and is ranked nationally by US News and World Report as one of the top 25 Schools of Education. The School's special education department is often top ranked. The KUSoE moved to a new building in August 2000 with many current amenities, featuring broadband Internet connectivity to all offices and classrooms, multimedia technology in each classroom, an instructional design laboratory, a statistics

laboratory, three computer labs, a telecommunications classroom and computer kiosks for e-mail and Internet access.

The School's teacher preparation graduates approximately 110 students a year. Several university-supported technology assistance options are available to all faculty members. Additionally, the School of Education has provided a number of projects that support technology integration in K-12 schools with underserved populations. The technology professional development that was available was primarily in the form of one-on-one training and traditional workshops. Many faculty reported that the rigidly scheduled workshops did not serve their needs and they were not consistently demonstrating integration of technology in their teaching. With Learning Generation, we addressed these need for a sustained approach to engage faculty and students in modeling and developing innovations in integrating technology throughout the teacher education experience.

The initial idea for the cohorts in Learning Generation emerged in an instructional design course where students selected teacher education faculty as their clients. In this course students worked with teacher education faculty to create instructional products that addressed the faculty member's needs. Procedures were refined over several semesters with faculty serving as content expert and students providing technical skills, knowledge of instructional design and suggesting strategies for technology integration. The Learning Generation model has since expanded to a broader constituency with more collaborative sharing of ideas that extend the ownership and sustainability. For example, the successful Generation Why project (Coe & Ault, 2001) influenced the inclusion of K-12 students and teachers in the cohorts.

Conceptual Framework

The Learning Generation model features teacher education students, university faculty and K-12 teachers working together to discover solutions for integrating

technology that serves their unique teaching and learning needs. The model is designed to adapt as information technologies and the educational needs of society continue their rapid pace of change. Rather than recommending one-for-all instructional prescriptions, Learning Generation is a systemic model that seeks to create conditions where solutions emerge in a collaborative environment, rich in resources and ideas. The Learning Generation model involves the creation of innovation cohorts based on instructional and organizational needs in teacher education.

The model is effective in creating the conditions needed for change in a teacher education program. It recognizes institutional history and culture while at the same time accommodating needs for change. Faculty members are able to retain control of the cohort process if they find this more comfortable, or, they can allow the cohort to function in an entirely democratic way. We have described the model so that it can be replicated in different settings and we have provided examples of the processes and successes of diverse cohorts. We have also developed an extensive body of resources that capture the technical knowledge of the cohorts and information about how to integrate technology in teaching and learning.

Internal and external factors that were essential to the process include mechanisms for sharing information about the need for change, methods for communicating the way the cohort model works, an understanding of institutional needs and visions, faculty interests, student expectations, infrastructure support, and technical personnel support.

The cohort process is one by which faculty members can learn new technology skills from participating students. These technology skills align with the 'technology operations and concepts' standard. Additionally, faculty members and students learn to apply technology in relevant and appropriate ways for their content area and teaching practices.

Project Description

In the Spring of 2003, twenty-one Innovation Cohorts had been developed. Each cohort is headed by a School of Education faculty member and typically includes at least one School of Education pre-service student. Each cohort has developed an innovative way to use technology in the teaching field. Besides cohort developed projects, the Learning Generation staff has also created learning objects that can be used by faculty, staff and students. All of the cohort projects and learning objects can be found on the Learning Generation website. Notable examples of cohorts products include:

The Kansas Government Legislative Tracking Website (http://learngen.org/legtrack/). Teacher education students in Teaching Kansas Government class began by designing a TrackStar track that consisted of an overview of the issue written by the teacher education students, an Internet page that further introduced the high school students to the issue, Internet sites that provided information in support of and in opposition to the issue and a site that pulled together the issue. The teacher education students also developed a set of questions for the high school students to answer about each site and a lesson plan for use by the participating high school government teachers. This cohort's work eventually led to the development of another site (http://www.trackcurrentevents.org/) that enables students to organize current online resources, such as online newspaper articles that aid in summarizing and discussing a current event.

Online Foreign Language Learning (http://learngen.org/cohorts/spanish/). The Spanish language has many dialects, but students in the classrooms are usually exposed to a single dialect. This website offers Spanish language learners the chance to experience the uniqueness that exists in the different Spanish dialects. Users find samples of real oral Spanish language in the form of dialogues. These dialogues showcase different accents and varied vocabulary found in Spanish-speaking countries. Users can listen to native speakers from different Spanish-speaking countries to compare dialects.

The Field Experience Cohort (http://learngen.org/cohorts/field/).

This cohort integrated technology into field experience through video conferencing observations. This cohort created a survey (http://learngen.org/cohorts/field/survey/) that helps understand cooperating teacher's preferential teaching strategies and philosophies in order to help match students who have a strong technology background with teachers and schools who also have a strong technology background and who also use technology effectively in educational settings.

Enhancing Technology Integration (http://learngen.org/cohorts/coh_adaptive.html).

Some cohorts have worked directly in cooperating classrooms. An example is the cohort that worked to promote the use of technology in special education classrooms. One of their major projects was to convert generic social stories into personalized tools. For example, Spencer was having a hard time remembering to keep his hands to himself. Normally he would get a little book that had generic pictures and talked about manners. This cohort used PowerPoint to take these social stories to a new level. Using a digital camera, pictures were taken of Spencer modeling the appropriate behavior. These pictures were inserted into a personal story for him. Barry Bernstein, the district music therapist, put these social stories to music. Now Spencer can go to the computer, click his social stories and it automatically starts playing for him. This basic idea has expanded and now Spencer has a multitude of stories and interactive experiences on PowerPoint. For an example see: (http://learngen.org/cohorts/applied/lgc3/PrareStr/PrairieStar.html).

Gifted & Talented Education GATE (http://learngen.org/cohorts/coh_gifted.html).

This GATE cohort featured collaboration among two teacher education students who minor in gifted education, two experienced teachers working in the field of gifted education, and a group of nine high school students with considerable expertise in computer programming and web design. Together they created an online course that is available at: (http://learngen.org/cohorts/gifted/class/).

Technology for Field Observations (http://learngen.org/cohorts/coh_observe.html). The Using Technology for Field Experience Observations cohort studied and documented the process of integrating technology into a course that requires field experiences. Traditional face-to-face field experiences were replaced with a videoconference. Members of three PRE 200 classes at the University of Kansas participated in this pilot program through observation of a local high school's advanced video class and United States government class on a video projection screen. This cohort's website presents information about their work and the results.

Evaluation and Project Results

Surveys, interviews, document reviews and product analyses were used to assess needs and guide refinements. Interviews and qualitative evaluation of the web-based products assisted in the formative evaluation and refinements. Findings also indicate that Learning Generation is a successful and sustainable model for integrating technology in all aspects of teacher education.

Sustainability

The Learning Generation model is a scaleable and easily replicable model for creating and supporting ongoing innovation in integrating technology in teacher education. The (http://learngen.org/) provides the procedures, tools and examples for creating and supporting innovation cohorts including resources for integrating technology in teacher education. Once initiated, the Learning Generation program can be supported with reasonable funding for the teacher education students who serve as technology support for faculty and assistants in organizing the cohort activities and product development. Teacher education faculty and students who participate in the cohorts significantly advanced their modeling of technology integration and reported that they

will continue to model technology use for future generations of teacher education students.

Lessons Learned

Lessons learned included the need for clear communication, shared vision, working within the capacity of the institution, working in congruence with organizational culture, and the need for ensuring that there is consistent leadership and direction for the cohorts.

The preparation of technology-proficient teachers is an ongoing process that involves many components. In addition to providing skills, new teachers must also understand the context in which the technology skills they learn will be used. This includes having good models of technology use in their preparation program. Further, discussions need to occur throughout the preparation program to ensure that new teachers have the chance to think about how their technology skills might solve problems or address situations that they may expect to encounter. Finally, new teachers need to have opportunities to try their technology skills in realistic situations including their practicum experience.

Our ideas for how to create conditions for innovation, exploration and change evolved to create a flexible and adaptable model. There is sufficient flexibility in the model to explore different equations for success and to learn how to implement the model with a wide number of instructors who posses different levels of technology expertise and are from different academic disciplines. Key factors that we found include helping faculty understand the need for change, harnessing the creativity and energy of students and focusing on achievable goals.

C. Report Narrative

Project Overview

Learning Generation (http://learngen.org) was established to help faculty in the School of Education at the University of Kansas develop model strategies for increasing

the quality and quantity of technology integration in the School. We were guided by the belief that our students will become better able to integrate technology into their practice of teaching when they have good models of technology integration during all phases of their education. Additionally, we believed that a group of technology-using students would have a positive impact on the use of technology in their classes and by their peers. The Learning Generation model involves the creation of innovation cohorts based on the instructional and organizational needs in teacher education. It also includes the development of online resources, processes and products designed to reflect, disseminate and sustain the cohorts' innovations. Model cohorts include teacher education and liberal arts faculty, pre-service student(s), practicing teachers and K-12 students. Cohort development evolves through seven stages: 1) genesis, 2) consultation, 3) planning, 4) initiation, 5) action, 6) assessment and 7) celebration.

Background and Origins

A Climate for Change in Teacher Education

The design of Learning Generation began in 1999 when our nation was in an extraordinary period of growth in information technologies. Schools, businesses and governmental institutions were engaged in massive efforts to upgrade their computer systems and avert potential Y2k problems. The telecommunication act's e-Rate (Fulton, 1998), along with other factors propelled the rapid development of a network infrastructure to connect all businesses, schools and universities. Many recognized that these new digital technologies held the potential to transform our schools and universities (CEO Forum, 2000).

The need for advancing the role of technology in teacher education was clear in 1999 as it is today. The U.S. will see enrollment increase by three million students this decade while half of our teaching force retires (Recruiting New Teachers, 2002). Our nation will need over two million new teachers who will be responsible for preparing students with

the literacy's required for success in a changing society that is increasingly influenced by digital technologies and globalization (Rosenthal, 1999; Tyner, 1998). Yet, many teacher education faculty members possessed only a limited understanding of how to use computers in their teaching.

In 1999, approximately 54% of higher education classes used email, 39% used Internet resources, and 28% had a website (The Institute for Higher Education Policy, 2000). Higher education faculty were beginning to use technology more in their teaching (West, 1999). Internet access had increased markedly and nearly all faculty and students accessed the Internet at least once per day (Milliron, 1999). School teacher's skills in using technology were evolving. According to Davis (cited in Duhaney 2001), only 20% of teachers felt confident in their ability to integrate technology in their teaching. The National Center for Education Statistics (NCES) polled public school teachers and found that only one third of teachers felt "well prepared" or "very well prepared" to use computers and the Internet in the classroom (NCES, 2000). According to NCES (2000), 45% of teachers who had three or fewer years of teaching experience felt either well prepared or very well prepared to use technology in the classroom. This is a significant increase in perceived preparedness of the teachers with 10 to 19 years of experience (31%), and teachers with 20 or more years of experience (27%).

Integrating Technology in the Teacher Education Curriculum.

The teacher education curriculum at the University of Kansas includes a specific course in educational technology. Many teacher education curricula include such an educational technology course that provides students with technology literacy skills and examples for integrating technology in their teaching (Hargrave & Hsus, 2000). The educational technology course is not intended to replace or discourage technology integration in other courses. On the contrary, it provides students with fundamental skills and strategies that they will expand on in other methods courses. One of the reasons that

the course is important is that not all faculty can stay abreast of the rapid changes in technology. Faculty who have educational technology as their primary research focus contribute significantly to the overall fabric and dialog in a progressive teacher education program.

Although an educational technology course contributes significantly, a more comprehensive plan is needed to influence widespread reform. The Learning Generation model addresses the overall capacity of the teacher education program in preparing students to integrate technology throughout their teaching career. Teacher education students need ongoing experiences using technology in their teaching and faculty who model effective uses of technology (Abdal-Haqq, 1995; Novak & Berger, 1991). The Office of Technology Assessment (OTA) found that the majority of teacher education faculty reported that they, "do not model technology use, do not use information technology to accomplish the objectives in the courses they teach, and do not teach students how to use technology for instructional purposes" (OTA, 1995, p.190). The Panel on Educational Technology (Willis & Mehlinger, 1996) and the OTA (1995) called for increased modeling of technology integration by college faculty. More recent studies indicate that this problem persists (Cooper, 2001; Ledermand & Niess, 2000; Hargrave & Hsus, 2000; Willis, Thompson, & Sadera, 1999). Moursund and Bielefeldt (1999) indicate that "Faculty IT skills tend to be comparable to the IT skills of the students they teach; however, most faculty do not model use of those IT skills in teaching."

The Learning Generation project was initiated as the School of Education completed the renovation of a former dormitory into an integrated office and classroom space designed to house and serve the entire School of Education. The new building offered the opportunity to bring the School's faculty together into one building where before they had been housed in at least two separate buildings. The new facility provided more meeting areas, better access to computer labs and, most importantly, more chances for working

with groups of people that included faculty. Learning Generation was given operating space in the new facility.

Along with the new spaces, the School of Education committed to improving the technology infrastructure. The new facility featured excellent network connections, three computer labs (two of which are drop-in labs accessible to all KU students) with both Macintosh and PC systems and increased access to computer systems, project systems and the Internet in several technology-enhanced teaching spaces.

When the newly renovated Joseph R. Pearson (JRP) Hall opened in 2000, funding for the new building stopped short of providing the level of technology integration the School of Education desired. Therefore, through funds such as the student technology fee, JRP is now upgraded with the latest information technologies. While a few of the classrooms were equipped with technology, the School completed the task of upgrading the technology infrastructure in the building. It now includes mediated classrooms, which are equipped with rear projectors, Internet-connected computers, VCRs, laptop support and overhead projectors. Some classrooms even have ELMOs, which are video cameras that work like overhead projectors. Furthermore, Learning Generation has provided computers for students to use as e-mail kiosks.

Not only have classrooms been upgraded, but faculty and staff have also received new hardware and software. Furthermore, the School has provided them with opportunities to improve their technology skills. The School offers classes in a variety of technical and instructional topics. From personal instruction on how to use equipment in mediated classrooms to learning how to use iMovie, these classes provide faculty with the skills necessary to effectively implement technology into their teaching.

As Learning Generation was being conceptualized, the School of Education underwent reorganization. Two departments, Curriculum and Instruction and the Leadership Department, were merged into the Department of Teaching and Leadership. This resulted in a stronger department with a broader focus.

The School of Education further committed to the development of a support structure for its infrastructure through the creation of a Technology Support Unit. While the School has had tech support for around six years, this unit has evolved with the School's growing technology capabilities and needs. This group of full-time staff members services the technology infrastructure of the School as well as provides technical support and training for faculty members in the School. Frank Carey is the Director of Technology and has three other full-time staff members working with him. The unit even includes two student employees who provide desk-side assistance to faculty and staff and two student employees who assist in running the computer labs.

