



***Taking the Lead:  
A Deans Summit on Education  
for a Technological World***

**Progress Report  
January 2004**

# ***Taking the Lead:***

## ***A Deans Summit on Education for a Technological World***

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## Report On Dean's Summit I

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**T**echnology inarguably drives the course of cultures and economies in the modern world. Whether policy makers in the halls of government, business leaders, voters at the polls, or individual consumers in the marketplace, fundamental technological competence is critical to sound decision making.

Questions of promoting “technological competence” aside, leaders in education have yet to define what the term means for persons schooled outside of the scientific and engineering disciplines. The lack of a common understanding of the place of technology in society, let alone a program to teach it, threatens not only the vitality of western economies and the prosperity of their citizens, it compromises their independence as well as they become increasingly reliant on others—some informed, some not—to make decisions that materially affect their lives.

In October of 2001, nearly 100 deans of education and engineering from over 40 universities worldwide convened in Baltimore, Maryland, USA, to discuss ways in which their disciplines might cooperate to produce a more technologically literate citizenry. Specifically, the deans were charged with developing policies and programs to bridge not only the institutional divides between schools and colleges of engineering and education, but at least as important, the lack of connection between higher education and the pre-college community from which they draw their students, and to which they send classroom teachers.

Representatives to the summit were welcomed by Lyle Feisel, the IEEE's Vice President for Educational Activities, who reminded the deans that the meeting had three goals, namely:

1. To improve the ability of classroom teachers to prepare students for a better life in an increasingly technological world;
2. To foster education-engineering collaborations in community outreach;
3. To improve the teaching of engineering.

Through a series of panel presentations and breakout sessions, Feisel said, the deans would work toward developing “models of campus collaboration for each goal,” and leave the summit “with the beginnings of some collaboration.”

Feisel's welcome was followed by introductory remarks from Ted Batchman, Dean of Engineering at the University of Nevada-Reno and chair of IEEE's Pre-College Education Coordinating Committee, who enjoined the conferees

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*Wulf invoked the conference's underlying premise, namely the contradiction between America's growing dependence on technology and its technological illiteracy.*

to develop concrete action plans as a result of their participation in the conference. Batchman placed special emphasis on the challenge to large urban public school systems, where even many teachers have minimal competence in technology. He cited the partnership between the University of Chicago and 28 neighboring public schools as a possible outreach model for adoption by other institutions. The success of such programs, Batchman said, will demand smaller schools, team-based learning approaches, and the adoption of technology as a tool across the curriculum rather than relegating it to the status of a subject in isolation from others.

### **Technologically integrated curriculum**

Feisel's call for a technologically integrated curriculum was seconded by the session's plenary speaker, Dr. William A. Wulf, president of the National Academy of Engineering. Wulf explained to the assembled deans—particularly those in education—the history and mission of the Academy, including its advisory role to the federal government (in Wulf's borrowing, "speaking truth to power"). Wulf invoked the conference's underlying premise, namely the contradiction between America's growing dependence on technology and its technological illiteracy, lamenting that while most accept as a given the need for the humanities in a liberal education, they do not accept the need for technological literacy, specifically the understanding of processes as opposed to the specific body of knowledge that characterizes the standard math and science curricula routinely invoked by policy makers.

The first panel session of the conference centered upon collaborations to enhance the teacher preparation process, and was chaired by David Imig, president and CEO of American Association of Colleges for Teacher Education. Imig led the panel with a discussion of what he considered the primary concerns of most policy makers, including the supply of teachers, the quality of new teachers and their ability to positively impact the learning of all students, and the "piecemeal" efforts to address these concerns through textbooks, technology, and tinkering with curricula rather than taking a more systemic approach to the problem. Imig's remarks were followed by panel presentations on the collaborations of four universities with pre-college teacher preparation efforts. The session concluded with nine breakout groups, which made recommendations for greater collaboration between engineering and education programs, as well as engaging outside partners such as government and business.

### **Preparation of future teachers**

The day's keynote address was delivered by Dr. James Lightbourne, senior science advisor to the National Science Foundation's Division of Undergraduate Education. Lighthouse exhorted the assembled deans to "assume a personal responsibility in the preparation of future pre-college teachers," including recruitment, course work, educational research, follow-up, and continuing professional development for teachers already working in the schools. Lighthouse noted several schools that have taken the lead in this direction by offering joint engineering BS-teacher certification programs and programs in applied science education, citing Iowa State's engineering course

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for students in the College of Education. The National Science Foundation, he reminded, stood ready to support the development of such programs, regardless of scale.

## Revamp rewards system

The conference's first day concluded with a second panel discussion and breakout sessions centered on outreach to pre-college classrooms. Active pre-college outreach programs, according to panel moderator Janet Johnson, Dean of the College of Human Resources and Education at Virginia Tech, pay dividends in the form of students better prepared to meet the challenges of technology in college and university classrooms. Johnson also addressed the need to revamp higher education's rewards system so that funding, tenure, and promotion policies encourage faculty interaction with pre-college classrooms and teachers.

*“. . . commonplace assumptions about teaching tend to deny ‘the scientific basis of the art of teaching’.”*

Panel participants from several schools discussed projects that included summer day camps, weekend programs for talented youth, leadership and multi-disciplinary programs, and collaborations to make university resources more available to pre-college audiences. Breakout groups emphasized the involvement of universities with pre-college schools as equal partners, identifying stakeholders, and making the issue more prominent in public policy.

The second day of the conference featured a plenary address by Dr. Nancy L. Zimpher, Chancellor of the University of Wisconsin-Milwaukee, who offered a survey of efforts to strengthen university involvement in teacher preparation since the publication in 1983 of "A Nation at Risk" by the U.S. Department of Education's National Commission on Excellence in Education. Zimpher observed that there still was wide disagreement as to just what constitutes good teaching, and that "commonplace assumptions about teaching tend to deny 'the scientific basis of the art of teaching'." She concluded, however, that evidence points to the significance of collaboration with scientists and engineers in producing high-quality teachers in these fields, and offered ten "actions" that conference participants might consider to improve the training of teachers by their own institutions.

## Models of teaching, learning

Zimpher's address was followed by the third and final panel of the conference that focused on models of interactive teaching and learning and encouraged deans of education and engineering to study materials and journals in each other's disciplines. The panel was moderated by George Nelson of the American Association for the Advancement of Science, who stressed that pedagogy must have both clear goals and the means to measure them effectively. Panelists presented several successful interactive teaching and learning models from their own institutional experience. The breakout sessions offered a number of approaches toward interactive models, including seminars, retreats, and workshops for education and engineering faculty to share teaching approaches and assessment techniques, teaching engineers to communicate more effectively with non-technical audiences, and instituting

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*Community colleges represent a valuable resource in establishing a continuum of technological education.*

continuous improvement programs for student retention and development. The day's keynote address, "The Role of Community Colleges in Teacher Preparation," was given by Belle Wheelan, Ph.D., president of Northern Virginia Community College. Community colleges, Wheelan said, serve as linchpins between high school and university populations, and as such represent a valuable resource in establishing a continuum of technological education. Moreover, Wheelan added, due to their emphasis on technical education, community colleges also offer working models for four-year institutions in their own efforts to better integrate technology across the university curriculum.

