Educational Technologies Task Force
March, 1997

Original Charge: Determine the impact/implications of becoming a leader in the development and use of a wide range of educational technologies and the tools of cognitive science.

Revised Charge: Determine the impact/implications of becoming a leader in the exploration, development and use of current and emerging educational technologies so as to increase access, improve quality and control costs.

Abstract
Higher education is undergoing a major transformation in which educational technology is playing an increasingly important role. As our understanding of the importance of learning styles increases, so does our need for technologies that facilitate these pedagogical trends. The committee believes that technology can have a positive impact on the educational experience of WPI students, but not without a cohesive plan.

The first set of recommendations is to develop a strategic plan that specifically addresses academic uses of technology and establish a support team to continuously coordinate and guide it. An in-depth inventory of all academic and academic support departments with respect to the technology currently in use and the support staff employed must be conducted. Further deployment of technology and additional support can be determined based on this current state of affairs. WPI must also provide services that have not existed in the past - training for faculty to enhance their teaching skills and evaluation tools to
determine and measure success. To accomplish this, it is recommended that WPI hire a trained instructional design expert and an assessment professional. Last, but not least, it is essential that WPI provide a better teaching/learning environment for faculty. Faculty need time and support to integrate technology into the curriculum. Release time, summer support and a reward system that places value in these types of activities need to be established.

In conclusion, this committee strongly recommends the establishment of a Center for Teaching, Learning and Technology whose primary function would be to encourage, advise and support the use of technology so as to cost effectively improve, extend or enhance educational goals.

**Introduction**

During the past couple of decades, dramatic shifts in who is learning -- as well as when and where they are learning -- have resulted in a mismatch between our current models of education and student needs. Changing demographics and competitive pressures require a new pedagogical approach to serve the educational needs of our constituents. As our understanding of how students learn increases, so does our need to restructure the learning environment and the roles that each of us plays. What we know about high quality learning -- the use such techniques as mastery learning, collaborative learning and discovery learning -- implies a learning-by-doing model rather than a passive, classroom-based model that typifies a large part of today's teaching. In part, WPI recognized the need for change in the delivery of engineering education when it redesigned its degree requirement 25 years ago with the Plan. But would the Plan be different or better if today's technology was available then? Would WPI have been able to better address the issue of learning styles more efficiently and cost-effectively (e.g., eventual demise of the Individually Prescribed Instruction (IPI) because of the faculty time commitment)? We believe so. We believe the technologies that are available today provides us with an opportunity to deliver an educational experience that maximizes learning while controlling costs.

**Problems with Current Applications of Educational Technologies**

Educational technologies and access to reliable networked resources have the potential to overcome many of the limitations in the IPI model of learning that
WPI encountered many years ago. Educational technologies also allow us to conceive of other projects that positively influence student learning. Current WPI applications of technology-assisted learning environments illustrate possible solutions to the challenges we face, but they do so in a piecemeal fashion. Some increase access (e.g. distance learning program and availability of classroom resources on the WWW) and some improve quality (e.g. use of simulation software), but most do not control costs and few, if any, achieve all three goals. Instead, most of these applications are added on to the traditional classroom structure, thereby increasing the cost of instruction.

**WPI Barriers to Improving Teaching and Learning with Educational Technology**

**Lack of Vision/Strategic Plan**

An infrastructure to support the exploration, development and use of educational and information technologies, in essence, represents a new paradigm for teaching and learning. Of critical importance to this transformation is a communicated vision and university-wide commitment to enable and support lasting change. In the words of Steve Gilbert, Director of the American Association of Higher Education, "A vision alone can't really mobilize a group or direct an individual's efforts. What's needed along with the Vision, is a Path and Support. The Vision is where you are going. The Path is how you get there. The Support is the encouragement and tools you need to keep going -- to start again when you stumble." As we seek to improve teaching and learning through more thoughtful and cost-effective uses of educational technology, we need to provide all participants with a Vision, Path and Support.