Conceptual Framework

The Learning Generation Model: Fostering Innovation with Tomorrow's Teachers and Technology

The Learning Generation model features teacher education students, university faculty and K-12 teachers working together to discover solutions for integrating technology that serves their unique teaching and learning needs. The model is designed to adapt as information technologies and the educational needs of society continue their rapid pace of change. Schools have long been criticized for ignoring the value of experience and choosing instead to, in John Dewey's (1915) terms, "teach by pouring in." Rather than prescribing one-for-all instructional prescriptions, Learning Generation is a systemic model that seeks to create conditions in which solutions emerge in a collaborative environment, rich in resources and ideas. The Learning Generation model involves the creation of innovation cohorts based on the instructional and organizational needs in teacher education. It also includes the development of online resources, process and products designed to reflect, disseminate and sustain the cohorts' innovations.

Phases in Implementing the Learning Generation Model:

Assemble the core implementation group.

The Learning Generation model uses a small core group of educators to guide implementation. This group sets policy, coordinates outreach to other educators, communicates with the administration and advises personnel who support the cohort in initiating and implementing their innovations.

Assess institution needs.

Evaluate the unique capabilities and needs of your teacher educational program and institution. Examine technology plans, coordinate with other support groups, and determine the type of support that is needed. For instance, you might note that there is a priority to improve the use of technology in communicating with placement schools, to engage students in creating technology-rich portfolios, and/or to make better use of online course management system*s*.

Evaluate and advance faculty and student abilities and interests.

Conduct surveys and interviews to assess the abilities, attitudes and preferences of students and faculty in the use of technology in teacher education. The Learning Generation model depends on the active involvement of faculty and students. Follow up the analyses of institutional priorities and participant attitudes with round-table discussions, presentations at faculty meetings and class discussions.

Enhance technical infrastructure, if needed.

Infrastructure requirements will vary for each institution. Examine your technology inventories and ensure that the infrastructure exists to support your team's vision. When we implemented Learning Generation in KUSoE we had just moved to a new building and our administration was very supportive in enhancing faculty equipment, internet, computer labs, classroom technology and support personnel. If infrastructure support is limited, this model is flexible enough to makes use of your existing infrastructure.

Evaluate support in technology integration education and enhance if needed.

By this stage the anticipated needs of faculty and the hardware and software infrastructure needs should be clear. It is time to determine how to provide the technology skills training and education in the use of new technology integration strategies. In some cases this can be accomplished through personnel resources that are already available. Some questions to answer are: Who will train and support the students to ensure they have the needed technology skills? Who will promote the activities and answer faculty questions about setting up a cohort? Who will help to assure that the cohort innovations are captured and disseminated?

Establish a system for communicating goals, procedures, activities and accomplishments

The project goals, operational procedures, events and accomplishments should be clearly communicated to all constituents. Early on establish both a public and internal web presence to communicate the project goals, activities and accomplishments. The public website (e.g. http://learngen.org/) includes a description of the model, the cohort planning documents, examples of cohort activities, scholarly support for research, and online resources for developing technology skills and technology integration strategies. The internal site includes policy, procedural and in-progress documents.

Develop or adopt a technology skills enrichment program for students.

The Learning Generation model relies on students to pioneer and develop uses of technology with the faculty and other members in their cohort. Provide these students with the support that they need to make use of the hardware and software that will be available to the cohorts. In addition to working with their cohorts, these teacher education students should have additional time to learn together. The solution may include an educational technology courses during the early phases of the program where the students serves to infuse technology integration strategies throughout the program as they serve as cohort team members an/or participate in subsequent course.

Pilot test of the model.

Select a small number of faculty and students to pilot test your implementation of the Learning Generation model. It is not necessary to select people who have high levels of technology expertise. Rather, it is important the individuals in the pilot program have a clear vision, are motivated to succeed and are willing to serve as models for the full scale cohort implementation.

Announce availability of the program.

Use examples of products created by the pilot cohorts as an opportunity to announce the program. Consider having members of the first cohorts present their work and experiences at special gatherings or faculty meetings. Explain how others can be a part of your program and clearly specify a contact person.

Support the Cohort Development

Each cohort will need different levels of support. The seven stage model to support the cohorts is described in the Project Description section.

We designed the model so that it can be used by other institutions to achieve similar results including the quality of the innovations and products of the cohorts. Among our indicators of success were a clear model that could be replicated, products or artifacts of our cohorts and other efforts, changes in attitudes on the part of faculty in the School of Education and graduating teachers better prepared to integrate technology in their teaching research and personal growth.

Internal and external factors that are essential to this process include mechanisms for sharing information about the need for change, methods for communicating the way the cohort model works, an understanding of institutional and program needs or visions, an understanding of faculty interests, an understanding of student interests, certain levels of infrastructure support and a certain amount of personnel support.

Part of the process of supporting cohorts involved technology training for students. Additionally, cohorts created resources, consistent with these standards, that function to provide training to others. This training and these products aligned with the following NETS standards: Basic Operations and Concepts; Technology Productivity Tools; Technology Communications Tools; Technology Research Tools; Technology Problem-Solving and Decision-Making Tools.

The cohort process is one by which faculty members can learn new technology skills from participating students. These technology skills align with the "technology operations and concepts" standard. Additionally, faculty members and students alike learn to apply technology in relevant and appropriate ways for their content area and teaching practices. This ensures alignment with the "teaching, learning, and the curriculum" and "productivity and professional practice" standards. Cohorts chose to work on a number of unique innovations. Some of these innovations which will be shared during these sessions will align with the teacher standards on "technology operations and concepts" and on "teaching, learning, and the curriculum."

The Learning Generation Goals

The Learning Generation goals and model evolved with the understandings that Rogers' (1995) and others (Boyer, 1990; Tavalin & Gibson, 2000) have identified as critical to the adoption of innovation. Innovation is more likely to be adopted when the constituents who will implement the change are actively involved in the decision making, are engaged in learning with others and view the innovation as congruent with their needs. As Cuban (1986) observed, the changes teachers have embraced solve problems that teachers have identified as important.

The successful Generation Why project also influenced the development of the Learning Generation model. Generation Why is a student mentoring model for K-12 schools wishing to integrate technology into their regular curriculum and increase their

use of project-based, student-centered learning practices (Coe & Ault, 2001). The Learning Generation model adopts the principles of students working with teachers in designing innovation for integrating technology in teacher education.

Another factor that influenced the Learning Generation conceptual development was the desire to develop a model that celebrates diversity by empowering a broad range of constituents with new information technologies that foster ongoing collaboration and innovation. According to the Association of American University Women (AAUW, 1998), girls are especially unprepared to use technology while boys tend to gain confidence and enthusiasm regarding computers (AAUW, 1998; Khine, 2001; McLester, 1998). Sustainable reform must involve systemic conditions where representatives of the diverse stakeholders are actively involved in developing and "owning" the innovation. Learning Generation focuses on creating conditions for innovation to emerge as opposed to prescribing technology solutions. As is true for many PT3 projects, the goals are designed to foster systemic reforms in teacher education.

The goals of Learning Generation and alignments to GEPRA are:

1. to assess the teacher education candidates perceptions and abilities concerning technology and to attract diverse candidates to the teaching profession who are interested in integrating technology in teaching and learning. [GPRA Obj. 2].
2. to significantly improve the technology literacy competencies of teacher education faculty and pre-service students. [GPRA Obj. 1: (1.2, 1.4) Obj. 2: (2.1)].
3. to empower faculty, teacher education students and cooperative teachers with the tools, skills and technical support for extending best practices in integrating instructional technology in their teaching. [GPRA Obj. 1: (1.2, 1.4) Obj. 2: (2.1) Obj. 3: (3.1, 3.3)].

4. to engage cohorts consisting of teacher education students, university faculty, practicing teachers and K-12 students in adopting and developing innovative approaches for integrating technology in teacher education. GPRA Obj. 1: [(1.2, 1.4) Obj. 2: (2.1) Obj. 3: (3.2, 3.3)].
5. to apply information technology in improving communication and collaboration with placement schools; thereby providing more immediate understandings of the issues, preferences and needs impacting K-12 teachers and students. [GPRA Obj. 3: (3.3)].
6. to use a variety of strategies for disseminating innovation in integrating technology in teacher education including: conference presentations, publications in refereed journals and the main Learning Generation website with resources highlighting best practices and innovations. [GPRA Obj. 1: (1.4)].

The model is effective in creating the conditions needed for change in a teacher education program. It respects institutional history and culture while at the same time encouraging change. Faculty are able to retain control of the cohort process if they find this more comfortable, or they may allow the cohort function in an entirely democratic way. More than 20 cohorts were created. Through working with these cohorts we have learned what it takes to support these kinds of collaborative groups. We have described the model in a way that can be replicated and cohort websites describe their processes and successes. In addition, we have developed an extensive body of resources that captures the technical knowledge of the cohorts and information about how to integrate technology into teaching and learning.

Project Description

An administrative counsel managed Learning Generation. This counsel consisted of KUSoE faculty Ron Aust (PI), and the CoIs Joe O'Brien, Steve Smith, Sean Smith, and Suzanne Robinson. This group served as a leadership board and met almost weekly at the beginning of the project to set policies, discuss the way the project should work and to

create models for cohorts. This group also met occasionally with outside evaluators, such as Jim Trammell, and would form sub-committees. Brian Newberry, a doctoral student in Teaching and Leadership served as the project coordinator. Vicki Occhipinti was hired to manage collaboration with the schools. Ms. Occhipinti helped create cohorts and worked directly with partner schools.

Partner Districts and Schools

The existing Kansas University Professional Development Schools (KUPDS) alliance was instrumental in determining the school partnerships for Learning Generation. KUPDS is a collaboration among professionals in the public schools, university faculty and staff, and KU students designed to enhance education. University and K-12 school personnel work together to identify educational needs and propose solutions. The partnership allows for supervised experiences for the preparation of prospective teachers and other educational professionals. These professional development schools provides an environment where teacher education students can apply research-based instructional practices and teaching innovation in K-12 classroom. The alliance is committed to partnering with sites that: 1) have a significant number of minority and/or low SES students, 2) focus on increasing student achievement, 3) provide a faculty liaison who supports pre-service training, inquiry, and professional development to carry out PDS activities.

Several of the project activities involved partnering with the PDS schools. The director of the Institute of Education Research and Public Service (IERPS) Jerry Bailey was instrumental in supporting the initial partnerships with the districts. Most partner districts had interactions with several Learning Generation cohorts involving multiple schools and cooperating teachers. There was, however, less interaction with the Turner district than was originally planned because a change in administration at a key elementary school significantly reduced the Turner district's involvement in the KUPDS.

One aspect of the K-12 collaboration was originally intended to be coordinated with the Kansas Department of Education Generation Why activities. After changes in two changes in personnel at KSDE, support for the Generation Why activities diminished. The relationship with the K-12 schools were supported through IERPS and KUPDS. Additional schools were then involved in working with Learning Generation cohorts including the Shawnee Mission and Perry districts.

Several of the Learning Generation cohorts have worked with local area school district. Some examples of these collaborations are evident in the teaming of DeSoto High School and the Kansas Government cohort; a Blue Valley elementary school and the Classroom Performance System cohort; a Lawrence elementary school and the Music cohort; Kansas City Kansas, Blue Valley, Lawrence schools and the Autism Cohort; a Blue Valley high school and the Economics Cohort; and a Lawrence high school and the Gifted and Talented Education Cohort. The Observation cohort, the Hope cohort, and the Field Experience cohort worked with several districts.

Districts who collaborated with Learning Generation cohorts included:

1. Baldwin USD 348 (Baldwin HS)
2. Basehor-Linwood USD 458*
3. Blue Valley USD 229* (Blue Valley Northwest, Overland Trail Middle School)
4. DeSoto USD 232* (DeSoto HS, Mill Valley HS)
5. Kansas City USD 500* (New Stanley Elem., Argentine Middle, Sumner HS)
6 Lawrence USD 497* (Cordley & New York Elem., Southwest JrHi, FreeState HS)
7. Olathe USD 233 (Pioneer Trail Junior High)
8. Perry USD 343 (Lecompton HS)
9. Shawnee Mission USD 512 (Shawnee Mission HS, South Park Elementary)
10. Turner USD 202* (Turner Elementary)

* Original partner in 1999.

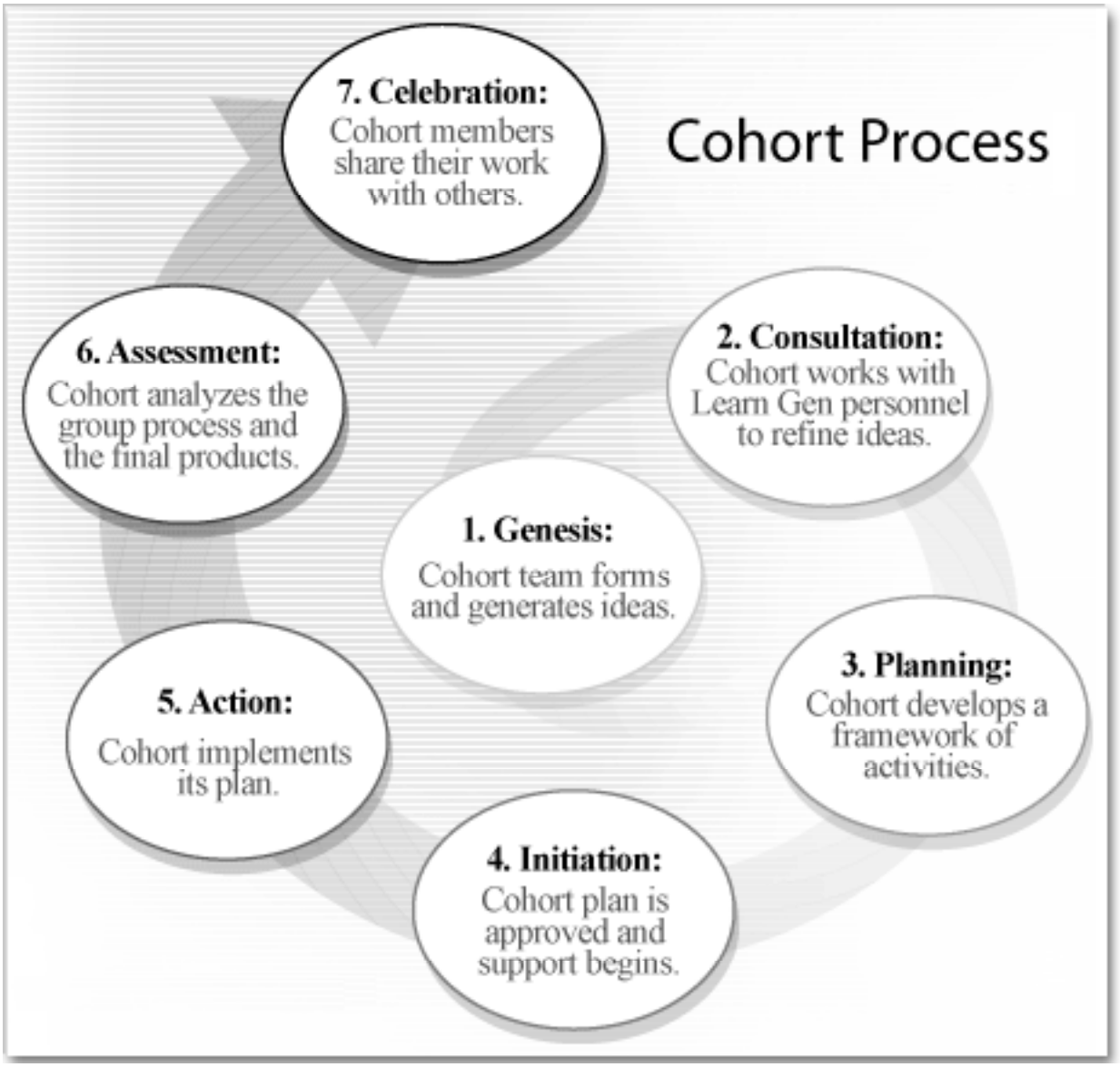
The Learning Generation Cohort Design and Process

The Learning Generation model adopts a multifaceted implementation plan where technology acts as a catalyst for change in teacher education. The implementation includes: improvements to the technical infrastructure that bring high quality connectivity and technology resources to faculty's desks and classrooms, ongoing opportunities for professional development, community produced online learning resources, program reform, technology enriched field experiences and policies that recognize faculty and student innovations. A central aspect of the model calls for the creation of the Learning Generation cohorts.