The summit concluded by offering four recommendations for future action:

1. Sponsor a major national conference for education and engineering faculty, featuring speakers from both disciplines.
2. Encourage engineering schools to either establish or become affiliated with a center for teaching and learning, involving community colleges as an important part of the pipeline.
3. Support revision of pre-college curricula to include design and engineering as a national goal.
4. Develop a recognition program for outstanding collaborations.

Conferees used the four recommendations to tailor plans suitable for their campuses and institutional missions, including both new initiatives and enhancements of already existing collaborations between colleges of engineering and education. Along with the customary retirement and attrition of personnel, budget constraints arising from the recession of 2000-2001 and its continuing fiscal aftermath prevented many institutions from implementing these action plans. Nonetheless, a number of institutions have moved to improve collaboration between engineering and education since the first conference. The following section profiles seven institutions—five in the United States and two overseas—that are leveraging both new and existing resources to make these partnerships for educational progress a reality.

## North Carolina State University

Currently both the College of Education and the College of Engineering at North Carolina State University are collaborating with other NC State Colleges and the Wake County Public Schools as partners in the Wake County Education Reform program. As part of this initiative, the two colleges are placing engineering and education majors in local classrooms to assist students with math preparation, as well as assisting Spanish-speaking students at the elementary and middle school levels with science and math. The colleges also work with local 4-H programs on summer camp and after-school programs in math and science.

*As part of this initiative, the two colleges are placing engineering and education majors in local classrooms to assist students with math preparation.*

Specific collaborations of the two colleges include the NSF-sponsored Girls on Track program. Girls on Track brings together the College of Education's Center for Research in Science and Mathematics Education and the College of Engineering's Department of Computer Science in a partnership with Meredith College (a four-year women's institution), the Wake County Public Schools, and the North Carolina Department of Public Instruction in a program to increase the interest of middle school girls in math-related careers by engaging them in computer-based mathematical explorations of urban problems in their communities.

Other collaborations between the Colleges of Education and Engineering and other academic units at North Carolina State focusing on challenges specific to female learners include Expanding Your Horizons in Math, Science and Technology, a program to bring middle school girls to the NC State campus for a day of workshops and activities. Finally, the two colleges are co-PIs for Women and Information Technology: A Comparative Study of Women from Middle Grades through High School and into College.

Broader efforts of the two colleges include various NSF-funded projects and programs such as TeKnowledge Greenhouse: An Engineering and Education Learning Community and Green Processing Undergraduate Research, a summer program in which students have the opportunity to work with faculty from Chemical Engineering, Wood and Paper Science, Textiles, Chemistry and Multidisciplinary Studies to improve their research skills and experience, as well as to learn more about ethics in the field of engineering.

Finally, the Colleges of Engineering and Education, along with NC State's Departments of Humanities and Social Studies, are co-PIs in an NSF program entitled Interrelationships between Success and Learning Strategies Applied by Engineering Students, a project that examines the study skills and habits of engineering freshmen in order to identify remediable deficiencies. A key goal of this project is to help failing students (43% in the first year in college) succeed by helping them to learn more efficiently. The first papers published by project investigators have received two best paper awards at international conferences.

## Penn State University

In response to the challenge of the IEEE's "Dean's Summit on Education for a Technological World," the deans of Penn State's collaborating colleges appointed a planning group to identify strategies for developing strong partnerships among education, science, and engineering students and faculty; establishing working relationships with K-12 schools; and improving the instruction of math, science, and engineering concepts through better teacher preparation and curriculum development to engage students.

Though much work remains to be done, to date the Penn State team has made progress in all of these areas. Team members have nurtured a broad partnership among the five collaborating colleges at Penn State and numerous school systems in the Commonwealth through the Pennsylvania Educating for Success program, a dialogue with over 50 school systems that includes teachers, curriculum coordinators, administrators, and school board members. In the process of articulating this broader partnership, the Penn State team has documented an inventory of existing outreach projects, as well as developing joint proposals for teacher preparation and student engagement in math and science.

The Penn State partners submitted a joint proposal in response to the NSF's Comprehensive Math and Science Partnership (MSP) solicitation. Although the team's initial attempt to obtain an MSP grant was not successful, the network of schools, teachers, curriculum coordinators, and administrators developed during the proposal preparation process established a strong base from which to develop subsequent proposals. The project plan for the MSP submission, along with a strengthened assessment component, prepared the partnership to respond strongly to other requests for proposals to foundations and the state.

The Colleges of Engineering and Education will participate in a consortium funded by the NSF's Center for Integration of Research, Teaching, and Learning (CIRTL) program, headed by the University of Wisconsin. Along with other Penn State academic units, the two colleges have also taken the lead in submitting an NSF Graduate Teaching Fellows in K-12 Education (NSF GK 12) track II proposal, currently under review, and are responding jointly as well to both a GE Fund request for proposals on K-12 Math Excellence and an upcoming Title II RFP related to No Child Left Behind/MSP funding administered by the Pennsylvania Department of Education.

Deans and associate deans from the collaborating colleges continue to discuss and develop the partnership's next steps, including expanding outreach to school systems recruited for the initial MSP project. A list of existing outreach programs across the university is currently being updated and will be posted to the Web in order to help both faculty in research centers and those in the process of writing grant proposals to develop plans and foster broader partnerships in pre-college programming.

*Team members have nurtured a broad partnership among the five collaborating colleges at Penn State and numerous school systems in the Commonwealth through the Pennsylvania Educating for Success program.*

## Middle East Technical University, Ankara, Turkey

Middle East Technical University (METU) has established a Professional Development Program on Effective Teaching, characterized the past three years by a series of seminars that have brought together not only teachers from METU's Faculty of Education and Faculty of Engineering, but also scholars from other Turkish universities.

Initiated in April 2001, the seminars seek to develop in newly employed faculty members of METU's College of Engineering the necessary background, skills, and awareness to perform at higher levels in the classroom. Special emphasis is placed on orienting new teachers to effective teaching strategies, including active learning, assessment, and evaluation techniques. Also, considerable attention is given to instructional planning, communication skills, and the social dynamics underlying the instructional process. Sessions typically are conducted in lecture format, followed by question and answer periods. Detailed written evaluations offer another mechanism for participant feedback.

