

Board of Visitors – Fall 1999 Strategic Planning Document

September 24, 1999

11:00 a.m. – 6:00 p.m.

Associates Room, Oklahoma Memorial Union, Room 310C

UNIVERSITY OF OKLAHOMA

COLLEGE OF ENGINEERING

5 YEAR STRATEGIC INITIATIVES

for the period 1999-2004

AS SUPPORTED BY THE SCHOOL OF COMPUTER SCIENCE

(Revision Date: 9/18/99)

OUR VISION:

To produce engineering graduates sought among the first by industry and investors for excelling in a rapidly changing technology-driven world both as engineers and technology managers in existing companies, and as leaders in starting new, technology-based companies. We will accomplish our vision by transforming our faculty expectations, our approach to student mentoring, and by adjusting our curricula in order to align with the realities of the new economy. We will succeed by creating meaningful partnerships with industry as well as the public sector to become as dynamic as the constituencies we serve.

OUR STRATEGIES AND GOALS:

Strategy 1. Enhance the traditional role of teaching excellence and mentoring by becoming a leader in the demonstration of technological innovation and personal creativity in the knowledge delivery and learning process.

Goals:

1.1 Become a leader in the development, testing and promotion of cutting-edge knowledge delivery products, with emphasis on education oriented to the realities of the new, technology-driven economy.

1.1a (CS) Develop distance education MS degree program(s).

Action 1.1a.1 Conduct market survey to target regional and national industries and organizations with highest demand for distance education MS degree programs in CS.

Action 1.1a.2 Again, based on market surveying, target one or two specializations within the field of CS (e.g., software engineering, telecommunications) in highest demand.

Action 1.1a.3 Visit other institutions that have been successful in using distance education for graduate programs.

Action 1.1a.4 Hire two new faculty members by Fall 2000 with expertise to support the targeted specializations.

Action 1.1a.5 Estimate potential range for number of semester-student-hours that could be generated by targeted program(s).

Action 1.1a.6 Determine technical support and infrastructure needed to implement the program(s).

Action 1.1a.7 Generate business plan to define resources required to implement program(s).

Action 1.1a.8 If viable, implement program(s).

1.1b (CS) Develop, license, and market new "dynamic" knowledge delivery media.

Action 1.1b.1 Develop prototype by Fall 2000 based on CS 1323.

Action 1.1b.2 License the technology.

Action 1.1b.3 Evaluate prototype media in controlled environment.

Action 1.1b.4 If viable, fully integrate into CS 1323 by year two, fully integrated in CS 1333 by year three.

Action 1.1b.5 Longer term research involving use with more theoretical courses, e.g., Automata Theory.

Action 1.1b.6 If viable and marketable, implement full-featured product for production and sale.

Success Criteria (Responsibility):

- Creation of a new, fully-funded School of Multidisciplinary Engineering and an Institute for Multimedia Engineering through a combination of State budget additions, private endowments and self-generated income from technology commercialization. (Dean and Executive Associate Dean)
- Establishment of an Internet-based graduate engineering program that is financially self-sufficient. (Executive Associate Dean and Directors)
- Delivery of an integrated, ABET 2000 compliant, Internet-based engineering core program that incorporates management, leadership and entrepreneurship mentoring that is: first, fully implemented within the College of Engineering and second, adopted nationally and internationally by other engineering and technical institutions of higher education. (Executive Associate Dean; Associate Dean for Academic Affairs; Directors)
- Establishment of a self-sufficient on-line technical training program funded by the external users. (Directors of School of Multimedia Engineering and Institute for Multimedia Engineering)

1.2 Transform and enhance the knowledge-delivery process in the College by integrating state-of-the art learning techniques and technology throughout the curriculum.

1.2a (CS) Track and utilize state-of-the-art technologies for putting all CS course material online.

Action 1.2a.1 During year one convert as many CS course notes as possible to electronic form and publish on web.

Action 1.2a.2 During year one have (at least) a minimal presence of all CS courses materials online (syllabus, assignments, use of message boards).

Action 1.2a.3 By end of year two, have all course materials converted to electronic form and on the web.

Action 1.2a.4 By end of year two, establish at least one course at each level that represents the "flagship" course in utilizing the state-of-the-art in online delivery.

1.2b (CS) Increase quantity and efficiency of summer course offerings.

Action 1.2b.1 Tape at least one course each fall and spring for use later to supplement summer course delivery.

Action 1.2b.2 Increase rate of taping during fall/spring to meet summer student demands.