The Learning Generation cohort model emerged in an instructional design course where students choose teacher education faculty as their clients. The students worked with the faculty to create instructional products that addressed the faculty's needs. In this course, the faculty member serves as a content subject expert while the students provided technical development skills and knowledge of instructional design. The Learning Generation model expanded this notion to include more constituents and greater involvement and ownership of the ideas for integrating technology to create a sustainable model.

The ideal cohort consisted of 1) a School of Education faculty member, 2) teacher preparation student(s), 3) a College of Liberal Arts and Science faculty member, 4) a practicing teacher and 5) at least one K-12 student. This structure was designed to bring together a diverse group of people who have a stake in the effective integration of technology in a subject area or theme. While this is the ideal structure, cohorts have been formed with various permutations of these five constituencies.

Figure 1: The Learning Generation Cohort Process



Steps in the Cohort Development Process

Step 1 – Genesis of a Cohort:

The genesis of a cohort begins when the cohort team comes together to discuss and generate ideas. Typically, a faculty member lacks technology skills necessary to bring an idea to fruition and the time required to develop these skills. The model provides an opportunity for faculty to form a cohort with pre-service teachers and others to

address their needs. While the faculty member often serves as the catalyst, in some cases an idea arises when a group of students and faculty meet in a gathering.

Step 2 – Consultation with Experts:

Once the cohorts form their ideas, they consult with Learning Generation personnel, which consists of faculty members, staff and graduate students with expertise in instructional technology, to discuss the feasibility and refine initial ideas. This consultation allows technology experts with the Learning Generation project to provide advice, identify similar projects from which to learn, recommend technology solutions and help the new cohort team avoid potential problems that arise when a cohort takes on ambitious tasks.

Step 3 – Develop a Plan:

After consultation, the cohort then develops a plan that articulates the vision, membership, goals, support needs, timeline, deliverables and evaluation strategies. This plan becomes the framework for the cohort's activities. The planning phase is crucial because it provides the cohort with guidance and a sense of cohesion. During the planning phase the Technology Infusion Group (TIG) support group provides cohort web space where they document their work.

Step 4 – Initiation of Plan:

Initiation occurs when the cohort plan is approved and the Learning Generation support package is created. The cohort faculty leader meets with a member of the Technology Infusion Group to make sure the project is understood and the resource and technical support needs are communicated.

Step 5 – Action:

Once the plan is developed, the cohorts enter the action phase where work begins according to their plan. The teacher education student(s) often serve as the engine for the action. Cohort members meet regularly and share products through their website.

The cohort's products remain publicly available beyond the active phase as one way to sustain the cohort's innovation.

Step 6 – Assess Results:

As a cohort concludes its action phase it implements assessment strategies as specified in the plan. During the assessment phase the cohort analyzes the group process and the final products. Each cohort is encouraged to share details of the assessment on the website. Assessment assists the cohort members in understanding the salient aspects of the process and the functioning of the cohort. The assessment phase also provides insights for refining the overall cohort process.

Step 7 – Celebrating and Showcasing the Results:

The cohort has a celebration following the completion of the plan, which gives the cohort an opportunity to share their work. Celebrations may take the form of a product release, a round table discussion, showcase or conference presentation. The celebration also communicates the innovation and encourages others to form cohorts. The celebration helps culminate the cohort's efforts and acknowledges the significance of the cohort's accomplishments.

A Learning Generation cohort is a multidisciplinary, project-based collaboration between a School of Education faculty member, at least one School of Education pre-service teacher and others. Cohorts come together for a self-determined period of time, usually one or two semesters, in order to investigate some aspect of technology integration or technology application in an area, subject or discipline. Each cohort creates a plan that helps guide its efforts and establishes expectations for products and other outcomes for the cohort. The membership of the cohort is flexible and each cohort recruits members that help it achieve its goals. Members of a cohort might include School of Education faculty, faculty from the College of Liberal Arts and Sciences, practicing teachers and students from K-12 schools.

Supporting the School of Education students in their work with cohorts is an essential part of the process. Much like the Generation Why approach, the Learning Generation model relies on students to learn new technologies in order to assist faculty members in some aspect of technology integration. This ensures that faculty members have access to support in their efforts to integrate technology in ways that accommodate faculty needs for technology skills development and their time schedules. The faculty member may choose to concentrate their efforts as a subject matter expert, taking advantage of the student's ability with new technologies easily. This flexibility ensures that the Learning Generation cohort process creates a cooperative environment through which faculty can learn new technology skills with participating students while developing the means to integrate technology in relevant and appropriate ways for their content area and teaching practices.

Technology Infusion Group

An important part of the Learning Generation model is Technology Infusion Group (TIG). This group is made up of a small number of people with both teaching and technology proficiencies. The purpose of the Technology Infusion Group is to help the School of Education students who work with cohorts broaden their view of technology integration and to become aware of the range of possibilities that exist. Additionally, TIG provides technology training to these students in support of their work with the cohort. Each semester, all teacher education students who were active in a cohort during that semester are required to meet as a group with members of the TIG. Bringing the students together in this way helps the students form a community of practice to learn from and to support each other in their work with cohorts. TIG plans the first meetings to help students understand their role in the cohorts and in the larger picture of the Learning Generation project, to cooperatively develop a vision of technology integration, to develop a reporting routine that provides TIG with information about the operation of

each cohort, and to acquire technology skills they need to accomplish their cohort's innovations.

The purpose of the TIG is to support and extend the teacher education student skills and to give students opportunities to discuss and to refine their ideas. In the Learning Generation model this is done by helping students form a collaborative and supportive peer group. In this group environment students have opportunities to engage in discussions about technology integration and exchange what they learn from their cohort experiences. This helps extend the innovations from each individual cohort to all cohort . Students working with TIG also have a chance to learn about technology integration from each other and develop or improve their technology competencies.

Technology skills enhancement is accomplished in three ways. First, members of TIG provide direct instruction to Learning Generation students on specific technologies as needed. Second, students form a network with each other and provide peer support to each other. Third, Learning Generation students are encouraged to participate in a resource development process to learn new software skills and to share those skills with others. Direct instruction of technology skills is sometimes needed to help students to achieve their cohort's vision. This direct instruction ensures proper care for equipment as well as a common knowledge base that helps students work together. Students in the Learning Generation project have access to laptop computers to use while they work with a cohort. The availability of laptops is seen as a helpful but not essential aspect in the model. Examples TIG instruction include: an introduction to laptop computers, how to use the laptop with the campus network, how to use the computer with a wireless network and how to use the computer to connect to an Internet service provider using the internal modem.

During the meeting with TIG, students have opportunities to learn new technologies and exchange ideas about what they learn. This enhances the individual student's knowledge and extends the learning throughout the group. In some cases several students

commit to learning more about a particular software package. An example of this occurred with the choral music cohort when the students committed to developing a training and support system to help choral music instructors at local high schools create websites. The students selected DreamWeaver to aid in the creation of the website and develop a DreamWeaver tip sheet as a collaborative project of the student group (http://learngen.org/resources/). In this way, students each learned about the program and they created a persistent resource that was used by other cohorts.

To assist in the collaborative sharing of ideas we have developed tools and standards for developing community produced learning objects (http://learngen.org/resources.html). The learning object community publishing environment is a procedural system for creating, testing and sharing tutorials that teach specific software skills in the context of an educational task. This process helps the student learn more about software or share knowledge that they already have about a piece of software. In addition to learning specific technologies, this process encourages students to think about technologies in the context of an instructional activity in support of the work they are doing with their cohort. These learning objects are designed to be easily integrated into a wide range of educational situations including online course management systems such as Blackboard or WebCT.

The Cohorts: Goals and Accomplishments

The Learning Generation cohort model accommodates the needs of these faculty by providing a team-environment where responsibilities and involvement of various members often shifts over time. All cohorts have created and maintained a website. Mores extensive information can be found on the Learning Generation website (http://learngen.org).

The Current Cohorts Include:

Creating Online Course Supports
Faculty: Nona Tollefson, Bruce Frey; Students: Andrea Banks

This cohort is working to meet the challenge that many instructors face when they attempt to convert or create materials for online course supports. The results include tutorials and examples that on how to create and organize online course support.

Engaging Students in Learning Using the Classroom Performance System
Faculty: Steve White; Students: Ryan Turner, Nic Slayton

The Classroom Performance Systems (CPS) cohort has piloted the use of the technology at the elementary level (6th grade). Students were presented with the material with PowerPoint. Students were given the CPS to use to take a quiz over the material. CPS data was gathered from student grades and traditional quizzes. This sequence was followed twice with different materials. [Blue Valley - Oak Hill Elementary].

Enhancing Technology Integration
Faculty: Sean Smith; Students: Sara Sieve, Kathryn Zook

Many school districts are finding effective and beneficial ways to use technology that in the university environment may be considered obsolete. To prepare students to adapt to varying technology situations, this cohort modified the curriculum of three School of Education courses to accommodate a range of technology infrastructures and capabilities.

Evaluating Classroom Software
Faculty: Flora Wyatt; Students: Sara Sieve, Kathryn Zook, Teachers: Christy Kelly, Joni Weiss, Mary Barke, Virginia Rollison, Sandra Sanders

There is considerable software available to teachers. However, not all software is created equally. This cohort examined a number of different software titles and reviewed them. This is designed to help teachers make informed choices about software purchases [Lawrence District - New York Elementary, Cordley Elementary, Turner District - Turner Elementary; Kansas City KS - New Stanley Elementary].

Faculty and Staff Technology Enrichment Program

Faculty: Frank Carey, Vicki Occhipinti, Steve Smith; Students: Jozenia Colorado

In the TEC-e (Technology Enrichment Cohort) teacher education students were trained to provide basic technology training (software programs, operating systems, etc.). Faculty and staff members send in their requests for training to the cohort through a "menu" style door hangers. Faculty and staff can also sign up for training through the TEC-e web page. The TEC-e staff has supported over 22 faculty/staff members.

Initiative for Enhancement of Choral Music Online
Faculty: James Daugherty, Anne Daugherty; Students: Erin Stewart

Technology can help choral directors communicate about their program. This cohort trained a number of choral music directors how to create websites to organize and teach. [Lawrence District - Lawrence HS, Southwest Jr. High].

Integration of Technology into the Curriculum: A Pilot Study
Faculty: Sean Smith, Flora Wyatt; Students: Sarah Curry, Jenny Fuller, Amber Heiserman, Jaye Kowitz, Janet Medina, Erica Rozenberg

Student teachers trained in-service teachers to use HyperStudio in their classrooms. By becoming technology mentors, the students were able to successfully integrate technology into classrooms that had little prior technology enrichment. "Reversed mentoring," said Sean Smith, "has a lot of power." [Lawrence District - Cordley Elementary, Shawnee Mission - South Park Elementary].

Integration of Technology Into the Elementary Curriculum
Faculty: Flora Wyatt; Students: Greta Danner, Kathryn Dodson, Jennifer Fleming, David Slayton

This cohort used two programs, Kidspiration and Inspiration, to help kids improve their writing skills by helping them organize stories. KU students worked with teachers at Cordley Elementary School to implement the programs into their lessons. Flora Wyatt,

faculty leader of the cohort, said, "I...reinforced my belief that technology can't be taught in isolation, that it needs to be integrated into meaningful content."
[Lawrence District - Cordley Elementary].

Kansas Government Legislative Tracking Website
Faculty: Joe O'Brien; Students: Aaron Grill, Jada Kohlmeier, Mike Runyan

With the help of Track Star, a software program that teacher education students in this cohort designed, high school students can take an active role in learning about the Kansas Legislature. Track Star enables students to perform a guided Internet search on Kansas Legislature issues. Working directly cohort members, the students can also inform legislators about their stance on issues. [DeSoto Schools - Mill Valley HS]

Making Hope Happen: A Strength Enhancing Web Project
Faculty: Shane Lopez; Students: Elizabeth Burns, Sharon Jenkins, Jennifer Lang, Aaron Polson

Through the Making Hope Happen cohort, technology is used to help students reach goals. The cohort designed a 5-week program and a website to increase hopeful thinking in children using didactics, narrative techniques and games. The technique is called Hope TALK, which stands for Teaching the hope model, Applying the language, Luring kids into the use of terms, and Kindling a hopeful spirit. [Perry - Lecompton HS].

Online Economics Lessons for High School Teachers
Faculty: Barbara Phipps, Shala London; Students: Randall Holt Teachers: Scott Conklin, Kathryn Lawhorn, Bill Sanderson

Many high school students don't have enough opportunities to learn about economics. This cohort has worked to create online resources for use by high school students on economics education topics. [Blue Valley - Blue Valley Northwest HS, Kansas City KS - Sumner Academy].