METU's engineering-education collaboration began in the fall of 2000, when three members from each faculty, including the deans, met to plan the seminar series. Faculty included three members of the College of Education specializing in instructional planning, communication, and assessment and evaluation. Their counterparts from the College of Engineering included faculty with a particular interest in developing effective teaching skills. The seminars are typically scheduled to run two days, and have been facilitated by all six members of the original planning group, with sessions conducted jointly by a member from each faculty.

The first seminar, held in April 2001, attracted 19 participants—12 from the College of Engineering and the rest from other departments. Evaluation forms were distributed to participants at the end of the two-day session in order to assess the effectiveness of the seminar and make improvements in future offerings. Using feedback from both participants and facilitators, the joint planning group then modified the structure of the workshop in order to better meet the needs of participants. A second workshop was held in January 2002 with 14 participants, nine of them from the College of Engineering.

Feedback from these workshops has led to plans for extending the program to other faculty in the future, and for establishing a more permanent system for professional development. In fact, outcomes from the first two seminars were sufficiently promising that the group was invited by another Turkish school, Atatürk University in Erzurum, to organize a similar workshop for their faculty members. This seminar, held in June 2002, attracted nearly 50 Atatürk faculty members, about half from the College of Engineering and the rest from the College of Science. Based on the success of these initial offerings, two additional workshops were planned for 2003, including one from another university in Turkey.

*...outcomes from the first two seminars were sufficiently promising that the group was invited by another Turkish school to organize a similar workshop for their faculty members.*

## Louisiana State University

The scope of the Gordon A. Cain Center was broadened to include four of Louisiana State University's colleges: Arts & Sciences, Basic Sciences, Engineering, and Education. The name of the center was changed to the Cain Center for Scientific, Technological, Engineering and Mathematical Literacy, thus recognizing the expansion of the Center's activities beyond arts and sciences. This productive collaboration in teacher development, research, and community service for preschool through adult learners has generated innovative programs in science and mathematics education supported by both internal and external funding, with current activities funded by the National Science Foundation and the Howard Hughes Medical Institute, as well as by state agencies.

*High school students  
who complete the  
program receive a  
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LSU as long as they  
major in engineering.*

The overarching purpose of the newly expanded and refocused Center is to strengthen science and mathematics education in Louisiana through activities that support teachers. The Cain Center's endowment includes \$1.8 million to fund a "triple chair" to be occupied by the Center's permanent director, supplemented by state commitments of \$1.2 million and a \$90,000 faculty line funded through the state appropriation for teacher education redesign. Benefactor Gordon Cain's original commitment also includes \$700,000 to support the purchase, outfitting, and initial operating costs for a science van to provide pre-college students with science experiences that otherwise would be unavailable to local schools.

The Center administers a number of programs involving its participating colleges. Among these are the Louisiana Quality Science and Mathematics fund, or "QSM," which includes an annual state appropriation of \$180,000 to purchase equipment for mathematics and science instruction. In addition, the Center supports numerous pre-college outreach activities designed to interest students in STEM disciplines, including a computer programming contest for high school students in a tri-state area, summer workshops in science education for middle and high school teachers, a program to facilitate the development of technology-proficient teachers for grades 1 through 8, and an annual two-week summer program to introduce minority high school students who have high grades in math and science to engineering. The latter is taught by LSU professors with the assistance of LSU engineering students. High school students who complete the program receive a scholarship to attend LSU as long as they major in engineering.

In collaboration with faculty from the College of Education and the Math Visions Lab, the Center and its Advisory Council continues to be involved in redesigning the university's undergraduate teacher preparation programs. A notable achievement was the acquisition of a four-year NSF grant for \$1 million under the STEM Teacher Preparation program to support teacher recruitment and related activities. The goal of the program is to increase the number of highly qualified secondary teachers in science and mathematics by presenting a dynamic curriculum developed and enriched by a community of scholars, including secondary teachers and LSU faculty members associated with the Cain Center.

## University of Pretoria, Pretoria, South Africa

The engineering profession in South Africa has been under tremendous pressure to transform itself and to better reflect the demographics of post-apartheid South Africa. In order for this to happen and to develop a pool of future engineers, it was clear that South Africa needed to expand the relatively small number of mathematics and science students in the public schools. The question remained, however, how this might be done effectively without undue interference in local school systems.

Research shows that problems with learner interest in engineering education in South Africa are often due to a lack of awareness by secondary pupils and their parents of the need for adequate instruction in math and science prior to entering university. The research also reveals a general lack of information regarding engineering career paths in black high schools and homes, as well as a lack of engineering role models in the black community.

Over the past few years, an externally funded project of the University of Pretoria did some exploratory outreach to pre-college teachers. The Teachers Outreach Workshops (TOWs) were conducted during school holidays for mathematics, science, vocational guidance, and biology teachers from disadvantaged areas. During the workshops, teachers were given talks on what engineers do, including discussion of the differences between engineers, technologists, technicians, and artisans. The teachers were briefed on the various engineering disciplines, including requirements for study in each of the disciplines. Workshop participants were taken on tours of different industries and exposed to black professional role models who spoke to them about their careers.

As a result of the TOW program and other outreach activities, university faculty determined that the most effective way to expand the pool of potential engineers was to focus on these pre-university teachers. Developed by the University of Pretoria, the Teachers Mentorship Program (TMP) assists mathematics and science teachers in four pilot schools in the greater Pretoria area. Senior mentors work with teachers in their classrooms during regular school hours to empower them with better and more effective teaching tools. The response to this intervention program from stakeholders has been very positive, with a clear understanding of the program's focus and objectives.

Intervention through the TMP will take place once a week for at least a three-year period to ensure sustainability. If, on average, four teachers per school are mentored, with an average of 250 students per teacher, up to 1000 students per school—or a total of 4000 students in the pilot group—will be exposed to engineering principles and practices during the support project. Further, it is anticipated that the TMP can be easily duplicated in schools and areas outside of Pretoria. Finally, the TMP may also be linked to other “value-added” outreach efforts to ensure that the objectives of promoting science, engineering, and technology education are achieved and the currently small pool of potential engineers is considerably expanded.

*TMP may also be linked to other “value-added” outreach efforts to ensure that the objectives of promoting science, engineering, and technology education are achieved and the currently small pool of potential engineers is considerably expanded.*

*Six seed grants of \$8,000 each were awarded. . .for projects that focus on improving the pedagogical skills of engineering faculty and enhancing pre-college education.*

## University of South Carolina

The University of South Carolina's College of Education (CoE) and College of Engineering and Information Technology (CoEIT) have made significant strides over the past year toward a greater and more productive collaboration to enhance pre-college teacher preparation in the areas of math, science, and technology. The two colleges established three objectives for improving teacher preparation:

1. To enhance collaboration between CoE and CoEIT faculty for the purpose of improving the instructional expertise of CoEIT faculty.
2. To increase the involvement of CoEIT faculty in pre-college endeavors for the purpose of integrating engineering concepts into pre-college s curriculum.
3. To help formulate emphases and protocols for the university's Center for Teaching and Learning for the purpose of ensuring the continuous improvement of instruction.