Success Criteria:

- Integration of the computer into the knowledge-delivery process throughout the curriculum of the College. (Executive Associate Dean and Directors)
- Internet-based course delivery between the campuses of the University of Oklahoma. (Directors, including the School of Multidisciplinary Engineering and the Institute for Multimedia Engineering)
- National prominence of the College and its faculty for leadership and creativity in computer integrated knowledge delivery and Internet-based course development and delivery. (All Deans, Directors and Faculty)

Strategy 2. Expand traditional faculty research through leadership in the creation of new technology and processes, industry partnerships in product development, and economic development through the spin-off of new technology-based ventures, with emphasis on those located in O.U.'s research park and other Oklahoma sites.

Goals:

2.1 Raise the quality of research and graduate education to place OU among or equal to the top 25 public engineering colleges in the U.S. News & World Report "Top 25 Graduate Engineering Colleges".

Action 2.1.1 Determine CS index values for top 25 recognition for: doctoral candidates per faculty; research dollars per faculty; and G.R.E scores for graduate students.

Action 2.1.2 Improve response time for making financial offers to graduate student applicants.

Action 2.1.3 Make financial offers to graduate student applicants that are competitive with top 25 schools.

Action 2.1.4 Fill current fellowship openings by using more aggressive methods (e.g., publicize more, travel to other schools and recruit).

Action 2.1.5 Develop a 5-year combined BS/MS program to attract and retain the very brightest students.

Action 2.1.6 Increase research funding by forming logical teams to generate substantial proposals in the strongest areas of faculty expertise.

Action 2.1.7 Team with other OU units both within and outside of COE to establish centers and institutes of excellence. One example is the teaming with Geosciences, ECE, Williams Communications, and others to develop a terabit testbed for networking and distributed high-performance computing research and applications; another example is the Human Technology Interaction Center with Psychology and others. Examples of teaming within COE include collaborative research in optimization with IE and others and hardware/software co-design research with ECE.

Action 2.1.8 By hiring two additional professors by Fall 2000, the teaching load of some faculty researchers will be less, which will enable research productivity to increase.

Success Criteria:

- o Top 25 recognition or equivalent in three key indices of the U.S. News methodology:
 - a. Full time doctoral candidates per faculty;
 - b. Total research dollars per faculty; and
 - c. Average quantitative and analytical G.R.E. scores for graduate students.

(Dean; Executive Associate Dean; Associate Dean for Research; Directors and Faculty)

2.2 Stimulate economic growth and provide entrepreneurial experiences for students by increasing College productivity in technology transfer.

Action 2.2.1 Establish a tracking mechanism to determine the number of startup companies generated by our graduates.

Action 2.2.2 Target software engineering and information technology as areas with most potential to generate technology licenses and royalty income for faculty.

Action 2.2.3 Form a corporation specializing in the marketing, production, and support of prototype software developed by students and faculty.

Action 2.2.4 Provide clear incentives for faculty to participate in technology transfer activities.

Action 2.2.5 Invite industrial experts to educate faculty and students in the areas of leadership and entrepreneurship.

Success Criteria:

- Achievement of "Top 25 U.S. News & World Report" productivity in the following indices:
 - a. Technology licenses per faculty-,
 - b. Royalty income per faculty; and
 - c. Number of startup companies per graduate.

(Dean; Associate Dean for Research; Directors and Faculty)

- Development of a research park that succeeds in the commercial development of technology resulting from the collaborative efforts of OU researchers and technology companies.

(Vice President for Technology Development & Dean; Faculty)

2.3 Become a technology transfer leader by achieving the national average of industrial sponsored research of the top 25 public colleges of engineering.

Action 2.3.1 Increase interaction with industry.

Action 2.3.2 Increase industrial sponsorship of research by learning the needs of industry.

Action 2.3.3 Encourage industrial sponsorship of equipment and software.

Action 2.3.4 Invite industrial experts to educate faculty and students on issues such as licensing of intellectual property.

Success Criteria:

- Achievement of "Top 25 U.S. News & World Report" productivity in the following indices:
 - a. Industrial research expenditures per faculty; and
 - b. Percentage of total research with corporate sponsorship.

(Associate Dean for Research; Directors and Faculty)

Strategy 3. Attract the very best students by our leadership in producing graduates widely known for not only being in great demand for existing jobs, but for their understanding of, and unique preparation for, creating jobs.

Goals:

3.1 All schools within the college exceed all ABET 2000 requirements and receive six year accreditation.

Action 3.1.1 Continue to track the requirements of CSAB (Computer Science Accreditation Board) to ensure that approved six year accreditation visits continue.

Success Criteria:

- o Each school receives six year accreditation during the 5 year strategic planning period.

(Associate Dean for Academic Affairs; Directors)

3.2 The merit credentials of CoE students will place them in the top 10 of all public and private engineering colleges in the U.S.

Action 3.2.1 Request statistics from Institutional Research regarding ACT scores, SAT scores, and national merit scholars for entering CS students.

Action 3.2.2 Strengthen our high school recruitment activities and coordination with the Associate Dean for Academic Affairs.