Online Foreign Language Learning
Faculty: Manuela González-Bueno; Students: Todd Hernández, Rosalea Cartar, Carmen Ruiz

A language is not only one static thing. It varies depending on the linguistic community that uses it. This cohort is designing a website that showcases the different dialects, different pronunciations and different varieties of the Spanish language. The site is a way of collecting lots of information and putting it together to make it easily accessible to students. The goal is to expose learners of Spanish to language variances.

Online Instructional Modules for Basic Technology Skills
Faculty: Steven Smith; Students: Christopher Heatwole, Michael Kravets, Irene Ratzlaff, Tyler Stransky

This cohort explored the development of online supplemental instructional modules for students entering the teacher preparation program. These modules would cover basic skills deficiencies, thus enhancing the educational experience and instilling in students the skills necessary for using technology when they become teachers themselves.

Placing Student Teachers in Technology-Rich Schools
Faculty: Janel Hinrichsen, Mike Neal, Joe O'Brien, Fred Rodriguez, Sean Smith

The field experiences of teacher education student's will be more rewarding when they are placed in technology-rich schools where the students technological abilities are matched with the cooperating teachers abilities. This cohort works to place students in classrooms that will most benefit from their technological interests and capabilities. [Desoto - Starside Elem., Lawrence District - Cordley Elem., Baldwin - Baldwin HS].

Preparing Teachers for Inclusive Education: Using Technology to Present Case Pedagogies to Pre-service Teachers
Faculty: Monica Brown; Students: Melia Johnson, Marie Hooper

Students in the School of Education are exposed to real-world scenarios through avenues other than field experience. In fact, the Inclusions Solutions cohort is working on

bringing the real world into the classroom by using the case study method of teaching. This method helps students make the leap from theory to practice and is preparing them to teach thoughtfully in diverse classrooms.

Promoting the Use of Technology in Special Education Classrooms
Faculty: Suzzane Robinson; Students: Laila Richman, Jennifer Zink

This cohort worked to use technology as a learning tool for children in special education classrooms. Through using new tools, students are engaged and interested in technology while learning. Throughout the year, this cohort worked in two different classrooms and hopes to contribute what it learned to the teacher education program.

Redesigning a Gifted and Talented (GATE) Education Course
Faculty: Reva Freidman-Nimz; Students: Eniola Ajayi, Debra Denson, Becky Halloran, Judith Lacey

The Gifted and Talented Education (GATE) Course has been taught in the School of Education for 25 years. This cohort worked to improve that course by making it an interactive, internet-based educational experience. Students involved in the computer club at Free State High School created a GATE website. Students have presented this project at two GATE conferences. [Lawrence District - Free State HS].

Technology in Science Teaching
Faculty: Jim Ellis, Joe Heppert, Jeremy Mohn, Norm Sedillo; Students: Jennifer Klein-Wackerla

This cohort helps students focus on how to integrate appropriate applications of technology into instruction. They judge characteristics that make a quality technology product for science education and review the most effective ways that science teachers are using technology in teaching. [Blue Valley Northwest HS, Kansas City KS-Argentine].

Tracking Current Events
Faculty: Joe O'Brien; Students: Aaron Grill, Dustin Leochner, Jennifer Schlicht, Stacia Schwarz, Jeff Strickland

Students never really see current events as unfolding stories. This cohort created a website whose purpose was to track current events over a quarter or semester. The tracker enables the teacher and the students to take particular events and then see what happens with those events over the course of time. [Lawrence District - Southwest Jr. High, DeSoto Public Schools - Mill Valley HS].

Using Pocket PCs to Enhance the Quality of Life for Individuals with Asperger Syndrome
Faculty: Brenda Myles; Students: Elisa Gagnon

Students, parents and teachers were trained by the teacher education students on how to use and integrate the Pocket PCs in everyday activities. Data is being collected on the effectiveness of the Pocket PCs with Asperger students. [Blue Valley - Overland Trail Middle School, Olathe - Pioneer Trail Junior High School].

Using Technology for Field Experience Observations
Faculty: Janel Hinrichsen, Fred Rodriguez; Students: Emily Stintzi

Field experience is an integral component of the teacher education curriculum in the School of Education. This cohort seeks ways to further advance field experience assistance and evaluation through video conferencing observation. This approach addresses the need to inform instructors about technology and the dialogue that needs to take place with P-12 participants. [Lawrence District Schools].

<u>Evaluation / Project Results</u>

Initial Surveys on the Use of Technology by Students and Faculty

A survey was used to assess the use of information technology by teacher education students and faculty during the initial phases of the project. Participants consisted of 244

(92.1%) students, 16 (6.0%) professors, and 5 (1.9%) graduate teaching assistants. Most of the participants were women (73.1%). All the students, instructors, and graduate teaching assistants (GTA) were recruited from School of Education courses. The majority of participants were Caucasian (94.4%), African-American, Asian, Native American, and a number of international students were also represented. The students' ages ranged from 19 to 50 (M = 22.44, SD = 4.74). The professors' and GTAs' ages ranged from 21 to 53 (M = 34.89, SD = 10.28).

Instruments.

The survey consisted of 30 items covering various technology skills. Participants received a total score as well as scores on the following 6 subscales: basic computer skills, online activities, presentations, software use, spreadsheet and database, and word processing. Alpha coefficients suggest acceptable internal consistency for the total scale and the 6 subscales. The alpha coefficient for the total scale was a = .957.

The basic computer skills subscale consisted of 7 items such as "Open and exit programs; including starting up and shutting down the computer properly" (a = .836). Online activities consisted of 5 items such as "Access the Internet; including performing searches, setting bookmarks (favorites), following links, and saving web pages" (a = .770). The presentations subscale consisted of 5 items such as "Create programs and presentations using multimedia authoring programs; including creating linear/nonlinear programs, incorporating text, graphics, audio, and video" (a = .865). Software use for Instruction consisted of 5 items such as "Prepare lesson plans that involve the specific use of software to accomplish classroom goals" (a = .795). The spreadsheet and database subscale consisted of 4 items such as "Create charts and/or tables using spreadsheets and databases; including publishing the information in the most appropriate form" (a = .871). Finally, the word processing subscale consisted of 4 items such as "Perform the following operations in a word processing program; select, cut, copy and paste text; change font size and styles; and spell check documents" (a = .783).

Participants responded to the items using the following Likert scale: "No experience" = 1, "I am able to do this but need assistance" = 2, "I am able to do this but not to its full capacity" = 3, "I am able to do this routinely to its full capacity" = 4, and "I could teach others to do this" = 5. Therefore, possible total scores could range from 30 to 150. The survey also gathered demographic information such as date of birth, sex, ethnicity, major, and minor.

Procedures.

The researchers recruited student participants from various teacher preparation courses. We obtained instructors' permission to administer the technology survey during class time and student consent for participating. The instructors of those courses also signed an informed consent document and completed the survey. Each session took approximately 15 min.

Results.

A one-way repeated measures ANOVA was used to compare the scores on the 6 subscales: basic computer skills, online activities, presentations, software use, spreadsheets/databases, and word processing. The Wilkes Lambda procedure indicated a significant finding, $F(5, 244) = 173.11$, $p < .001$. Eta squared was used to determine the effect size. The effect of the subscales accounted for 78% of the variance in scores. Because post hoc analysis consisted of a large number of paired-samples t-tests, the Bonferroni correction procedure was used. Fourteen of the pair-wise comparisons were significant. Only the spreadsheet/database and presentations comparison was not significant. Table 1 shows a list of comparisons. Table 2 shows the means and ranking of technology literacy skills where the faculty and students had more confidence in their ability to use word processing ($M=3.84$) than in their ability to use spreadsheet and database programs ($M=2.77$).

Table 1: Post Hoc Analysis of Repeated Measures ANOVA on Technology Use Subscales

Pair-wise Comparison	t – test	
Word Processing – Spreadsheet/Database	t (260) = 23.52,	p < .001*
Word Processing – Software Use	t (256) = 18.68,	p < .001*
Word Processing – Presentations	t (260) = 22.09,	p < .001*
Word Processing – Online Activities	t (256) = 9.84,	p < .001*
Word Processing – Basic Computer Skills	t (256) = 6.17,	p < .001*
Spreadsheet/Database – Software Use	t (256) = -4.66,	p < .001*
Spreadsheet/Database – Presentations	t (261) = -1.61,	p = .109
Spreadsheet/Database – Online Activities	t (257) = -15.42,	p < .001*
Spreadsheet/Database – Basic Computer Skills	t (257) = -18.66,	p < .001*
Software Use – Presentations	t (256) = 3.57,	p < .001*
Software Use – Online Activities	t (252) = -12.04,	p < .001*
Software Use – Basic Computer Skills	t (252) = -14.60,	p < .001*
Presentations – Online Activities	t (257) = -14.86,	p < .001*
Presentations – Basic Computer Skills	t (257) = -16.32,	p < .001*
Online Activities – Basic Computer Skills	t (253) = -3.77,	p < .001*

*Note: * Indicates significant difference.*

Table 2: Ranking of Student and Faculty Overall Means on Technology Use

	Technology Skill	Mean*	SD
1.	Word Processing	3.84	.818
2.	Basic Computer Skills	3.61	.785
3.	Online Activities	3.49	.782
4.	Software Use	2.99	.970
5.	Presentation Software	2.84	1.06
6.	Spreadsheets / Database	2.77	1.06

** 1 = "No experience" ... 5 = "I could teach others to do this"*

A series of t-tests were used to compare the men's and women's total scores as well as their scores on the 6 subscales. Bonferroni correction was used to control the error rate.

Men scored significantly higher than the women on the presentations and basic computer skills subscales. As table 3 shows, the other comparisons were not significant.

Table 3: Comparison of Men and Women Use of Information Technology

Subscale	Means		Standard Deviations		t-test
	Men.	Women	Men.	Women	
Word Processing	4.00	3.77	0.88	0.79	t (244) = 1.92, p = .056
Basic Computer Skills	3.86	3.51	0.83	0.75	t (244) = 3.08, p = .002*
Online Activities	3.64	3.43	0.83	0.75	t (244) = 1.96, p = .051
Software Use	3.20	2.92	1.09	0.89	t (243) = 2.07, p = .040
Presentation Software	3.14	2.70	1.19	0.98	t (244) = 2.93, p = .004*
Spreadsheet/Database	2.94	2.67	1.12	1.03	t (244) = 1.74, p = .083

*Note: * Indicates significant difference.*

T-tests were also used to compare the instructors' and students' total scores as well as their scores on the 6 subscales. Bonferroni correction was used to control error rate. Because the sample sizes were small the professors and the GTAs have been combined into one group called instructors. As Table 4 shows, there were no significant differences between instructors' and students' scores on the technology use subscales.

Table 4: Comparison of Instructor and Student Use of Information Technology

Subscale	Means		Standard Deviations		t-test
	Inst.	Student	Inst.	Student	
Word Processing	3.91	3.84	.95	.81	t (260) = -.351, p = .726
Basic Computer Skills	3.96	3.60	.76	.78	t (260) = -1.97, p = .049
Online Activities	3.44	3.50	.97	.76	t (260) = .279, p = .780
Software Use	3.17	2.99	1.10	.95	t (260) = -0.82, p = .414
Presentation Software	3.00	2.83	1.38	1.04	t (260) = -.658, p = .511
Spreadsheet/Database	3.32	2.71	1.32	1.02	t (260) = -2.49, p = .013

Initial Interviews of Faculty on Uses of Technology in Teacher Education

Interviews were conducted to follow up on the initial surveys. The participants were 20 professors and 6 graduate teaching assistants from the School of Education who responded to 11 open-ended questions. The interviews considered the following topics: familiarity with information technology, advantages and disadvantages of information technology, technology skills that teacher education graduates need to have, ideas about technology integration, how they use information technology in their classrooms, barriers and resources, and personal teaching style. The same interviewer conducted each interview lasting about 30 minutes. Table 5 shows a summary of interview comments.

Table 5: Summary of Instructor* Interviews on Uses of Technology

What are the advantages of using technology in teacher education?	
Information was obtained more easily	89%
Access to a wide range of resources	35%
Greater access to others outside of university	23%
Keeps students' attention	19%
Ability to individualize instruction	19%
What are the disadvantages of using technology in teacher education?	
Too time consuming	30%
Not everyone has access	30%
Fear or anxiety of technology	30%
Too many technical problems	27%
Evaluating information is difficult and time consuming	19%
No disadvantages if technology is used properly	19%
How should technology be integrated in teacher education?	
Instructors should model technology use	36%
Integrated technology in all courses	36%
How do you use technology in your teaching?	
Use email to communicate with students	69%
Use technology only at a very basic level	50%
Have assignments that require students to use technology	42%
Use videos or overhead projectors	27%
Have a class website(s)	23%
Use PowerPoint	19%
What are the barriers to integrating technology in teacher education?	
Need for training and technical support resources	64%
Lack of access to equipment	72%
Lack of time to learn how to use technology	52%
Lack of training opportunities and support	40%

Fear/anxiety towards technology	36%
Have adequate access to equipment	29%
Lack of funds	20%
Sufficient funds available	18%

** Results from interviews with 20 professors and 6 graduate teaching assistants.*

Evaluation Arranged by Goals

Goal 1. To assess the teacher education candidates' perceptions and abilities concerning technology and to attract diverse candidates to the teaching profession who are interested in integrating technology in teaching and learning.

The survey findings suggest that students and faculty felt confident in their ability to use various technology applications. They were especially confident in their ability to use word processors, online resources, and basic computer functions. The participants were slightly less confident in their ability to use spreadsheets, databases, and presentation software. This is worth noting because these uses of technology often support learning activities involving inquiry (using spreadsheets to organize and analyze data) and project-based constructive learning (using presentation software to report interpretations). We provided technical support and resources to encourage many of the more recently established cohorts to integrate technology in ways that will support inquiry activities and constructive learning projects.

The survey findings indicated a gender gap where men reported higher confidence in their basic technology and presentation skills than women. Models for integrating technology should address the needs, interest and abilities of diverse learners. Learning Generation is a collaborative, democratic and non-competitive model that focuses on peer support and networking. The model is conducive to equitable involvement and support for all participants. Learning Generation has been successful in recruiting female students to work in cohorts, however initially there were very few female faculty members involved in cohorts. We increased our efforts to recruit female faculty while retaining the

already high female student participation. Modeling effective use of technology by female faculty may be especially effective in mentoring.

Several faculty indicated that instructors should model the use of information technologies in courses. The survey suggests that most faculty are confident in their use of technology. However, the interview indicated that many faculty were not using their technology skills in their teaching.

Instructors have identified several mechanisms for attracting students with computer skills into the teacher education program. One possibility is to value technology use as a criteria for admissions into the teacher education program. That is, require students list technology skills, courses and projects involving the use of technology as part of the application process. We are considering adding this criteria to the application that currently assess experience along four dimensions: leadership, diversity, working with young people and working in a classroom setting.