Discussions between the two colleges for establishing the university-level Center for Teaching and Learning are still underway. However, significant progress has been made toward the collaboration's other two objectives. Six seed grants of \$8,000 each were awarded to teams of faculty representing both colleges in March 2003 for projects that focus on improving the pedagogical skills of engineering faculty and enhancing pre-college education. Objectives of these grants include plans and proposals for future collaborations between the colleges' faculties.

As for the partnership's second objective, a team of faculty members (one from each college) has obtained funding from the State Commission of Higher Education to establish the Center for Engineering and Computing Education on the University of South Carolina campus. Initial funding for this center is being used to integrate engineering concepts into science instruction at the pre-college level by supporting a Graduate Teaching Fellows in K-12 Education program, a Summer Institute for Teachers, and a Research Experience for Teachers program.

In the summer of 2003, the University of South Carolina began a "Project Lead The Way" affiliate program, training approximately 30 teachers in Project Lead The Way courses. Project Lead The Way is a national, privately supported program offering a four-year sequence of technology education courses which, when combined with college preparatory mathematics and science courses, introduces high school students to the scope, rigor, and discipline of engineering and engineering technology prior to entering college. In addition, proposals are pending with a private foundation and with the State of South Carolina to enhance our Project Lead The Way program in South Carolina.

*Among strategies the project may implement in the future are the introduction of learning communities and modularization of course content, permitting self-paced learning.*

## Virginia Tech University

Virginia Polytechnic Institute and State University has established “Bridges for Engineering Education: Virginia Tech” (BEEVT), a program to foster and sustain collaboration among Virginia Tech’s engineering and education faculties, pre-college educators, corporate and industrial partners, and policy makers throughout Virginia.

According to the National Science Foundation, the Bridges for Engineering Education program is intended to “open and facilitate new avenues for collaboration and innovations in the teaching of engineering, mathematics and science, and enhance the development of the U.S. science and engineering workforce. Collaborations are expected to increase the engineering content of the programs of study of pre-service teachers and general education majors, improve pedagogy and evaluation in undergraduate engineering programs, or accomplish both objectives by providing opportunities for increased interactions among engineering and education students and faculty.”

The purpose of the project’s partnerships and activities is to enhance education in engineering and technology from kindergarten through university in both Virginia and beyond. Specific objectives of the BEEVT initiative include the development of a new Masters of Technology Education teacher licensure option for engineering graduates; creation of a contemporary framework for undergraduate engineering pedagogy, beginning with freshman engineering experiences; and establishment of a “Virginia Engineering/Education Collaborative” to ensure stakeholder ownership of the outcomes of the BEEVT program.

NSF has funded BEEVT from September 2003 to August 2004 in order to implement the project between technology education and engineering faculty. Project faculty believe the proposed masters/licensure model will be successful both in providing new opportunities for engineering students—including women and underrepresented populations—and in addressing critical teacher shortages in technology education. At the same time, the BEEVT project will study pedagogical and other issues of the engineering curriculum. Among strategies the project may implement in the future are the introduction of learning communities and modularization of course content, permitting self-paced learning.

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**Individual Campus Action Plan**

**Initiative title:**

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Expand role of CRESMET collaboration
2. Increase visibility of deans of Engineering and Education – leading collaborative efforts
3. Partner on outreach programs / efforts

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

- Expand the existing 3 college partnerships in education
- Funding – state/federal
- Inventory our outreach programs – share ways to mutually enrich programs through joint activities
- Partner with University of Arizona (engineering/Education) on advocacy RE: improvement of state technology standards

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Increased collaborative programs among faculty.
- Increased pedagogy in Engineering curriculum and increased technological awareness in education.

**Please provide a proposed timeline to accomplish your objectives.**

1. 3 Years
2. 1 Year
3. 2 Years

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**This is a new initiative.**

**Please list the objectives of this collaboration.**

Outreach

1. Improve K-12 SMET initiatives
2. Increase SMET HS graduates
3. Increase interest in School of Ed, School of Eng and Comp Sci

Internal

1. Improve SMET teaching
2. Promote outcomes-based assessment
3. Establish teaching and learning center

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Outreach

- Identify possible structures of candidate proposed programs
- Implement around pro devt schools and summer institutes

Internal

- Interested funding for T&L center staffing and core projects
- External funding for SMET-related activities

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Outreach

- More, better incoming BU students
- Improved community
- Informed, committed faculty

Internal

- Improve, recognize SMET @ BU
- Success of ECS students, teacher candidates, faculty

**Please provide a proposed timeline to accomplish your objectives.**

Outreach

- Seek VP Res advice and connections
- IEEE as facilitator
- ID team—BU and external
- Est proposed date

Internal

- Meet with and recognize SMET @BU
- Lobby Provost and others
- ID leaders for center

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**Initiative title:** Deans Seminars on Teaching Effectiveness

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. For faculty to learn new teaching and assessment methods
2. To share best practices
3. To develop and deliver new or redesigned courses in engineering and education

**Briefly describe the initiative you have agreed to begin/continue.  
Describe funding models, both internal and external, that you may use to support this collaboration.**

A deans sponsored series of seminars on best teaching practices featuring faculty from education, engineering and the sciences. Deans office funding (internally), potentially IBM funding externally.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Better and more innovative teaching in undergraduate and graduate level courses with the potential for better retention.

**Please provide a proposed timeline to accomplish your objectives.**

Beginning Spring semester through Fall semester 2002 with plans for continuing the model in a formal way.