Action 3.2.3 Increase the number of undergraduate scholarships available through industrial sponsorship.

Action 3.2.4 Develop a 5-year combined BS/MS program to attract and retain the very brightest students.

Action 3.2.5 Create a program to accept credit for advanced standing students.

Success Criteria:

- Average ACT of entering CoE freshmen = 28

(Associate Dean for Academic Affairs)

- Exceed 100 new freshmen National Scholars each year specifying engineering as their major. (Includes National Merit Scholars, National Achievement Scholars, and National Hispanic Scholars)

(Associate Dean for Academic Affairs; Director of Minority Engineering Program; Director for Development)

- Number of new Distinguished Freshman Scholars each year = 200

(Associate Dean for Academic Affairs; Director for Development)

3.3 Provide an undergraduate educational experience that will place the College on the active recruiting lists of increasing numbers of Fortune 500, NASDAQ, and other "high-tech" companies.

Action 3.3.1 Determine statistics describing whom employs our CS graduates.

Action 3.3.2 Facilitate educational modules in "hot technology" areas. Modules would often be taken by students on voluntary basis and may provide students with a "certification" of achievement. Modules would typically be created and implemented with strong industrial support; content would be co-developed and/or approved by faculty of the School of Computer Science.

Success Criteria:

- A total of 150 companies, included in the three categories identified above, actively recruit our graduates each year.

(Associate Dean for Academic Affairs; Directors)

3.4 Integration of the required use of a computer for achieving success in every CoE course.

Action 3.4.1 Refer to Goals 1.1a, 1.1b, 1.2a, 1.2b and the associated action items to achieve these goals.

Action 3.4.2 Investigate the development of new computing and/or information technology course(s) that

could serve as core requirements across all engineering schools in the COE.

Action 3.4.3 Provide computing resources and physical space required for state-of-the-art laboratories for computer science education. Required resources include data base systems, graphics systems, software engineering tools and services, client-server resources, assorted server types of differing architectures (e.g., super-scalar processors versus SMPs) and operating systems (e.g., Unix versus NT), clusters of machines for distributed computing, etc.

Action 3.4.4 Investigate the creation of permanent endowments to support the ongoing need to periodically update the laboratories used for computer science education.

Success Criteria:

- All CoE classrooms equipped for advanced information technology delivery of course content.

(Executive Associate Dean; Director for Development)

- Integration of advanced information technology delivery methodology with course material in all CoE classes.

(Associate Dean for Academic Affairs; Directors and Faculty)

3.5 Increase undergraduate retention and graduation rates to place us in the top quartile of Big 12 and public engineering colleges in the U.S.

Action 3.5.1 Determine past retention and graduate rates for our program.

Action 3.5.2 Determine the retention and graduation rates of CS programs in the top quartile of Big 12 and public universities.

Action 3.5.3 Communicate more effectively with potential CS students, high school councilors, parents, and others the expectations and requirements placed on students that enter our program. This would be done in an effort to prevent students from entering the CS program that have a misunderstanding about what is required in terms of curriculum content, rigor of program, etc.

Action 3.5.4 Identify new techniques for improving retention rates.

Success Criteria:

- Undergraduate retention and graduation rates required to achieve goal. (Associate Dean for Academic Affairs; Directors)

Strategy 4. Become the positive, collaborative partner with the appropriate OU, private sector, and State and Federal Government entities to acquire the necessary technical and scientific resources for the University of Oklahoma to fulfill the Sarkey's Energy Center's vision of being the premier research facility serving every segment of the worldwide energy industry.

Goals:

4.1 Identify and implement major research thrusts which require the collaborative efforts of at least the College of Engineering, the College of Geosciences and the Sarkey's Energy Center for success.

Action 4.1.1 Build upon our successes in collaborating with these units in areas such as CAPS, meteorological visualization, geographical data bases, and others.

Action 4.1.2 Team with Geosciences, ECE, Williams Communications, and others to create terabit testbed for networking and distributed high-performance computing research and applications.

Success Criteria:

- At least three (3) major research thrusts initiated in AY1999-2000.
- In subsequent years, accelerated CoE activities with Sarkey's Energy Center and multidisciplinary research efforts with other campus units and their industrial advisory groups. (Dean; Executive Associate Dean; Associate Dean for Research; Appropriate Directors and Faculty)

4.2 Formalize the interrelationship between Engineering, Geosciences and the Sarkey's Energy Center as a model for collaborative, interdisciplinary research that is recognized, rewarded and promoted in all units of the University.

Success Criteria:

- Formalized structural relationship established within the University which provides for and promotes evaluation, recognition and reward of significant collaborative effort by individuals and units for all interdisciplinary research at the University. (Dean; Executive Associate Dean)