A cohort specifically targeting recruitment developed a website and marketing tools that describe how technology literate students use their skills in teaching careers. The intent is to encourage candidates who are current leaders in using information technology to consider teaching as a career option. The recruitment goal is also being addressed by those cohorts who include high school students including a cohort that produced online classes about economics, the Spanish dialect site cohort, and a cohort that pairs teacher education and high school students in addressing social studies issues.

Goal 2. To significantly improve the technology literacy competencies of teacher education faculty and pre-service students.

In order to evaluate the student use of information technology in the teacher education program, we gathered data to establish baseline measures of faculty and student familiarity with the use of technology in general within three target courses: PRE (Psychology and Research in Education) 300, T&L (Teaching and Leadership) 320 and

T&L 325. The three courses were chosen because they are the courses that most individuals entering the teacher education program would enroll in. The survey was administered to these classes in each of the project years.

Table 6: Student Use of Information Technology for 4 Years

	N	Basic Skills	Word Processing	Software Use	Spread-Sheets	Presentations	On-line Activities
Cronbach's Alpha		.8360	.7819	.7939	.8704	.8649	.7690
Year 1	78	3.69	3.89	3.27	2.69	3.17	3.49
Year 2	80	3.74	3.96	3.28	2.94	3.07	3.74
Year 3	175	3.80	3.99	3.28	2.99	2.96	3.62
Year 4	53	3.46	4.02	3.33	2.97	3.07	3.61

** 1 = "No experience" ... 5 = "I could teach others to do this"*

Data from the survey reveals no significant changes in their use of technology over the four years of the project. One reason for this may be that students entering the teacher education program are now quite confident in their use of media and technology. Many of the high schools in the service area of the University require electronic portfolios and media presentation as requirements for graduation.

We also followed a specific group of students from entry into the School of Education (project year 1) until their final semester before graduation (project year 4). Table 7 presents the results of this follow up.

Table 7: Student Use of Technology Tracked: Year 1 and Year 4

	N	Basic Skills	Word Processing	Software Use	Spread-Sheets	Presentations	On-line Activities
Year 1	77	3.54*	4.04	3.40	3.15	3.13	3.60
Year 4	77	3.53	4.07	3.45	3.16	3.16	3.59

** 1 = "No experience" ... 5 = "I could teach others to do this"*

Scores over the three-year period remained consistent. Again, this can probably be explained by the fact that most students enter the teacher education program at a relatively high level of technological sophistication.

School of Education faculty and Graduate Teaching Assistants (GTAs) teaching as part of the core undergraduate teaching program were also surveyed using the same questionnaire. Results are shown in Table 8.

Table 8: Faculty and Instructor Use of Technology

	N	Basic Skills	Word Processing	Software Use	Spread-Sheets	Presentations	On-line Activities
Year 1	21	3.99*	4.14	3.61	2.86	3.70	3.82
Year 2	27	4.09	4.21	3.59	3.41	3.43	3.67
Year 3	30	4.10	4.19	3.55	3.18	3.19	3.88
Year 4	23	4.13	4.17	3.62	3.32	3.37	4.01

** 1 = "No experience" ... 5 = "I could teach others to do this"*

The student technology survey was also designed to reflect the six International Society for Technology in Education (ISTE) student technology foundation standards. Student scores over the project period are shown in Table 9.

Table 9: Student Technology Use Related to ISTE Standards

	Basic Operations *ISTE 1*	Social, Ethical, Human Issues *ISTE 2*	Productivity Tools *ISTE 3*	Communication Tools *ISTE 4*	Research Tools *ISTE 5*	Problem Solving *ISTE 6*
Year 1	3.89	3.26	3.28	3.22	3.31	3.13
Year 2	3.88	3.17	3.26	3.17	3.31	3.13
Year 3	3.94	3.21	3.32	3.18	3.42	3.22
Year 4	4.19	3.53	3.65	3.52	3.77	3.61

Professors and GTAs were also interviewed to evaluate several lines of interest: familiarity with educational, opinions regarding advantages and disadvantages, opinions about how familiar they believe teacher educators/graduate students should be about the use of information technology, barriers present or resources available, personal teaching style and the amount of technology they use in their classrooms.

Interview data revealed that most faculty and graduate student instructors defined information technology primarily as computer-based methods for the delivery, retrieval, organization and management of information. They also believed that information technology can include any type of technology designed to disseminate information and assist in teaching and learning, ranging from overhead projectors to websites or software programs to aid learning. The most commonly cited uses of information technology in teaching are e-mail, PowerPoint and Blackboard.

Common advantages of using technology in the classroom include time management, organization, communication and access to other resources and include: fast and easy access to information (e.g., websites, Internet), increased contact with different resources (e.g., other institutions, organizations and libraries), increases in the use of innovative teaching methods, increased likelihood of collaborative projects and increases in communication between instructor and students. In practical terms, faculty report that technology has made it easier for them to manage and keep track of classroom information. For example, by using websites or Blackboard, faculty are able to post such things as course syllabi, class assignments, grades, etc. This also allows the students to turn in class assignments electronically. The use of PowerPoint has allowed lectures to become more organized, concrete and visually interesting. Several of the faculty report that, with the use of PowerPoint and other technology, they are able to present information using graphics that they were unable to present on paper. Faculty report that the use of e-mail has aided in improving the frequency and speed with which students and faculty interact, thereby increasing their accessibility to the students. It also gives

students who normally would not be in contact with each other the opportunity to interact and share information and ideas (e.g., distance learning, websites).

Common disadvantages of technology included: security issues and the potential for abuse and misuse (e.g., adolescents accessing inappropriate material), web information may be inaccurate or lack credibility, lack of expertise (need more training), not all students have access to the same technology, it takes too much time to order and set up equipment, and lack of technical help to troubleshoot problems that may arise during presentations.

Most individuals interviewed stated that they expected graduates of the teacher education program to be competent with basic computer skills, know how to conduct searches and evaluate the quality and credibility of the information found on the Internet, know how to access the different search engines, understand and be able to use technology as an instructional tool, and finally, be able to integrate its use within the course and use it as a means to facilitate learning.

A frequent comment made by faculty is that technology should only be used if it enhances the curriculum and should not be used just for the sake of using technology. In addition, student feedback indicates that they would prefer a combination of classroom instruction approaches that combine old fashion lecture and chalkboard methods with the use of technology. Finally, many professors feel that instructing future teachers to use technology in the classroom needs to be balanced by the fact that many of them may be placed in schools that have limited or no technology available. With this in mind, faculty and students tend to agree that the best way to increase the use of information technology into the teacher education program is to integrate its use within existing courses through assignments that make the use of technology a necessary component. For future teachers to use technology in their courses it is first necessary for School of Education instructors to effectively model the use of technology by having active websites for their courses and

making use of instructional software or creating assignments that force students to use technology to establish collaborative networks with other institutions.

There is great variability in the how much different instructors use technology within their courses, ranging from instructors who claim they do not use technology beyond e-mailing and keeping track of grades to other instructors who use technology extensively and integrate its use throughout the course (e.g., websites, online syllabus and assignments, etc.).

Student cohort members made a major contribution to the goal of improving the technology literacy of teacher education faculty and pre-service students. KU student cohort members often possessed technical skills that far exceeded those of the faculty. Their contributions included such things as designing, creating and maintaining websites, providing training in computer skills, and developing expertise in such things as HyperStudio, Dreamweaver, Adobe Acrobat and iMovie. Student cohort members are often used to provide outreach training and support to KU SoE faculty, in-service teachers, and community partners.

Student online surveys indicate that, for the most part, students feel that they already posses the technology skills needed for success in their teaching careers. While some of the students cited high school or college courses as the source of their technology training, most stated that they were self-taught. Thus, many of the students feel that their technology skills are at a basic level and that more training would be beneficial. Specifically, students stated that they would like more training on how to incorporate the use of technology and would like more information on available software. Many students requested increased access to computer labs (e.g., longer hours) and tools (e.g., digital cameras, video conferencing). Another common comment made by the students was that they didn't know what was available in terms of training, support and other resources and suggested that the School do more advertising about what is available.

Most individuals identified barriers to the use of information technology as: lack of knowledge and time, no incentive for many instructors to learn, lack of usefulness in learning to use technology for students because many times the sites where they will teach will not have the equipment, lack of equipment and lack of technical support for initial learning.

Based on interview data, instructors have identified the primary reason for their lack of literacy and competency in the use of technology as due to lack of technical support during the initial phases of learning. Although there are enough resources and technicians available to troubleshoot problems, there are not enough services and individuals to teach them how to use different computer programs in their teaching and they are reluctant to invest time in trial and error techniques. A means of increasing competency in teachers is to provide courses or in-services that focus on how information technology can best be used in teaching as opposed to focusing on the technology itself. Another means of increasing literacy for instructors is to make learning technology more integrated with existing courses.

Goal 3. To empower faculty, teacher education students and cooperative teachers with the tools, skills and technical support for extending best practices in integrating instructional technology in their teaching.

Many professors and graduate student instructors have stated that one of the primary reasons for the lack of use of information technology within their courses is because they are unfamiliar with the different instructional tools available or they do not feel competent enough to integrate the use of technology into their courses. Support in the form of just-in-time technical assistance from staff or students and online tutorials are viewed as more valuable than workshop training. Instructors also felt that technical help must be available when they are teaching so that they do not have to spend time fixing the problem instead of teaching.

Year 3 faculty interviews found an increased positive attitude toward the use of technology as an instructional tool. For example, a "brown-bag" seminar offered during Year 2 of the Learning Generation project introduced Blackboard to faculty. At the time, fewer than 10% of the faculty had made use of this resource offered by the University. Currently, over 60% of the undergraduate curriculum is offered, at least to some extent, on Blackboard. The interest generated through the Learning Generation activities contributed to an increase in faculty instructional support websites.

The interviews revealed that faculty are more aware of the "interesting projects" that Learning Generation cohorts have developed. This awareness has come primarily through word of mouth rather than the Learning Generation sponsored gatherings. Sharing between colleagues has produced interest among faculty to develop similar projects for their content area. Perceived lack of time and required expertise are the most often reported barriers for those who have not engaged in the cohort activities.

Audit of Cohort Website on Goal Attainment

An audit of the websites was also used to evaluate all goals with a particular focus on how well the cohort members were integrating technology in their teaching and the teacher education program. The researchers accessed 20 websites associated with or created by members of the 21 Learning Generations cohorts. The cohort websites were evaluated for evidence of progress towards attainment of the goals of the Learning Generation project. Specifically the researchers looked for evidence of:

- Increases in technology literacy competencies of teacher education faculty and pre-service students (evidenced by materials created to deliver technology skills training and plans for technology training in a cohort timeline of activities.).
- Instructional technology integration in teaching and learning (evidenced by examples or discussions of a new technology use by a professor).

- Engagement of cohorts including information that communicates the sustainability and replicability of the cohort model (evidenced by products designed to sustain the innovation over time that demonstrate institutionalization of cohort innovation).
- Recruitment of technology literate students into the teaching program (evidenced by the presence of materials that reach out to high school students with technology skills as well as procedures or projects that involve high school students).
- Use of information technology to improve communication and collaboration with professional development and placement schools (evidenced by the inclusion of telecommunication technologies used to communicate with school-based personnel).
- Dissemination of new visions of teaching, learning and teacher preparation (evidenced by conference presentations, local presentations, and academic papers).

Two researchers independently reviewed the cohort websites. Each researcher analyzed the cohort websites and products looking for evidence of attainment or progress towards project goals. After the independent reviews the two researchers compared analyses. Inter-rater agreement was confirmed in this comparison. A count was prepared to indicate the number of cohorts whose products included evidence of progress towards the goals of the project according to the independent review of the two researchers. Table 10 shows the reviewer's assessment of how well each cohort attained the project goals based on an analysis of the resources developed on cohort websites.

Table 10: Assessment of Goal Attainment Based on Product Audit

	Goal	# of Cohorts who Attained Goal	Percent
1	Student Assessment and Recruiting	10 of 21	48%
2	Technology Literacy Competencies	21 of 21	100%
3	Technology Integration	15 of 21	71%
4	Cohort Engagement In Teacher Ed. Reform	10 of 21	48%
5	Communication with Placement Schools	10 of 21	48%
6	Dissemination	13 of 21	62%

Items in cohort websites that indicated progress towards increasing technology literacy competencies of teacher education faculty and pre-service students included materials specifically created to deliver technology skills training and plans for technology training in a cohort timeline of activities. Each cohort website incorporated a variety of these resources including learning objects that were created by and for the cohorts. The learning objects provide step-by-step procedures for accomplishing various technology tasks. The learning objects created by cohorts provide assignments and evaluation strategies as well as examples. One cohort created several procedures that were targeted specifically for their professors' professional development. These learning objects were used to teach the faculty how to transform paper documents into online resources and other skills. Another cohort created a system of technology training that students may provide to faculty in the School of Education. For example, a cohort targeting the use of technology in music education developed a tip sheet for a popular web editor and used it to provide training to students, choral music directors of local schools and others. One of the cohorts interested in supporting placement activities developed training to student teachers and their cooperating teachers on a popular multimedia development software package. This cohort then used this software in action research projects.

Evidence supporting the integration of instructional technology in teaching and learning included examples or discussions of a new technology-rich experience being used by a professor. One cohort's website discusses the creation of a web-based community for use by pre-service science teachers. Another cohort investigated the development of high-quality online course supports and produced numerous examples. One cohort produced a website with audio resources to provide examples of Spanish dialects for foreign language teachers. Another cohort investigated the use of a Classroom Performance System, which allows the instructor to use a technology augmented polling device in a lesson. And, a special education specific cohort worked to

use a presentation program to help students tell social stories as a way to help the students learn and use positive behaviors.

Goal 4. To engage cohorts consisting of teacher education students, university faculty, practicing teachers and K-12 students in adopting and developing innovative approaches for integrating technology in teacher education.

As previously described, the cohort membership structure has evolved to better meet the needs of the School of Education. A typical cohort consists of one (in some instances two) School of Education faculty and two or three pre-service students.

Comments by faculty involved in Learning Generation cohorts touched on three key issues: technology support, funding and communication. Cohort leaders' experiences with the technology piece of the project varied widely. For some, the technology assistance that Learning Generation could provide was one of the main incentives for becoming involved. One professor has used Learning Generation resources and the cohort activities to implement technology-based lessons in his undergraduate methods class and create a central informational web page for his students and advisees. For others, technology has been the major obstacle to productive cohort activity. Two cohort leaders mentioned their frustration at having invested time in the preliminary phases of a project only to come to a standstill in trying to post the product on a website. Another group of professors had quite a bit of technological expertise before becoming involved with Learning Generation. For these individuals, the cohort model has provided structure and funding for an already-existing vision rather than technology support resources. In sum, cohort leaders' satisfaction with the process seemed to vary significantly as a function of the number of technological difficulties they encountered and how accessible they found support to be.