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**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. To more fully develop our involvement with Jason Project
2. To continue joint research in Biomechanics and to initiate SMET curriculum research in K-12
3. To initiate plan for acceptance/ adoption of Mass (Tufts) plan in Idaho

#s 1 and 2 are additions and #3 is new

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Deans and faculty from both colleges will continue to meet and develop objectives and activities to implement three efforts above. #1 & 3 are curriculum projects in K-12 and #2 is a faculty res effort designed to inform the medical community and K-12 coaches/trainers #3 involves business, political, educational infrastructures. (\*\*)

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Pipeline – Engineer
- Teaching methodologies – both
- Informing pedagogy and research through communication and transfer of information

\*\* Some from industry (Jason) and from base budgets – Deans will adjust as necessary – current grants – proposed NSF / ED Dept Funding

**Please provide a proposed timeline to accomplish your objectives.**

- Started Spring 2001 – Net site 2003 – Continue indefinitely
- Started Fall 2000 – Ongoing
- Started Fall 2001 – Action / Legislation by 2003

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**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Improved learning in both colleges. Pedagogy in Engineering and technology in Education
2. Increased understanding of Engineering by P-12 educators
3. Cooperation between colleges on new accreditation processes

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Engineers for Tomorrow Program – Outreach to communities with engineering firms, community colleges & K-12 schools to further engineering as a career. Possible parallel programs for Education and Health Sciences. Internal and external funds.
2. Joint workshop program developed by both engineering and education faculty. Focus determined by working group. Internal funds.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

1. Pedagogical improvements in both colleges
2. Greater collaboration in accrediting processes
3. Greater outreach to community and P-14
4. Increased enrollment

**Please provide a proposed timeline to accomplish your objectives.**

1. Engineers for Tomorrow Program – 5 year pilot program started fall 2001
2. Joint workshop working group will be established this year.

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**Initiative title:**

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Increased collaboration between engineering/technology faculty and teachers of courses in pre-service teaching programs.
2. Students transferring to four-year teacher training programs will be more technologically literate
3. Pre-service teachers will have a better awareness of the process of engineering

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

- Assembling small group of faculty from core pre-service courses and technology education and stimulate them to modify pre-service courses to improve technological literacy. Faculty release time will be used.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Technological literacy among pre-service teacher will improve.

**Please provide a proposed timeline to accomplish your objectives.**

- Groups are convened by November 30<sup>th</sup>
- Discussions continue through Spring 2002 for implementation in Fall 2002.
- The faculty will develop an assessment plan

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**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Faculty Collaboration Study Group

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Exploration of mutual areas of interest and concern
2. Design seminars series to engage broader group
3. Identification of potential funding sources

**Briefly describe the initiative you have agreed to begin/continue.  
Describe funding models, both internal and external, that you may use  
to support this collaboration.**

An initialization effort that is expected to lead to ideas for future collaboration. Internally funded.

**Briefly describe the impact this collaboration will have on your school of  
engineering and school of education.**

Engagement of increased number of people from both sides. Increased technological awareness for education & pedagogical awareness for engineering faculty.

**Please provide a proposed timeline to accomplish your objectives.**

Final report due May 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Center for Science, Math, Engineering & Technology Literacy (SMET)

**This is a revision of a current collaboration.**

**Please list the objectives of this collaboration.**

1. Impact higher education faculty in SMET to reform teaching practices based on empirical evidence of learning effectiveness
2. Impact pre-service and in-service teachers to teach high quality SMET in PK-12 schools
3. Coordinate #1 and #2 into PK-16 curriculum development

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

The beginnings of the center already exist in Science, Math and Education we will expand to include engineering and technology.

Funding:

Internal: Support from 4 colleges – Arts & Sciences, Basic Sciences, Engineering, and Education

External: Seek both grant funding & private support in form of endowment.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Better student learning
- Better qualified students coming to university
- Better understanding across disciplines

**Please provide a proposed timeline to accomplish your objectives.**

2001-2002: Refocus and expand Center, including developing detailed plan

July 2002: Fully implement expanded Center

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Provide math and science teachers with a deeper understanding of technology on society.
2. Provide math and science teachers with information and technical assistance for use in their classrooms.

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Develop a new graduate level course on technological literacy to be co-taught by engineering and education faculty and directed to science and math pre-service and in-service teachers as part of their master's /credential requirements. Minimize internal funding is needed.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

1. Will bring together faculty from engineering and education in a collaborative working relationship
2. Will better prepare science and math teachers.

**Please provide a proposed timeline to accomplish your objectives.**

Will offer course for the first time Fall 2002.

Will develop course Spring and Summer 2002.

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Improve SMET student (6-12) learning through INTECH (District 10 NYC public schools) new school building
2. Introduce grade 6-12 students to career opportunities in SMET and the teaching of SMET with special emphasis on girls and groups traditionally underrepresented in SMET
3. Expose both Eng and Education faculty to modern pedagogy and technology

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

A new school (grades 6-12) in District 10 NYC is being built and the plan is to incorporate modern technology in the teaching of students. By bringing engineering faculty and students into the plan we can expand the original objectives of the project. A gender equity grant from NSF has been submitted and the NYC Board of Ed is also contributing to the Prof deal of the teachers.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Bringing together the faculties will expose both to modern technology and modern pedagogy. Long term: we need more engineering students and more women students.

**Please provide a proposed timeline to accomplish your objectives.**

The INTECH project is in progress. The school is scheduled to be built, within 6 months the collaboration efforts of the two schools will be discussed and articulated.

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Effective Teaching Collaboration

**This is an addition to a current collaboration. Please check one.**

**Please list the objectives of this collaboration.**

1. To improve learning by improving teaching quality.
2. To introduce contemporary instructional models, such as active learning and assessment techniques.
3. To develop communication, problem solving and teamwork skills of engineering students for a competitive work environment.

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

The faculty of engineering and the faculty of education will work together to develop and implement workshops, seminars and follow-up sessions to achieve the above objectives. The funding will be provided by the Continuing Education Center (CEC) of the University.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Communication, interaction and mutual understanding between the two faculty will increase. The faculty of education will be more familiar with technology and technological concepts and engineering faculty will improve their teaching and assessment skills.

**Please provide a proposed timeline to accomplish your objectives.**

- April 2001—Pilot workshop realized for junior professors
- November 2001—Evaluate pilot workshop
- December 2001—Revise and improve based on evaluation results
- February 2002—Workshop open to all engineering faculty
- May 2002—Establish an Effective Teaching Center

**Taking the Lead:  
A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Increase collaboration between faculty in CoE and CEd
2. Introduce courses and course content for teachers/teacher prep
3. Partner with selected K-12 schools

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Increase opportunities to increase technological literacy of middle grade and HS teachers and students through collaboration between colleges of engineering and education  
Provide college support, impact plan initiative  
Seek external funding

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Involve engineering faculty in school-based education  
Improve tech literacy of teachers beyond computers  
Encourage collaborative scholarship  
Increase tech literacy of K-12 students and encourage interest in engineering and other technical careers

**Please provide a proposed timeline to accomplish your objectives.**

Include in "compact plan" cycle 2001-2002 9spring  
Trial run of courses or course modules 2002-2003  
Assessment and follow-up 2002-2003

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Enhance teacher preparation
2. Enhance teaching/learning environment

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Develop/teach engineering course suitable to meet math or science requirements for preparation of 7-12 teachers
2. Involve education faculty members in engineering program reviews (mandated by state regents) & vice versa

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Progress toward meeting the two objectives

**Please provide a proposed timeline to accomplish your objectives.**

1. First offering next academic year (May 2002)
2. During May 2002 pilot with engineer tech programs. Extend to engineering & education programs in May 2003

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:** Interdisciplinary collaborative effort, education, science, engineering to impact K-12 teacher preparation

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Develop linkages among education, science & engineering faculty and students
2. Establish working relationships with K-12 schools
3. Improve instruction of math, science & engineering concepts through better teacher preparation and curriculum development to engage students

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

- Change the educational experience of preservice teachers to more effectively create a learning environment for math, science and engineering concepts.
- Will seek external foundation support and invest university funds.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Enhanced understanding by participants in the different strengths and challenges in introducing these items into K-12.
- Realization that through collaboration can increase the number of students who have a beginning understanding of "technology."