Currently, WPI has multiple groups attempting to perform tasks associated with planning the institution's future involvement in the use of educational technology. Each of these groups focuses on a piece of the overall picture, but there is no single body bringing them together to pool resources and benefit from an overall understanding of trends. For example, rarely do the CCC, the IMC and the Library get together to collaborate on how to best help faculty and students meet educational goals through the effective use of technology resources; and even if they did, a university-wide plan to guide their efforts does not exist.
Recommendations

- With input from all key sectors of the college, develop a strategic plan that specifically addresses academic uses of technology. The development of a campus-wide strategic plan is fundamental to successfully and efficiently address improved teaching and learning through the use of educational technologies at WPI. The commitment of the institution to the supporting infrastructure and the commitment of the faculty to employ existing and new technologies to improve teaching and learning cannot be fully garnered without a campus-wide strategic planning effort.

- Establish a permanent support team (a.k.a. committee) comprised of representatives from the Cabinet, CCC, IMC, Library, Faculty and the Student body whose focus will be to coordinate and continuously guide a campus-wide strategic plan to selectively integrate technology into the curriculum while controlling costs. The primary mission of the plan should be the development and continued maintenance of the infrastructure needed to help faculty learn how to understand, select, adopt, adapt and use new teaching approaches, new applications of technology and new materials.

Limited/Uneven Access to Support Services

While WPI has made some capital investments in the infrastructure (e.g. wiring of the residence halls and the establishment of some electronic classrooms) that have allowed more widespread access to educational and information technology resources, relatively flat investments -- even cuts -- in the technology-related support staff (CCC, IMC, Library) have been made over the same period. In response to the declining availability and quality of university-wide support services, some of the larger academic departments have juggled their budgets to hire their own technical support staff and buy their own educational technology, thus perpetuating a climate of "haves" and "have nots." While we are not advocating complete centralization of technology support personnel or resources, we are advocating planned decentralization where it makes sense (e.g. specialized, department-specific hardware/software). A defined minimum level of support should be available to every academic and academic support department. Resources that are generic to all faculty and academic support staff should be centralized until it makes sense for a
particular service to be located closer to its end users. The following technology-related support services, at a minimum, should be universally available to the groups referenced above, but not to the exclusion of the administrative support areas:

- purchasing of hardware/software/peripherals,
- installation and maintenance of hardware/software/peripherals,
- training for the use of hardware/software/multimedia
- support for network access and connectivity

**Recommendation**

- Conduct an inventory of all academic and academic support departments to determine what technology and technology-related support staff currently exist at WPI. Defining the current state of affairs with regard to teaching technologies (i.e. what technology is currently in place, what are our current best practices, where are there redundancies and inefficiencies, where are there gaps, etc.) will provide a starting point from which to plan the deployment, implementation and support of new/additional technologies, as well as the possible redistribution of existing technologies and support.

**Non-existing Support Services**

In addition to the actual decrease in technology-related support personnel, staff in closely related support positions such as those in the faculty training & development area have either never existed or have been cut almost entirely. For example, currently 25% of a single faculty member’s time is dedicated toward faculty development issues. Our faculty members have never had access to an instructional design expert -- someone trained on the systematic design of instruction to address learning objectives and learning styles. Every faculty member should have access to someone who is aware of the possible and probable uses of technology so that techniques and methods that further educational goals can be exploited. But more importantly, regardless of whether or not technology is involved, because the quality of instructional design is a crucial part of effective learning, faculty need access to someone who can help formulate these educational goals and "package" their material to address various learning styles. Technology can be a powerful tool in this
process, but only if it is used properly. Options that merely replicate the problems and failures of conventional classrooms will not benefit the students or the university, regardless of the amount of planning or use of any particular technology.

Recommendation

- The definitions and terminology related to learning style are as varied as the individuals dealing with the concept, but arguably, it's a concept we cannot continue to ignore. Regardless of the pedagogy adopted to address different learning styles, WPI needs to either develop this resource in-house or bring someone in whose primary function would be to help faculty members become better teachers by focusing on good instructional design principles and various learning styles. Full-time appointment of a trained instructional design expert is recommended.

Faculty Time, Rewards and Support

Just as we promote better learning environments for students, we need to recognize that a better learning environment for faculty is essential as well. When we ask a faculty member to adopt new teaching combinations involving technology, we are asking a lot. It is unrealistic to expect anyone, even faculty, to replace -- quickly, easily, and without help -- habitual behaviors (remember, most faculty teach as they were taught and very few have had any formal training in how to be good teachers). Significant changes in the way a course is delivered and received requires at least as much effort as creating a new course from scratch, and should be recognized as such.