Cohort leaders often mentioned the availability of funding through Learning Generation as an important factor in enabling their projects. Several had ideas for

projects before they heard of Learning Generation, but had not been able to implement those ideas due to lack of funding. One cohort leader suggested that other professors might be more interested in integrating technology within their own teaching if they knew that funding was available. "They might think an idea they see is great, but if there's no money to make the technology available to them, they won't use it."

Several professors identified communication as a key area for improvements. Other professors expressed a desire to know more about what other cohorts are doing. In spite of gatherings and other sponsored meetings, they needed a better sense of what the project as a whole was accomplishing or what other cohorts were producing. As one cohort member said, "Learning Generation needs a face." During the second year many professors who weren't involved with Learning Generation did not have a clear understanding of its purpose or function. We increased word-of-mouth efforts to communicate the Learning Generation opportunities and now over half of the teacher education faculty have engaged in at least one of the 21 innovation cohorts.

The student cohort interviews were designed to elicit data concerning reasons for interest in the project, expectations about project participation and the extent to which those expectations were realized. The most common reasons for interest in project participation included interest in technology, greater interaction with particular faculty personnel, stipend and vita "building." Expectations included enhanced media technology skills, greater career options and the ability to use media in curriculum development.

There were notable differences between Year 1 and Years 3 and 4 in the participants' responses concerning the degree to which expectations were met. Several of Year 1 participants were somewhat negative about the experience. Some student participants saw the experience "as a waste of time." Several faculty cohort members also felt somewhat negative about the Year 1 experience stating that it lacked focus and direction. By Year 3 and Year 4 cohort members expressed much more positive feelings concerning the degree to which their expectations were met. Several have expressed their desire to

remain with the project, even without the stipends or additional funding. Most of the students believe that the Learning Generation experience has prepared them to better meet the demands of classroom teaching. Several students indicated that working closely with and getting to better know the faculty cohort member(s) was the major benefit of the Learning Generation experience.

Most student cohort members describe the cohort experience as "team like." That is, there is a team leader, the professor, who decides on a project and the manner in which it will be developed. The student members then carry out the implementation plan devised by the professor. Although the project designers had envisioned a somewhat flatter team structure with member contributing equally, they note that the students consider the instructor led team approach favorably.

Goal 5. To apply information technology in improving communication and collaboration with placement schools; thereby providing more immediate understandings of the issues, preferences and needs impacting K-12 teachers and students.

Many cohorts (10 of 21) created web-based methods of communicating with schools in alignment with the fifth goal, using information technology to improve communication and collaboration with professional development and placement schools. Four cohorts created technology enriched communications with placement schools. Two were web-based and featured teachers and students in local schools creating website to communicate about current events. Another used video to bring examples of teaching practice into the pre-service program. Cohorts also worked with schools to build collaborative websites. One cohorts developed training for student teachers and their cooperating teachers on a popular multimedia development software package.

Goal 6. To use a variety of strategies for disseminating innovation in integrating technology in teacher education including: conference presentations, publications in

refereed journals and the main Learning Generation website with resources highlighting best practices and innovations.

Based on the interviews, instructors have reported several methods to communicate their innovations in using technology including published papers, conference presentations, classroom lectures that use technology, student presentations and website development. Each cohort has created their own information website. While the evaluators who audited the websites reported some problems locating specific cohort websites and some links were unavailable, evaluations of the websites indicate that, overall, they are attractive and informative. Furthermore, respondents indicated that they would use the websites as a teaching resource and felt that the information on the sites could be adapted for use in the classroom.

While the websites alone could be considered evidence of dissemination, the researchers held a more restricted view of dissemination. Clear evidence of dissemination of new visions of teaching, learning and teacher preparation were found in references to conference presentations, brown bag type events, and academic papers. More than 15 papers and presentations are available on the Learning Generation site.

Sustainability

Sustainability of Learning Generation's innovations has been a guiding principle throughout the project. We have worked to capture the work and process of cohorts and in the form of resources and materials that are available on the Learning Generation website (http://learngen.org). We developed the cohort model to be adaptable to a variety of settings. The model can be used by individual professors as a way to work collaboratively with students and school district personnel to advance innovation in integrating technology in teacher education. The cohort model has been detailed along with the process for creating and supporting the members of cohorts in various papers and resource materials available on the Learning Generation website.

More than 20 papers and presentations have been completed in an effort to disseminate information about the Learning Generation project. Many of these are also available on the Learning Generation website. At the end of the project the website will be copied to CD and distributed throughout the School.

The required introductory instructional technology course, T&L 400, is now offered as two courses; one for elementary and one for middle secondary. The sequence of courses has also changed so that the T&L 400 course is offered early in the program. The second class, T&L 729 is a graduate level course that has begun to use the Technology Enriched Learning module produced by Learning Generation. Learning objects and a module are disseminated for use in the School and other teacher education institutions. The T&L 731 Instructional Design course has also been modified so that students in the course are asked to work with teacher education faculty as their clients, thereby forming a cohort.

Another sustainable product of Learning Generation is the TEC-e cohort. The cohort provided one-on-one assistance to faculty and staff on any technology topic of their choosing. Frank Carey, Director of Technology, is working towards institutionalizing this model to provide the much-needed desk-side hardware and software assistance to faculty.

Lessons Learned

Learning Generation is designed as a systemic model for fostering technology integration in teacher education. The model is best understood in terms of its ability to sustain interest, ownership and collaboration in obtaining long-term reform rather than near term skills-based outcomes. Implementation of the model will benefit from several conditions including: a readiness for program reform in teacher education, a successful placement program, a supportive administration willing to fund technical and personnel needs, technology assistance, online resources and an educational technology course.

Effective communication is an essential in a successful implementation of the

Learning Generation model because the type of change that we are seeking to create is as much about impacting attitudes as it is about improving skills. We found face-to-face communications in class, meetings and casual interactions and classes to be more successful in engaging students and faculty in cohorts than formal "gatherings" or more asynchronous communication such as newsletters, websites and email. A part of Learning Generation's success is attributed to the number of stakeholders in the teacher preparation process that came together to discuss how to prepare new teachers to use technology effectively in their teaching.

Shareable products contributed significantly to the success of Learning Generation. Products such as papers, PowerPoint presentations and websites provide tangible goals that offer challenging milestones, give the innovations shape and provide opportunities for celebrating accomplishments. By focusing on the design, development and delivery of a tangible product, participants in the project more readily create shared vocabulary and shared vision for their efforts. The products also serves as tangible artifacts that communicate the innovations to other cohorts and new cohort candidates.

One of the major concepts that changed throughout the project relates to how the cohort teams and their innovations would form. As originally envisioned, a cohort team would form, the team would engage in a dialogue and the innovation might originate just as often from a teacher education student or K-12 teacher as from a professor. The culture in teacher education, or in higher education in general, may not be as conducive to this type flat structure as we had anticipated. Most of the innovations that emerged in Learning Generation cohorts were faculty-directed. Although the project designers had envisioned a somewhat flatter team structure with members contributing equally, they note that the students view the instructor led team favorably. Also, several students indicated that working closely with and getting to better know the faculty cohort member(s) was the major benefit of the Learning Generation experience.

The Innovation Cohorts are designed to bring together faculty, teacher education students, practicing teachers and K-12 students in a group to create new ways of integrating technology in their teaching. The intent is not to prescribe specific solutions but to create the conditions where innovation emerges as part of the group's dialogue. The audit of the products and interview of faculty on goal attainment indicate that the cohort models is working to achieve the project goals. Faculty report developing a wide variety of skills and enjoying the collaborative grass roots nature of the cohort model. The web-based products, publication and other dissemination strategies indicate that the model will be successful in sustaining the integration of technology in teacher education programs.

A Summary of Lessons Learned

- Students who enter the program are confident in their skills to use technology.
- Surveys and interviews did not reveal significant differences in faculty and student abilities to use technology.
- Students and faculty are most confident in their ability to use word processors, online resources, and basic computer functions.
- Students and faculty are somewhat less confident in their ability to use spreadsheets, databases, and presentation software.
  This is worth noting because these uses of technology support learning activities involving inquiry (using spreadsheets to organize and analyze data) and project-based constructive learning (using presentation software to tell stories and report findings).
- Several faculty indicated that instructors should model the use of information technologies in courses. The survey finding suggests that most faculties are confident

in their use of technology. However, the interview indicated that many faculty were not using their technology skills in their teaching.

- Men reported higher confidence in their use of technology and presentation skills than women.

  Further research is needed to investigate the relationship between faculty modeling the use of presentation software and other technologies on students across gender. Teacher education recruiting should encourage leaders in using information technology (particularly women) to consider a career in teaching. Technology proficiency might be considered a criteria in selecting teacher education candidates.

- Most faculty are confident in their use of technology. Yet, many professors are not using technology or requiring their students to use technology in their teaching.

  Effective use of technology in teaching might be recognized through awards and/or be considered as part of the faculty member's teaching evaluations.

- Faculty report that advantages of using technology include time management, organization of classroom information, communication with students, fast and easy access to information from multiple sources, innovative teaching methods, and increased likelihood of collaborative projects.

- While an educational technology course is viewed as an important component, many faculty believe that students will benefit most when technology is integrated in their courses and throughout the teacher education program.

- Commonly reported disadvantages included: security and spam issues, lost time with technical problems, inaccurate information on the web, student misuse (e.g., adolescents accessing inappropriate sites), inequitable access (not all students have the same access to technology), lack of technical and troubleshooting help.

- Faculty cite that the technologies they use most often in their teaching are: e-mail, presentation software (PowerPoint) and course management software (Blackboard).

- Faculty frequently commented that technology should only be used if it enhances the curriculum and not simply for the sake of using technology.

- Some students and faculty believe that schools are not well equipped with information technologies and they question whether they will be able to apply their understanding of educational technology when they begin teaching.
  Teacher education faculty should inform future teachers that while a few schools may be behind in technology infrastructure, many schools are requiring teachers to use advanced technologies including fully online student portfolios.

- Regular communication is critical in collaborative team activities such as the Learning Generation Cohorts. We found face-to-face communication describing what other projects had achieved to be most effective in engaging new participants to join cohorts.

- Cohorts can be effective in highly democratic "flat" organizational structures or in faculty-directed teams.

- Teacher education students report that working closely with faculty was one of the major benefit of the Learning Generation experience.

- Key factors that contribute to designing successful cohort include clearly communicating the need for change, harnessing the creativity and energy of students and focusing on achievable goals.

- Products that convey the cohort innovation, including website and papers, communicate a shared vision within the cohort, inspire others and offer a opportunity for celebrating accomplishments.

- Teacher education faculty and students who participate in the Learning Generation cohorts significantly advanced their modeling of technology integration and report that they will continue to model technology use in their teaching.

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D. Qualitative Example

There are many examples of how technology was integrated into instruction during the course of the Learning Generation project that are available on the website (http://www.learngen.org). In the vignettes below, teacher education students from one cohort relate how they used technology with special needs students.

Spencer was having difficulty remembering to keep his hands to himself. Normally he would get a little book that had generic pictures that talked about manners. We used PowerPoint to take these social stories to a new personal level. We used a digital camera to take pictures of Spencer modeling the appropriate behavior and then inserted the pictures into a personal story about Spencer. Barry Bernstein, the district music therapist, put these social stories to music. Now, Spencer can go to the computer, click on one of his social stories and he sees himself modeling appropriate behaviors. This idea has expanded and now Spencer has many personal interactive stories and experiences.

Alex is a sixth grade student who has had eyesight problems until recently, so he's just now starting to read. He refuses to practice if the practice seems juvenile. Amy mentioned that he is a whiz at computers, so we came up with the idea of creating a PowerPoint tutorial at his reading level. First I gathered notes on all the essential features of PowerPoint such as how to create a new slide or add text to a slide. I broke down the phrases into individual words to make flash cards. Flashcards were also made of the phrases and the pictorial representation (when possible) of the function.

I was introduced to Alex as a person from KU who was there to teach him about PowerPoint. He knew that I was coming in advance so he had already learned something about PowerPoint. I explained to Alex that it was important for him to not just memorize where things are located, but to genuinely know all the words because he would see them in many other software programs. We grouped the flashcards so that we would first go through the individual words of about 3 phrases and then we would move on to the phrase and pictures. Since Amy and I were not exactly sure of Alex's reading level, I

had 5 groups of words and phrases that became progressively harder. I was a little nervous that Alex would think the beginning set was too easy. I discussed with Alex the need for him to know all the basics before we got into the more challenging commands and he was very responsive. On the first two sets of words Alex got about 80% right on the first try. I felt like we really hit his zone.

After we worked through all the basic words, we went to the computer to apply our new knowledge. As we progressed he had to read to me what he was doing. Since the words were fresh in his mind, he took pride in this because he could use the appropriate vocabulary in his descriptions.

E. Summary of Quantitative Data

Areas of Measurement (Use area in the box below for any definitions or qualifiers you wish to make.)	**Number**
Unduplicated count of targeted faculty: i.e., faculty identified as targets or as within the scope of your project	College of Education - 93 Arts & Sciences - 153 Other. Specify __
Unduplicated count of faculty who actually participated in the project	College of Education - 27 Arts & Sciences - 7 Other. Specify __
Unduplicated count of faculty for whom you have evidence of technology proficiency.	54
Unduplicated count of faculty for which you have evidence of expanding use of technology in preservice teaching and/or field experiences. *Note: This can be through observation, assessments, curriculum redesign, and other means.*	27
Unduplicated count of preservice teachers benefited by the project over the period of the project.	112
Unduplicated count of preservice teachers for whom you have evidence of technology proficiency.	237
Estimated number of program graduates affected by the project who are/will be teaching in schools with underserved populations.	45
Others affected by your project. *Define*:	Research faculty - 18
Unduplicated count of institutions of higher education that used products produced by your project.	5 - this is conservative We have not tracked all use of website by institution.
Unduplicated count of institutions of higher education that used services produced by your project.	5 - this is conservative We have not tracked all use of website by institution.

F. Checklist

Please check below all strategies, activities, products, and artifacts present in your project.