**Please provide a proposed timeline to accomplish your objectives.**

Fall 01—Bring relevant deans together to identify key faculty and schools

Spring 02 —Develop proposal scoping effort

Fall 02 —Begin effort

(Note: This effort will be reflection college strategic plan)

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Heighten education majors' awareness of the profession of engineering
2. Increase the pool of high school students choosing engineering and teaching as careers
3. Infuse technological literacy in E-4 and 4-8 teacher preparation programs

**Briefly describe the initiative you have agreed to begin/continue.  
Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Develop a course in general engineering for E-4 and 4-8 teacher certification programs
2. Have engineering majors join education majors serve as mentors and tutors in professional development schools
3. Have faculty members in both colleges in sharing their expertise with each other

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Heightened mutual understanding of the two professions
- Recruitment of quality students in both colleges
- Collaborative faculty research

**Please provide a proposed timeline to accomplish your objectives.**

The engineering course will be developed by Fall 2000 other initiatives will be ongoing and will be implemented by Fall 2002.

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:** Collaboration for Active Teaching and Learning in Science and Engineering

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Develop awareness of enhanced student success via Active teaching and learning
2. Curriculum revision to enhance concepts and inquiry skills
3. Enhance student retention

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

Begin with awareness conference. Develop the large and base groups to discuss change. Spread the model being used for elementary science education into all science and engineering education. Funding for in-house Center for Teaching Excellence and proposals to external agencies (NSF, Department of Education)

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Improved secondary science and math preparation.
- Increased conceptual knowledge for engineers.
- Develop educator - engineer – scientist consortia for potential funding projects.
- Move students into science, engineering, math and education in science and math.

**Please provide a proposed timeline to accomplish your objectives.**

- Develop conference for late Spring term
- Discussion groups start Fall 2002 - 2003

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Enhance technological literacy among all students, and maintain up-to-date knowledge of alternative pedagogies.
2. Retreat to develop forum for continuing Ed/Engr collaborations
3. Consider feasibility of developing general ed technology literacy course – team taught and articulated with CCS

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

The tech literacy class development will begin with consideration of existing intro to engineering course by Ed/Engr/K-12/CC instructors. Faculties will determine desired learning outcomes, design appropriate pedagogies and learning materials. Funding possibilities: CFDS, Center for Service Learning, Lottery, NSF or FIPSE.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Should develop collaborative working relationships among engineering and education faculty, as well as bringing on board instructors from K-12 and community colleges. An effective course will enhance tech literacy and possibly attract more students to SMET disciplines.

**Please provide a proposed timeline to accomplish your objectives.**

- Course designed by May 2002
- Develop in-service modules during summer 2002
- Module testing in Fall 2002 with in-service teachers
- Experimental course offering in Spring 2003
- Full course offering in Fall 2003

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:** Engineering Faculty Academy for scholarship in teaching

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Improve effectiveness of engineering teaching
2. Develop collaborations on educational research between the 2 colleges
3. Change culture in College of Engineering to recognize importance of educational psychology

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

- Series of workshops with both engineering and education leaders peer evaluation.
- Funded from salary savings from sponsored research in Dean's office.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Validation of value of educational research for faculty in College of Education. Heightened awareness of the importance of learning styles in developing effective teaching styles for engineering.

**Please provide a proposed timeline to accomplish your objectives.**

Project is underway. Full cycle of activities will be complete by 5/01/02. Re-evaluation will begin in 3/02.

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Enhance activities and integrated programs
2. Enhance teaching and learning strategies
3. Development of curriculum to enhance technological literacy

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Build on existing collaboration between engineering and education
2. Take advantage of campus – WIDE curriculum reform to advance agenda

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Further solidify an existing positive relationship between the two schools.

**Please provide a proposed timeline to accomplish your objectives.**

Initiate process in Spring 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Enhance technology awareness
2. Improve infrastructure for teacher development
3. Strive for improved relationships in various disciplines, including education and engineering, community and constituents for teaching

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. We suggest a center for Technology Literacy and outreach
2. This initiative to focus on a planning grant to allow evaluation of current academic use of technology awareness, course delivery and development of professional programs.
3. University to match the planning grant and employ industry support.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

The center will improve how teachers apply knowledge to pedagogy, develop and help students learn components and prepare technology awareness of students. Additionally, the center will strive to improve industry relationships and technology use in all aspects of the college experience, and sustained support.

**Please provide a proposed timeline to accomplish your objectives.**

- Planning grant to have six month period
- Request three-to-five-year implementation of center

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Explore with colleagues on campus opportunities for collaboration in providing "engineering content" in K-12 Preparation and professional development
2. Working w/ASU assist in broadening definition of technology standards in state requirements for K-12 schools.

**Briefly describe the initiative you have agreed to begin/continue.  
Describe funding models, both internal and external, that you may use to support this collaboration.**

The focus is to expand the Engineering/Education role in promoting technological literacy in K-12 schools. The primary purpose:

- Expanding the part of science/math/engineering students
- Expanding the technological literacy of the general populace

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

See "primary purpose" above.

**Please provide a proposed timeline to accomplish your objectives.**

Within the next semester; CoEM & CoE meet and present with Professional Preparation Board and other participant Deans by 12/31/01. Also meet with \* Deans Council

\* K-16 Council

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Joint CoEd/CoEn Initiative on Technological Literacy

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Inventory current activities, interests, relationships
2. Identify needs, opportunities, potential barriers
3. Develop concrete proposals aimed at impacting needs

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

In phase 1, we plan to bring together a group of faculty and staff from the two colleges to develop an in-depth understanding of the issues related to TL in our context. Long range goal is to develop a structure that will address TL for pre-service teachers, in-service teachers, and direct K-12 outreach.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

A big benefit will be the increase in relationships between the colleges. It will increase research opportunities, impact quality of students entering engineering and sciences, and enhance the preparation of teachers. As a large state supported university, it will benefit us by being viewed as leaders in TL.