Recommendations

- Provide faculty with release time or summer support to redesign course materials. The Task Force does not recommend that course development replace time allocated to scholarship unless the faculty member is able to report the experience in peer-reviewed outlets valued within his/her field.
- Analyze the faculty time commitment to support newly designed teaching/learning environments and compensate accordingly. Typically a transformation of the magnitude we are suggesting
changes the faculty member's role and how he/she spends his/her time. For example, various Asynchronous Learning Networks (ALN) can expand an institution's reach and may allow a faculty member to teach more students or deal with students with greater flexibility (e.g., a student with a conflict may still be able to take a desired class through ALN). However, this can lead to the fragmentation of a faculty member's time because the economies of the classroom can be lost if a teacher deals with many individual students or in small groups.

Another faculty obstacle to the integration of educational technology is the formal reward system in place at WPI. Perception is the reality we are judged by; currently, the perception is that tenure and promotion policies pay little attention to the improvement of teaching and learning. The "publish or perish" reasoning guides how faculty spend their time -- to do otherwise would be professional suicide.

**Recommendation**

- Establish formal procedures (e.g., peer-review process) to communicate and validate faculty work in the use and development of new educational applications of technology.

**Evaluation and Assessment**

Complicating the difficulty that faculty face when trying to adopt new teaching techniques, is the lack of accessible, comprehensive information about the successes and failures of colleagues who have tried to use technology in their teaching. This problem exists for two reasons: first, there is no identifiable venue for faculty to showcase their use of educational technology; and second, the models that are available typically do not include reliable, evaluative information about overall effectiveness, student learning outcomes, student retention or student/faculty satisfaction. In order to evaluate whether or not WPI and its faculty are successful in exploring, developing and using current and emerging technologies, goals and criteria have to be identified along with a rigorous review and follow-up process. For individual efforts, preliminary criteria of increasing access and improving quality while controlling costs of said exploration, development and use have been identified by this task force. Criteria to determine the overall effectiveness of the structure alluded to in this document will be part of the strategic planning process.
Recommendation

- A full-time appointment of a practicing educational assessment professional to assist in the evaluation of teaching combinations that employ technology is strongly recommended. This person would also be available to work on other academic assessment projects such as those required by grants and more traditional forms of teaching and learning (e.g., standard course evaluation forms).

Conclusion
Based on the extensive work completed by this committee and the many others that preceded it (see Appendix A), the Educational Technologies sub-committee of the Strategic Planning Steering Committee strongly recommends the establishment of a Center for Teaching, Learning and Technology whose primary function would be:

... to encourage, advise and support the use of technology so as to cost-effectively improve, extend or enhance educational goals.

The Center's responsibilities would include the support of educational technology in the classroom (e.g., computer classrooms, electronic classrooms); out of the classroom, but on campus (e.g., faculty and academic support offices, open laboratories, residence halls); and off campus (e.g., distance learning sites, project centers, satellite campuses and fraternities/sororities/commuting students). Support would also be extended to similar scholarship and administrative needs, but those needs would not drive the day-to-day decisions of the Center. The Center's priorities would be as follows:

- Mainstream Faculty Support (50%)
- Innovators/Early Adopters Support (30%)
- Outreach Activities (20%)

Funding
Without a complete inventory of what currently exists in terms of resources and personnel to support the Center, it is impossible to determine the amount of additional funding needed to provide adequate support to academic endeavors involving educational technologies. At a minimum, we recommended that the following line items and functions be included in the Center's budget - some of
which may be offset by existing resources in various capital and operating budgets and through additional revenues that could be realized through the Center's activities (e.g., distance learning registrations, grants, consulting services, etc....)

- **Equipment**: annual budget for hardware/software/peripherals purchase and upgrades; annual budget for network extensions and enhancements; annual budget for classroom technology upgrades and maintenance; annual budget for audio/video/multimedia technology.

- **Salaries**: administrative personnel; secretarial staff; purchasing staff; technical support staff; maintenance staff; training staff; instructional design expertise; assessment/evaluation support.

- **Misc. Supplies and Expenses**: funds for professional development of Center staff as well as funding to sponsor special professional development events/activities for faculty.