Activities

Curriculum/Standards Issues

X Redesigned preservice courses / curriculum
- T&L 400e Instructional Technology in Elementary Education
- T&L 400s Instructional Technology in Middle / Secondary Education

X Aligned preservice courses/curriculum with state standards
X Aligned preservice courses/curriculum with national standards
_ Developed technology standards
X Addressed technology standards (adopted or incorporated them)

Technical Assistance/Professional Development

X Provided mentors to faculty
X Provided mentors to preservice teachers
X Provided online training
X Provided face-to-face training/workshops
_ Provided technical assistance to other PT3 projects
X Provided just-in-time support or individualized training
X Provided joint training opportunities for faculty and P-12 teachers
X Hired students to provide technology assistance to faculty
_ Required SCDE faculty to maintain e-portfolios
_ Required non-SCDE faculty to maintain e-portfolios
_ Developed leadership programs to support technology proficiency and integration
X Conducted a needs assessment
X Loaned hardware or software to faculty

Preservice Teachers

_ Instituted/supported others in technology proficiency graduation requirement
_ Changed credentialing requirement
X Required preservice students to produce products using technology
X Enhanced student field experience by increasing technology resources or integration
_ Adopted E-portfolio for assessing students
_ Required preservice students to maintain e-portfolios
X Provided mentors to preservice teachers
X Students conducted action research projects
X Loaned hardware or software to preservice teachers

Collaboration

X Partnered with P-12 school districts
_ Partnered with other institutions of higher education
X Partnered with state education agencies
_ Formed partnerships with corporate entity
X Created an electronic learning community

X Formed teams including faculty, teacher, student, administrator
_ Formed cross-disciplinary collaborative teams at institution
_ Provided services to other institutions of higher education
_ Utilized video conferencing
_ Leveraged other projects
_ Provide name and source of grants:

Developed and Distributed Products

X Developed online courses (Technology Enriched Learning) (http://www.learngen.org/resources/module/lgend101_norm1/index.html)
X Developed online tools (Learning Object: http://learngen.org/resources.html)
_ Developed videos (specify:)
  _ on the project itself
  _ on electronic portfolios
  _ on teaching practices
X Developed evaluation instrument(s) (http://learngen.org/research/survey.html)
X Developed a website (http://www.learngen.org)
_ Developed web portal
X Developed technology-infused lesson plans
X Developed assessment rubrics
X Developed case studies
X Produced CD-ROMs and/or DVDs
_ Developed e-portfolio tool
X Disseminated project results
_ X in written publications
_ X on the Web
_ X at conferences
X Developed print publications – on topics other than project results – such as books, journals.

G. Collaborative Exchange

Did you participate in the Collaborative Exchange? _X_ Yes __ No

1. Hosting Visit: October 1 - 2, 2001

Visiting Team:

Steven F. Jackson (Indiana University of Pennsylvania)

Tweed W. Ross (Kansas State University)

Dan Surrey (University of South Alabama)

Guests: Sandra Siliezar; Robin Fernkas

Host Team (University of Kansas):

Dr. Steven Smith - Primary CE Faculty Dr. Sean Smith

Dr. Ron Aust - Project Director Dr. Suzanne Robinson

Dr. Joe O'Brien Brian Newberry

General Purpose of Visit:

The general purpose of the collaborative exchange was to examine technology standards and provide guidance about how to best integrate these standards into existing classes and a proposed online degree program. This exchange provided an opportunity for each participant to make a statement about their views and experiences with technology standards. Faculty from the University of Kansas also arrived to discuss their integration of technology and their work with Learning Generation. This exchange reviewed artifacts and ideas from other Schools of Education. It allowed participants from KU and the other institutions to review the resources and progress of Learning Generation.

Agenda

Sunday 30-September
7:00 PM No host dinner orientation meeting.

Monday 1-October
9:00 AM Introductions and Welcome
10:00 AM Participant exchange views and experiences with technology standards.

10:45 AM	Break
11:00 AM	KU Faculty discuss their integration of technology and LearnGen work.
12:00 AM	Lunch
1:30 PM	Review of artifacts and ideas from other Schools of Education
2:30 PM	Break
3:00 PM	Review and discussion continued
4:00 PM	Drafting statement or statements expressing the view of the group about effective models of technology standards implementation.

Tuesday 2-October

9:00 AM	Coordination of day's events
9:15 AM	Opportunity to visit T&L 400
10:30 AM	Tour of JRP
11:00 AM	Review of LearnGen resources and progress
12:00 AM	Adjourn

Individual Reflection for University of Kansas

Expectations

The KU collaborative exchange visit was expected to help participants here at KU become more aware of different approaches to the use of standards in online and traditional teacher preparation classes. There is a desire here at KU to examine the development of an online masters program and the collaborative exchange meeting was seen as a way to focus some attention on this process and to benefit from the insights offered by the participating faculty from other institutions.

Impacts

We were very pleased to have had, Dr. Steven Jackson, Dr. Tweed Ross, and Dr. Barbara Newhouse offer us their ideas. Additionally both Dr. Jackson and Dr. Ross shared examples of programs and uses of standards that were very helpful. Dr. Jackson offered a comparison of distance education guidelines as well as his practical experiences from an instructor's viewpoint. Dr. Ross demonstrated the standards-based instructional program that he has developed at Kansas State and both were well received.

Lessons Learned

The lessons learned included the need for considering scalability of the program and the importance of the faculty role in the shaping of any program or class including those

available online. As we move forward we will take these ideas and hopefully draw upon the new partnerships that have been formed as we investigate the feasibility of offering more standards-based, online classes here at KU.

The opportunity to visit with faculty from two other institutions and to look at the products they are working on was very valuable. It was very useful to get additional perspectives on the shared ideas. The CE people who came to our visit and those I have worked with on developing our CE plan have been outstanding! Very helpful, very professional and great to work with!

Summary Report for University of Kansas

(by Steven F. Jackson, Indiana University of Pennsylvania)

Focus Areas:

Learning Generation (KU)

This was a model of faculty development at the University of Kansas. This model relied heavily on faculty project development for technology based instructional activities with active support from the technology support staff and technology savvy mentors. The specific outcome of this project was to develop classroom activities that would enhance the learning of pre-service teachers. It closely intertwined with many of the development activities for on-line products already in production at KU. These include Profiler and TrackStar.

Standards for On-line Learning (IUP)

This project is a comprehensive look at the standards required for the development of 1) on-line classes and 2) on-line programs. If this method of instructional delivery is to have any chance of success a set of standards which are both prescriptive and descriptive must be subsumed to exist as an underlying framework for such delivery methods. IUP has taken an extensive look at what are the necessary (core) components of an effective on-line delivery.

Modular Based Learning for Large Scale pre-service basic technology instruction (KSU). This was a look at the necessary infrastructure to support an ISTE based/competency based course for basic technology skills and how this will be revamped and brought into line with the new NETS standards for pre-service education and integration of technology into teaching environments.

Outcomes

During implementation, grantees commonly revisit and modify initial objectives. These mid-course adjustments offer valuable insight into innovative strategies as well as the impact of contextual factors on project implementation. In this section, please describe briefly both the intended and actual outcomes of the Host project objectives.

Three initiatives are noted: the Learning Generation cohort program, the Four Directions program, and the Online Academy. Of the three, the Learning Generation and Online Academy were the major focus during the on-site visit. The Learning Generation program proposes to establish “Innovation Cohorts who work together to examine the relationship between the practice of teaching and the use of technology. Each cohort consists of School of Education faculty, School of Education students, College of Liberal Arts and Sciences faculty, practicing teachers and K-12 students." The structuring of the curriculum at the KU School of Education would appear to be the most successful aspect of the program, with an impressively comprehensive application of ISTE standards into the junior-level educational technology course at KU. The extent of K-12 and cooperating teacher participation in the cohort model does need to be further illuminated, since the crossing of institutional boundaries is often an area where collaborations face challenges. The LG program is working with cooperating districts to find suitable placements for student teachers. The KU uses PDS cooperating teacher system in which five to six student teachers work with a school instead of with an individual cooperating teacher, and KU School of Education faculty model uses of technology and collaborative

teaching in the K-12 classroom. The focus of the School, moreover, is to produce “teacher leaders" who can help lead a school district in technology adoption.

The operation of the Learning Generation team within the KU School of Education uses a faculty liaison to coordinate with and interview faculty to promote their use of technology in line with ISTE standards but are careful not to intimidate faculty. The School has three full-time equivalent personnel dealing with technology service. However, the School does not currently have a formal graduation requirement for technology, nor does it have a system for measuring students’ successful absorption of technology applications in teaching. The problem of portfolios or artifact evaluation and the inherent trade-off between standardization of technology skills and activities on the one hand and clear and reasonable application of technology within a subject area of teaching is a problem that does not appear to have a simple solution.

Trends

Use and measurement of technology standards-achievement remains a problem. KSU uses a modular course which services 350 students a semester and which tests them against the 1995 ISTE standards using a hybrid CD-ROM/Website. This has the advantage of being able to process a large number of students with relatively few resources, but tests technology skills only, not the use of technology in educational settings. Portfolio and artifact assessment of student technology applications to their subject teaching matter comes closer to achieving the goal of better teaching and learning with technology, but is difficult to standardize and very time- and labor-intensive, and often subjective.

The implementation of technology in subject area methods courses remains much more problematic, and one KU participant noted that enthusiasm for collaboration had decreased because of the time requirements. Inconsistency in the different subject areas was also noted, with some areas such as Special Education being noted for their implementation, but other areas are quite spotty.

Online programs for teacher education remain an area in which university administrations show a great deal more interest than understanding. The development of online courses remains very time-consuming and requires a range of instructor and developer skills. The different standards for online education presented by IUP disagree whether additional compensation is needed by faculty, and the extent to which online programs should be adopted by universities. Furthermore, experience has shown that an enormous difference exists between assembling a group of online courses and putting together a full online degree program. Given a random distribution of interest in online education among university faculty, it is not uncommon for a university to have a dozen or more fully online courses, but they are usually an eclectic offering of lower-level undergraduate courses, upper-division courses and graduate courses in different colleges. To develop a degree program would require a much more intensive development of distance education courses within a particular department, and the marginal cost for developing the fourth, fifth, and sixth distance education courses would increase substantially.

Suggestions

It was noted that we might make a remark somewhere about the travel disadvantages caused by 9/11 and how we might use even simple technologies (phone bridge) to include a greater audience and different stakeholders—i.e. some policy makers at our institutions—in these discussions.

2. Visiting: May 20 - 21, 2002

Visiting Team:

Wesley Fryer, Texas Tech University

Ron Aust, University of Kansas

Brian Newberry, University of Kansas

Host Team (Kansas State University):

Tweed W. Ross, Project Director; Lori Norton-Meier, Faculty Representative

Todd Goodson, Faculty Representative

Focus Areas:

1. Integrating technology into methods and practicum experiences.

2. Matching pre-service outcomes to ISTE NETS* Teacher standards.

3. Documenting pre-service competencies via electronic portfolios.

Excerpt from Collaborative Exchange Summary Report

(by Wesley Fryer, Texas Tech University)

Trends ....

"As expected proficiencies with technology increases, there will be an increased need for “just in time training" for faculty and staff. Large class workshops are insufficient as a means to usher in new technologies and help people get comfortable with new tools. We need more emphasis on person-to-person training and technology support.

The cohort model used at KU which was shared during our site visit is a great model for bringing the innovation and work time to K-12 and higher education collaborations."

H: Products and Artifacts

All products may be viewed at the Learning Generation website (http://learngen.org). Paper versions of many of the products appear in the appendices.

Appendix A: Papers *(bound separately)*

Appendix B: Presentations *(bound separately)*

Appendix C: Learning Objects *(bound separately)*

Appendix D: Learning Generation Website *(bound separately)*

Appendix E Innovation Cohort Descriptions *(bound separately)*

Appendix F: Technology Enriched Learning Module *(bound separately)*

Appendix G: Data DVD of the Website and Cohort Products

Published Paper

Friedman-Nimz, R., Denson, D., & Lacey, J. (2002, Fall). Teaming with G/T Students: Improving on-line teacher education. KGTC Bugle.

Kohlmeier, J., & O'Brien, J.E. (2004). A Web-based, issues centered assignment for teacher and high school students. Journal of Social Studies Research, 28(1), 03-15.

Papers in Press (see appendix A)

Aust, R., Newberry, B., O'Brien, J., & Thomas, J. (2004 in press). Learning Generation: Fostering innovation with tomorrow's teachers and technology. Journal of Technology and Teacher Education

O'Brien, J.E. (in press). Teacher education students: Key players in technology innovations. Technology and Teacher Education.

Other Papers (see appendix A)

Aust, R., Newberry, B., & Isaacson, R. (2003, July). Designing on-line professional development resources for teaching diverse students. Paper presented at the National Educational Computing Conference, Seattle, WA.

Aust, R. (2003, June). Learning Generation: Inspiring tomorrow's teacher with technology. Paper presented at the National Educational Computing Conference, Seattle, WA.

Colorado, J. T., Welch, C., & Smith, S. B. (2003, June). TEC-e: Using a mentorship model for faculty technology enrichment. Paper presented at the Ed-Media: World Conference on Educational Media, Hypermedia, and Telecommunications, Honolulu.

Cox, J., Grill, A., O'Brien, J., Smith, S. B., & Smith, S. J. Technology integration through innovation and collaboration introduction to the Learning Generation project.

Friedman-Nimz, R., Denson, D., & Lacey, J.(2002, November). Teaming with G/T Students: Improving on-line teacher education Paper presented at the National Association for Gifted Children Conference, Denver, CO.

Kohlmeier, J., O_rien, J. E., & Grill, A. (2000, November). Electronic collaboration between preservice and high school students: Boon or boondoggle? Paper presented at the College and University Faculty Assembly National Council for the Social Studies, San Antonio, TX.

Newberry, B., & Aust, R. (2003, March). Supporting faculty and students in collaborative technology integration activities: Learning Generation Innovation Cohorts. Paper presented at the Society for Information Technology and Teacher Education (SITE) Conference, Albuquerque, NM.

O'Brien, J.E., Richmond, L., Smith, S. J., & Smith, S. B. (2002, June). Effective cohort development for engaging technology integration by university faculty. Paper presented at the National Educational Computing Conference, Denver, CO.

Richmond, L., Smith, S. J., Smith, S. B., & O'Brien, J. E. (2001, April). Power of technology: Integration through collaboration. Paper presented at the Conference for the Council for Exceptional Children, Kansas City, MO.

Smith, S. B., & Smith, S. J. (2000, February). Learning Generations: Integration through innovative cohorts.

Smith, S. B., Smith, S. J., & O'Brien, J. E. Innovation through collaboration: Innovations in a teacher education program: A pilot study.

Smith, S. B., Smith, S. J., & O'Brien, J. E. Technology innovation through collaboration in a teacher education program.

Engaging faculty to integrate technology: the cohort process

National Presentations

Aust, R., Newberry, B. W., O'Brien, J., Smith, S. B., & Smith, S. J. (2003, July). Designing Learning Generation: Fostering innovation in teacher education with technology. Paper presented at the National Educational Computing Conference, Seattle, WA.

Aust, R. (2003, March). Online teacher education and professional development for rural schools. Paper presented at Society for Information Technology and Teacher Education (SITE) Conference, Albuquerque, NM.