**Please provide a proposed timeline to accomplish your objectives.**

Phase 1 will be done in the next 6 months.

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. To advance quality of our students in schools (K-12)
2. To advance quality of teachers (K-12)
3. To advance quality of lecturers (University)

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Loan
2. Outbreak (from business community)
3. Government

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

1. Efficiency of using resources
2. Exchange expertise
3. Improvement of education quality

**Please provide a proposed timeline to accomplish your objectives.**

- First of all is to achieve quality of lecturer.
- Secondly is teachers, facilities and equipment
- Thirdly is students improvement

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Assessment Brown Bag Series

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Share knowledge important to both colleges re: assessment
2. Improve assessment practices
3. Develop culture of assessment as an accepted practice in College of Engineering

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Plan a series of brown bad discussions on assessment
2. Encourage faculty from both colleges to a attend and activity participate
3. Summer 02 deans put together with key organizers to assess effectiveness of program

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Greater understanding
- Better assessment

**Please provide a proposed timeline to accomplish your objectives.**

1. By end of October
2. October - May
3. June

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Seek external funding to support SMET
2. Education among three universities through a collaboration with schools, IHES, and business/industry

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Engage faculties on KU, KSU, and WSU in planning for web-based delivery of content knowledge in SMET for professional development (teachers and engineers) and students. Build upon technological expertise already existing among partners.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Enhance quality of instruction and student learning. Expand collaborations among faculties on three campuses with two schools on each.

**Please provide a proposed timeline to accomplish your objectives.**

- Assemble faculty for conversations and planning with in one month at KU; expand to other two universities this year.
- Early 2002—Begin development of web-based course
- During 2002—Prepare grant proposal for this collaboration

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Improve UMBC, curriculum by jointly developing two GFR (general) education. One addresses technology and one pedagogy.
2. Outreach to schools to develop a high school (AP) course in exploring engineering
3. Teacher training for pre-service and in-service teaching in engineering principals.

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Under a center model (tube developed), the institution will offer curriculum development, teacher training and outreach to schools. Same external funding exists for these activities (K-16 funding), foundation support, and school district funding.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Increase expertise number of student enrollment increases in education
- Recruit students for engineering

**Please provide a proposed timeline to accomplish your objectives.**

Proposal will be written for funding through NSF

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

Establish faculty team of education, engineering math and science faculty to positively impact knowledge and attitude of K-12 students by working with pre-service and in-service teachers.

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. See Above
2. Internal funders for release time, summer stipends and travel
3. External – to be determined

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

1. Faculty on teams will reconsider their individual teaching styles.
2. Faculty on teams will enhance their understanding of the need for and use of various assessment procedures
3. The criteria for accreditation of the professional schools will positively impact the entire University.

**Please provide a proposed timeline to accomplish your objectives.**

Fall 2001—Faculty teams identified and established  
2002—Action plans and collaborations established

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Technology Literacy

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Development of MST Specialization for Elementary Teachers
2. Collaborate to redefine Industrial Technology Program

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Funding models to be formulated after appropriate study of issues and opportunities:

Identify sequence of courses that would to the MST specialization

See if shared resources can be utilized to charge and renew industrial technology

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Will focus interests on the issue of technology literacy and help build the framework for continuous cooperation for many common interests, better utilization of university resources.

**Please provide a proposed timeline to accomplish your objectives.**

Primary objectives done by July 1, 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Increase technological proficiency of teachers (K-12)
2. Increase technological literacy of school children
3. Increase interest in technological careers.

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

Engineering faculty to offer courses as part of Continuing Education Programs for teachers Funding Government/ Industrial Partners.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Increase in freshmen intake
- Better prepared students
- Start of increased co-operation between faculties

**Please provide a proposed timeline to accomplish your objectives.**

Introduce in 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Enhancing SE&T design contest

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Develop standards-based component to contest
2. Develop a distance-based recruitment and training component
3. Develop materials on best practices in working with K-12 students (for engineering students)

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Both faculty and students will work together to modify the competition, develop materials, and support
2. Funding – local industry currently funds; request will be made for additional support

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Increased discussion about teaching and learning across faculties
- Increased knowledge of Technological literacy students for both faculties
- Increased numbers of K-12 students participating
- Improved design process for participants

**Please provide a proposed timeline to accomplish your objectives.**

- April 30, 2002
- November—January 2003
- July 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. To enhance collaboration between COE and COEIT faculty for the purpose of improving instructional expertise of COEIT faculty
2. To increase the involvement of COEIT faculty in K-12 endeavors for the purpose of integrating engineering concepts into K-12 curriculum
3. To help formulate emphasis and protocols for the universities center for teaching and learning for the purpose of ensuring continuous improvement of instruction

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

- See above
- External funding: NSF supplemented funds for currently funded collaborative projects
- Internal funding: Provost's Office funds in support for the Center of Teaching and Learning

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Better teaching accomplished in the COEIT
- More effective and relevant curriculum for K-12 schools
- Better K-12 teachers
- Potential improved pipeline for students interested in engineering careers

**Please provide a proposed timeline to accomplish your objectives.**

1 –2 Years

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
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**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Enhance teaching/learning of math and science, EC/12
2. Infuse technological literacy in pre-service and in-service for EC/12 teachers

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Initiative will begin with a follow-up dialog and planning session by the education and engineering deans; communications with provost and president, other academic deans, and department chairs. \* Then the faculty of the two colleges will be involved. Ideas which may be integral to the initiative include (1) summer math, science and engineering camps for teachers and students; (2) engineering faculty participating in math and science teaching methods courses; (3) developing teaching certification programs for newly approved certification in physical sciences/mathematics/engineering. Funding will come from successful proposals to internal seed-money and externally for funding from NSF/Government and regional business.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Faculty from both colleges will be in dialog, planning sessions, and working together to address objectives. Will re-direct some priorities in activities and funding proposals development.

**Please provide a proposed timeline to accomplish your objectives.**

- Initial summer camps in 2002 and teacher certification program in physical sciences/engineering by Fall 2002.
- Faculty from two colleges working together on a task force by Spring 2002.

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Teacher Certification In Engineering

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. To provide post faculty certification in engineering
2. To provide another career track for engineering
3. To attract more people into teaching, especially math, science, and technology

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Texas has just approved a new certification area (secondary) in engineering. Initial funding could possibly be available from the State Board for Educator Certification, Texas Education Assoc. and / or Higher Ed Coordinating Board. Later we will approach NSF and Corporations.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

1. Engineering – It would bring immediate help with retention, but longer term, it will help with students understanding of math, science and technology as well as knowledge of learning theory, models of teaching, and knowledge production.
2. It helped Professors in their understanding of how to more appropriately apply pedagogy to the cognate areas. It would help students and professors come to value collaborations.

**Please provide a proposed timeline to accomplish your objectives.**

- Fall 2001—Get players in place
- Spring 2002—Develop program(s)
- Fall 2002—Pilot program will begin

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Increase critical thinking about science and technology
2. Prepare teachers who can integrate technology concepts in their teaching

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. Application to run a teacher summer course
2. Begin development of a course called Science in Society for Teacher Ed students (general ed)

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Increase teacher Ed student knowledge for their classroom
- Engage engineering faculty with teacher ed students
- Ultimately impact K-12 environments

**Please provide a proposed timeline to accomplish your objectives.**

- Summer 02, if funded
- Plan 01-02 to offer in 02-03

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Technological Literacy Through Engineering Design and Problem Solving

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Increase technological literacy of education students
2. Improve teaching of engineering design courses

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

We see reciprocal benefits of engaging the disparate skills of our two schools in helping each other. Education students will develop better curricular materials for their teaching, and engineering students will benefit from pedagogical input of education students and faculty.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Better curriculum materials
- Better teaching

**Please provide a proposed timeline to accomplish your objectives.**

New course next year for each school

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Introduce education and engineering into each others disciplines
2. Introduce an engineering general education requirement into the curriculum

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. At a common ground (i.e., a center) develop engineering course for teachers and introduce engineering faculty to new instructional techniques.
2. Work through campus approval process to add an engineering course to the general education requirements funding to come from the Milwaukee Idea and free up faculty time

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Improve the teaching and learning of our students and faculty
- Produce an electorate that is knowledgeable about engineering and technology issues

**Please provide a proposed timeline to accomplish your objectives.**

- Courses to be offered beginning Spring 2003
- Fall semester 2003 for curricular approvals

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Give prospective teachers (Ed students) experience using /integrating SMET education in K-12
2. Give perspective engineers (engineering students) experience in design and teamwork.
3. Involve students in interdisciplinary learning experience using the engineering design process as a model.

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

A course will be developed for education and engineering students to work together in teams on a design project to develop “design project frameworks” for use in a K-12 classroom (target a grade level) that includes less on plans, modules, kits of materials needed by a teacher to do the project which integrates SMET subjects in their classrooms.  
\*Need to find seed money support.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Engineering students gain a design and team learning experience, and a sense of correction to schools.
- Education students gain confidence and tools for teaching math, science, engineering technological subjects.

**Please provide a proposed timeline to accomplish your objectives.**

- Recruit faculty, develop course (by Fall 2002)
- Initial pilot trial of course (Fall semester 2002)
- Evaluate, revise (Spring 2003)—Test design modules in lab schools
- Broader implementation (Fall 2003)

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Outreach Modules for K-12 Partnering Technology Education and Engineering

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. To provide engineering education perspectives to technology education for K-12
2. To bring the pedagogy of technology education to engineering education for K-12
3. To share and network technology education and engineering faculty

**Briefly describe the initiative you have agreed to begin/continue. Describe funding models, both internal and external, that you may use to support this collaboration.**

The technology education and engineering faculties will explore the development of a K-12 outreach program developed around modules critical to the SOL's.

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Engineering—More conversation with education faculty. Entry to K-12 partners and introduction to labs of technology education.
- Education—More conversation with engineering faculty. Bring a new perspective to K-12 outreach

**Please provide a proposed timeline to accomplish your objectives.**

- Plan—Spring 2002
- Implementation—Fall 2002

*Taking the Lead:*  
**A Deans' Summit on Education for a Technological World  
Individual Campus Action Plan**

**Initiative title:** Pipeline Proposal to Promote SMET Teaching and Learning

**This is an addition to a current collaboration.**

**Please list the objectives of this collaboration.**

1. Increase faculty awareness about intercollege collaboration
2. Coordinate K-12 Outreach efforts
3. Plan general education courses on engineering/technology literacy
4. Explore joint science/engineering/education graduate programs

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

Increasing engineering technological literacy through collaboration in several activities, both internal and external. Seek funding to support joint science/engineering/education graduate programs (NSF Engineering Fellows, NSF Graduate Education).

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Education—Provides opportunity to share educational expertise and to prepare teacher education with enriched SMET background.
- Engineering—Provides opportunity to share engineering technology process with prospective teachers and to prepare engineering education in instructional/assessment outcomes areas.

**Please provide a proposed timeline to accomplish your objectives.**

Year 1

- Joint seminars
- Proposed general ed courses in eng/tech
- Center for coordination
- Proposed joint PhD program

Year 2

- Continue joint seminar
- K-12 partnerships
- Implement general education course
- Work on joint PhD program
- Statewide partnerships with 2- and 4-year institutions

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:** Technology Infusion and Integration Program "TIIP"

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Strategic planning meeting – education and engineering
2. Standards inclusion/infusion and curriculum revision in college of education - SMET
3. Course development – technology (general education/ education required)
4. Other

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

1. The goal of TIIP is to promote active infusion/integration of technological literacy into teacher education programs
2. Initially – reallocation internal funds; subsequently – seek external funds as necessary

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

- Change teacher prep curriculum
- Expose both faculties to broader knowledge base (educational pedagogy and engineering/technology course)
- Increase technological knowledge in several constituencies.

**Please provide a proposed timeline to accomplish your objectives.**

Keyed to Objectives:

1. No later than 1 November 01
2. No later than September 2002
3. Proposal—No later than May 2002
4. As necessary

***Taking the Lead:***  
**A Deans' Summit on Education for a Technological World**  
**Individual Campus Action Plan**

**Initiative title:**

**This is a new initiative.**

**Please list the objectives of this collaboration.**

1. Education college/faculty offer seminar series for engineering faculty on teaching and learning.
2. General education course on technology literacy.
3. Pre-College collaboration of engineering and education colleges with Dayton Public Schools on technology literacy (this will build on engineer col prior success)

**Briefly describe the initiative you have agreed to begin/continue.**

**Describe funding models, both internal and external, that you may use to support this collaboration.**

- 1 & 2 will be handled/supported internally between the two colleges
- 3 – This requires commitment of the university and colleges, and will also require and we will seek support from: a) business/industry; b) the air Force; c) private funders/foundations; d) State and National funders (NSF, USDOE, Carnigie, etc..)

**Briefly describe the impact this collaboration will have on your school of engineering and school of education.**

Engineer College will be able to recruit more technology literate students and retention should increase with better quality students and instruction education college will learn how to infuse technology literacy into the teacher education curriculum and partner schools will see A&S and engineering faculty involved with us in educational reform.

**Please provide a proposed timeline to accomplish your objectives.**

1. Seminars will start in January 2002
2. Goal will be to have in place for Fall 2003
3. This is occurring now but will expand in summer 2002 to include additional partners