Aust, R., & Isaacson, R. E. (2003, March). Creating streaming media for e-Learning. Paper presented at Society for Information Technology and Teacher Education (SITE) Conference, Albuquerque, NM.

O'Brien, J.E.(2002, November). Tracking current events. Paper presented at the National Council for the Social Studies Conference, Phoenix, AZ.

Aust, R. (2002, October). Cohort collaboration for integrating technology in education. Paper presented at the Technology Leadership Academy's Conference on Creating a Collaborative Community for Technology Leadership, Austin, TX.

Aust, R. (2002, October). Student guided technology innovation in teacher education. Paper presented at the Technology Leadership Academy's Conference on Creating a Collaborative Community for Technology Leadership, Austin, TX.

O'Brien, J.E., & Kohlmeier, J.(2002, March). A Web-based, issues centered assignment between preservice and high school students: Generation II. Paper presented at the American Educational Research Association Conference, New Orleans, LA.

Aust, R. (1999, December). A systemic cohort model for applying information technologies to teacher education reform. Paper presented at Technology, Teaching and Learning Conference, San Antonio, TX.

Internal Presentations

Aust, R., & Newberry, B. Learning Generation presentation (Keynote Presentation for Macintosh platform only)

Technology Infusion Group. (2003, March).Learning Generation presentation (Quicktime Movie Presentation)

Cox, J., Grill, A., O'Brien, J., Smith, S. J., & Smith, S. B. Technology integration through collaboration & innovation: PT3. (PowerPoint Presentation)

Smith, S. B., & O'Brien, J. Technology innovation through collaboration in a teacher education program: A preparing tomorrow's teachers to use technology grant (PowerPoint Presentation)

Smith, S. B., Smith, S. J., O'Brien, J., & Cox, S. Engaging technology integration by university faculty. (PowerPoint Presentation)

Smith, S. B., Occhipinti, V., & Grill, A. Technology integration through the cohort process. Presentation was presented at Kansas Association for the Gifted, Talented, and Creative Conference. (PowerPoint Presentation)

Learning Generation. (2001, February). Evaluating Websites for education. Presentation was presented at Learning Generation Brown Bag Event. (PowerPoint Presentation)

Other Documents (see appendices)

Learning Generation Cohort Process

Learning Generation Cohort Sampling

Online Foreign Language Learning Cohort

Technology Enriched Learning

Technology Innovation through Collaboration in a Teacher Education Program:

Technology Integration through Collaboration & Innovation: PT3

Learning Generations: Integration through Innovative Cohorts

Engaging Technology Integration by University Faculty

Technology Integration through the Cohort Process: Kansas Association for the Gifted, Talented, and Creative Conference

Evaluating Websites For Education

Learning Objects (see appendix C)

Activity	**Software**
Add Music	RealSlideShow
Add Text to Card	HyperStudio
Add Text to Image	Photoshop
Animate Slides	PowerPoint
Basic Statistics	Excel
Convert File to PDF	PowerPoint
Convert File to PDF	Word
Create Audio File	RealProducer
Create Award Certificate	Word
Create Banner	Publisher
Create Button	HyperStudio
Create Button Hyperlink	HyperStudio
Create Calendar	Publisher
Create Captions	Inspiration
Create Chart	Excel
Create Database	FileMaker Pro
Create Directory	WS_FTP
Create Event Program	Publisher
Create File Password	Adobe Acrobat
Create Flow Chart	Inspiration
Create Flow Chart	Word
Create "Flyer"	Publisher
Create Frames	Dreamweaver
Create Frames	Word
Create Gradebook	Excel
Create Handouts	PowerPoint
Create Hyperlink	Excel
Create Hyperlink	PowerPoint
Create Hyperlink	Word
Create Image	Inspiration
Create Image Map	Dreamweaver
Create "Jump Menu"	Dreamweaver
Create Music	Finale NotePad
Create Music Map	Inspiration
Create "New Stack"	HyperStudio
Create Online Sample	Finale Notepad
Create Organizational Chart	Inspiration

Create Picture Package	Photoshop
Create Presentation	PowerPoint
Create Rollover Image	Dreamweaver
Create Science "Cycle"	Inspiration
Create Slideshow	RealSlideShow
Create Table	Dreamweaver
Create Template	PowerPoint
Create Template	Word
Create Thumbnail	Photoshop
Create "Topic Web"	Inspiration
Create Video File	RealProducer
Create Web Page	Excel
Create Web Page	Word
Create "Web-Ready" Photo Album	Photoshop
Create XY Scattergraph	Excel
"Crop" an Image	Photoshop
Customize Arrow Links	Inspiration
Customize Bullets	PowerPoint
Customize Bullets	Word
Download Templates	PowerPoint
Educational Puzzle	Excel
Export File	Inspiration
Filter a Photograph	Photoshop
Filter Spreadsheet Data	Excel
Import Graphic	HyperStudio
Insert a Slide Number	PowerPoint
Insert Excel Chart	PowerPoint
Insert Image	PowerPoint
Insert Movie Clip	HyperStudio
Insert Page Border	Word
Insert Table	Word
Insert Text Box	Word
Random Picture Display	JavaSript
Rename File	WS_FTP
Resize Image	Photoshop
Slide Transition Effects	PowerPoint
Sort Spreadsheet Data	Excel
"Sound" Settings	WS_FTP
"Upload" Files	WS_FTP
Use "Blabbermouth" Function	HyperStudio
Use Eraser Tool	Photoshop
Use "Letter Wizard"	Word
Use "Line" Tools	Inspiration
Use Symbols	Word

I. Staff and Partner List

Staff

	Staff Member	Role	Start Date	End Date
1	Aust,Ronald J.	PI	06/24/00	08/30/03
2	O'Brien,Joseph E.	Co-I	06/24/00	08/02/03
3	Robinson,Suzanne Marie	Co-I	07/08/00	08/04/01
4	Smith,Sean Joseph	Co-I	07/22/00	08/03/02
5	Smith,Steven B.	Co-I	07/08/00	08/16/03
6	Newberry,Brian Wayne	Project coordinator	09/02/00	08/30/03
7	Occhipinti,Vickie L	Outreach coordinator	03/30/02	05/10/03
8	Bailey,Jerry D.	Director IERPS	05/10/03	07/19/03
9	Bhattacharyya,Gautam	Cohort faculty	05/24/01	07/21/01
10	Brown,Monica R	Cohort faculty	05/24/03	08/30/03
11	Colson,Steve E	Cohort faculty	07/20/01	08/04/01
12	Daugherty,James F.	Cohort faculty	05/26/01	06/23/01
13	Frey,Bruce B.	Cohort faculty	08/03/02	06/21/03
14	Gonzalez-Bueno,Manuela	Cohort faculty	05/26/00	07/07/01
15	Lopez,Shane J.	Cohort faculty	07/18/03	08/16/03
16	Nimz,Reva Carol	Cohort faculty	07/21/02	08/17/02
17	Ratzlaff,Irene	Cohort faculty	02/05/00	08/05/00
18	Rodriguez,Alfred	Cohort faculty	06/22/02	07/20/02
19	Tollefson,Nona	Cohort faculty	08/03/02	08/17/02
20	White,Steven Hugh	Cohort faculty	05/11/02	06/08/02
21	Wyatt,Flora R.	Cohort faculty	06/10/00	06/07/03
22	Ajayi,Eniola B	Cohort student	10/12/02	04/26/03
23	Al-Qattan,Dawood	Cohort student	08/19/00	05/25/02
24	Au,Kaman	Cohort student	08/19/00	09/02/00
25	Bartholow,Michelle Lynn	Cohort student	09/29/01	06/08/02
26	Belshe,James B	Cohort student	09/29/01	05/11/02
27	Burkett Crist,Michael Jay	Cohort student	10/26/02	07/19/03
28	Burns,Margaret Elizabeth	Cohort student	12/07/02	12/21/02
29	Cox,Joshua C.	Cohort student	02/19/00	01/06/01
30	Curry,Sarah Elizabeth	Cohort student	02/02/02	04/27/02
31	Danner,Greta J.	Cohort student	04/12/03	04/26/03
32	Eakin,Deborah Kathleen	Cohort student	03/04/00	09/16/00
33	Evon,Lauren Josephine	Cohort student	09/29/01	10/27/01
34	Ferguson,Heather Teresa	Cohort student	09/28/02	05/24/03
35	Fuller,Jennifer Frances	Cohort student	02/02/02	04/27/02
36	Gagnon,Elisa Shupe	Cohort student	05/10/03	07/19/03
37	Giessel,Andrew Jacob	Cohort student	09/30/00	04/27/02
38	Hall,Aaron Andrew	Cohort student	04/14/01	08/03/02
39	Halloran,Becky Lynne	Cohort student	09/28/02	04/26/03
40	Hawkins,Kelly A	Cohort student	11/09/02	05/10/03
41	Heatwole,Christopher	Cohort student	02/19/00	10/14/00
42	Heiserman,Amber L	Cohort student	02/16/02	04/27/02

43	Hernandez,Todd Anthony	Cohort student	05/26/01	08/04/01
44	Holt,Randall C	Cohort student	04/14/01	12/08/01
45	Hong,Phan Yen	Cohort student	04/15/00	06/09/01
46	Hooper,Marie Renee	Cohort student	10/26/02	04/26/03
47	Huddelston,Elizabeth A.	Cohort student	02/19/00	11/11/00
48	Immer,Glenda Gay	Cohort student	02/19/00	01/06/01
49	Jenkins,Sharon Billburg	Cohort student	09/28/02	05/10/03
50	Johnson,Melia K	Cohort student	10/12/02	02/15/03
51	Kirkpatrick,Katherine Helen	Cohort student	06/07/03	08/02/03
52	Klein-Wackerla,Jennifer Irene	Cohort student	05/26/01	01/05/02
53	Koleber,Terri Dawn	Cohort student	10/26/02	02/01/03
54	Kowitz,Jessica Lynn	Cohort student	02/16/02	05/25/02
55	Lainjo,Yibonka Beri	Cohort student	02/01/03	02/15/03
56	Lang,Jennifer E	Cohort student	12/07/02	02/15/03
57	Lents,Kathryn A	Cohort student	09/14/02	04/26/03
58	Lorson,Laura Ann	Cohort student	11/09/02	11/23/02
59	Medina,Janet Marie	Cohort student	02/16/02	04/27/02
60	Merillat,Linda Louise	Cohort student	09/28/02	11/09/02
61	Mesanovic,Emir	Cohort student	01/08/00	05/26/01
62	Metzler,Mary K	Cohort student	09/16/00	07/07/01
63	Nichols,Robert J	Cohort student	11/09/02	12/07/02
64	Osada,Ai	Cohort student	05/27/00	12/22/01
65	Picolet,Angela M.	Cohort student	05/24/02	06/08/02
66	Plese,Joseph M	Cohort student	07/20/02	04/12/03
67	Polson,Aaron Allen	Cohort student	03/15/03	07/19/03
68	Purcell,Megan Lynn	Cohort student	06/24/00	08/19/00
69	Richman,Laila J	Cohort student	02/19/00	01/06/01
70	Rozenberg,Erika R	Cohort student	02/02/02	04/27/02
71	Ruiz,Carmen Maigualida	Cohort student	05/27/00	08/04/01
72	Schultes,Patrick M	Cohort student	05/11/02	05/25/02
73	Sieve,Sara Adrian	Cohort student	02/19/00	01/06/01
74	Slayton,David N	Cohort student	03/29/03	04/26/03
75	Stewart,Erin Elizabeth	Cohort student	03/17/01	12/08/01
76	Stintzi,Emily A	Cohort student	12/07/02	05/24/03
77	Thaler,Erin Margaret	Cohort student	06/22/02	07/05/03
78	Tullis,Terri Dawn	Cohort student	02/15/03	04/26/03
79	Welch,Carin A	Cohort student	10/26/02	04/26/03
80	Wells,Robin A	Cohort student	06/08/02	08/31/02
81	Wilk,Jennifer Lee	Cohort student	04/12/03	04/26/03
82	Yu,Shau-Yuh	Cohort student	09/30/00	08/03/02
83	Zink,Jennifer Renee	Cohort student	02/19/00	08/18/01
84	Zook,Kathryn S.	Cohort student	02/05/00	01/06/01
85	Tramill,James L.	Evaluation	07/21/00	04/26/03
86	Colorado,Jozenia T	Research support	08/31/02	08/16/03
87	Meckstroth,Ann M	Research support	09/15/01	08/02/03
88	Thomas,Jennifer L	Research support	07/21/01	01/04/03
89	Hoyt-Reed,Dorothy J	Support staff	06/10/00	08/04/01

90	Banks,Andrea Lynn	TIG	08/03/02	09/13/03
91	Ben Salem,Elyes	TIG	06/23/01	08/16/03
92	Farris,Lindsay A	TIG	12/22/01	05/10/03
93	Grill,Aaron R	TIG	02/19/00	05/24/03
94	Holland,Janet L	TIG	03/15/03	09/13/03
95	Lin,Ming Hung	TIG	08/04/01	08/18/01
96	Ni,Shu-Fang	TIG	05/26/01	08/16/03
97	Oliver,Jon A	TIG	04/28/01	08/03/02
98	Phongsatha,Satha	TIG	07/20/02	08/16/03
99	Phongsatha,Thanawan	TIG	06/08/02	08/16/03
100	Shaw,Joel I	TIG	05/10/03	08/16/03
101	Shorock,Thomas A	TIG	07/20/02	09/13/03
102	Tee,Meng Yew	TIG	08/17/02	08/16/03
103	Travers,Matthw Lee	TIG	06/23/01	07/06/02
104	Vachon,Jesse D	TIG	03/02/02	08/02/03

Member Institutions

	Organization	Type of Partner*	Added	Ended
1	KU School of Education	IHE	1999	2003
2	Blue Valley / USD 229	LEA School District	1999	2003
3	Lawrence / USD 497	LEA School District	1999	2003
4	DeSoto / USD 232	LEA School District	1999	2003
5	Kansas City / USD 500	LEA School District	1999	2003
6	Basehor-Linwood / USD 458	LEA School District	1999	2003
7	Turner / USD 202	LEA School District	1999	2003
8	Kansas State Department of Ed	SEA	1999	2001
9.	Baldwin USD 348**	LEA School District	2001	2003
10.	Olathe USD 233**	LEA School District	2000	2003
11.	Perry USD 343**	LEA School District	2001	2003
12.	Shawnee Mission**	LEA School District	2000	2003

* *Types = Institution of Higher Education (IHE), State Education Agency (SEA), Local Education Agency (LEA), Museum, Library, Other non-profits, For-profit firm, Other*

** School districts that cohorts worked with who were not part of the original proposal.