

First Year Task Force Report

Background

In September 2002, after consultation with the Committee on Governance, Provost Carney appointed the First Year Task Force to examine evidence pointing to a major gap between:

- WPI's aspiration to provide all students with an "honors college experience," and
- survey and other data suggesting WPI first-year students (when compared to peers at other technological universities) were less likely to engage in activities shown by research to promote effective learning.

The Task Force was asked, by the end of the 2002-03 academic year, to make recommendations to address shortcomings in the first-year experience. The Task Force met ten times and, in term C '03, held an open meeting with the community. Members of the Task Force are Bill Farr, Ann Garvin, Hossein Hakim, Peter Hansen, Art Heinricher, Tom Keil, Nick Kildahl, Paul Mathisen, Natalie Mello, Judy Miller, Janet Richardson, Sheila Gines ('04), Steve Weininger, and Lance Schachterle (chair.)

Provost Carney's charge to the Task Force is in Appendix 1. (All appendices and supporting documentation for the Task Force are available under "First Year Task Force" in myWPI.)

Overview

Based on the evidence presented in Appendix 2, the First Year Task Force concludes that many WPI students are telling us that, compared with their peers, they do not find their first year exciting and challenging. For many first-year students (and we fear among them are the strongest), the typical WPI term, with a science course, a math course, and a "something else," is too much like high school:

- Too much time in class is spent listening, not responding.
- The sequencing of course subjects is often disjointed.
- Courses themselves are often unrelated to one another.
- Most important, for first year students, the "project-based education" which WPI states is its distinctive edge is not yet happening.

We believe the relative passivity of the first year prepares students poorly for the more vigorous and focused challenges they soon encounter in the major discipline. And while almost every department now has at least one 1000-level course designed to introduce their discipline, few first-year students are exposed to more than one potential major—a problem of increasing concern with more students entering as "undecided engineering."

Finally, WPI needs to make much more effective the “hand-off”—both academic and social—of first-year students into their majors of choice.

Departments do a good job of responding to the learning needs of their majors, but by concentrating on “their” majors, neither they nor any one else attends to the coherence and effectiveness of the first-year curriculum. The Task Force argues that WPI cannot address these deficiencies until we develop effective ways to monitor problems with and implement solutions for the first-year learning experience.

Further, we believe the current culture at WPI must change so that facilitating learning in the first year is valued more than at present. For example, our best faculty in every discipline, including engineering, should be in first-year classrooms regularly. WPI must support the development of all faculty and staff committed to helping students learn in the first year, and must reward their achievements. Only through sustained attention to issues of improving first-year teaching and learning can the problems we have identified be overcome.

Proposed Solutions

Program Integration and Effectiveness

Problem Statement

Integration involves both "horizontal" integration of academic subjects taught in the first year (as in the Project-based Learning Community or PLC), and the vertical integration of getting first-year students involved in activities with upper-level students (such as MQP or IQP teams, or research). In the WPI first year, the integration of knowledge is the exception not the rule, even in the PLC, in which the humanities component appears to bear the brunt of effecting integration.

Possible Solutions

- Adopt some form of common learning experience for all first-year students such as offering enough Project-based Learning Community sections in enough different disciplinary combinations (and perhaps in all 4 terms) so that most/all students could participate.

The PLC seems to address for many (not all) students the weaknesses that surveys disclosed in the current curriculum. For those faculty who want to participate, the PLC can provide a different and more fulfilling way of teaching and learning. Providing a combination of topics and of levels to accommodate those students and faculty who want the PLC mode should be pursued. Specific numeric targets should be developed, such as increasing the number of PLC sections annually,

identifying new combinations and levels of courses to bridge, and involving more faculty (perhaps initially as affiliates in established PLC sections).

At the broadest level, the PLC should be considered as a laboratory for innovation in the first-year program, rather than a format that has now become fixed in stone. To avoid having the PLC integration always fall on the humanities faculty, the "humanities" component could be team taught with non-humanities faculty.

- A related issue is the relative absence of engineering faculty teaching first-year students. Except for courses in certain engineering departments intended to introduce the major, few opportunities exist for engineering faculty to teach first-year students. Perhaps the PLC could be adapted so that it offered some combination of courses that included engineering professors. Possibilities include teaching an "introduction to engineering" course in the PLC along with faculty colleagues in math and science. (Perhaps such courses as ES1020, ME1800, ES2011 or CE1030 could be modified for this purpose.) As an alternative sequence, perhaps computer science faculty could offer the first two CS courses in a fall term PLC sequence with humanities and math/science partners in the PLC.

Such thematic, team-taught courses integrating humanities and engineering could be given catchy titles that would attract students for positive reasons, and not just to fulfill requirements. But it would be crucial that any engineering courses in the PLC would have to fulfill a department requirement; otherwise the experiment is doomed to fail.

- Adopt "Learning Outcomes" for the first year.

The Task Force considered the first year learning outcomes listed in Appendix 3 and recommends continued discussion of them, including developing appropriate metrics of achievement. Whatever outcomes ultimately may be adopted should reflect distinctive characteristics of the four-year WPI program, such as the need to master time management early (seven week courses), to plan one's curriculum (no "one-size-fits-all" course sequence for majors), and to succeed in the upper-level years (each with its own expectations for a project that constitutes a degree requirement).

Transitions

Problem Statement

Students make a big transition from high school to college, and at WPI, a second one of almost equal importance from (sometimes in) the first year into the major discipline which is the focus of the last three years. The relative absence in the first year of project-based or collaborative work and the low levels of academic challenge (as documented by surveys presented in Appendix 2) should be addressed. Another way of stating the

problem is that since our first-year students do not have many project-based experiences (our hallmark), the transition from "traditional" instruction to project-based education is deferred until later (the sophomore/junior year). This delayed transition is then all the more painful, as shown by our experience with ID 2050, preparation for off-campus projects.

Possible Solutions

- Make the Insight program available for credit (1/12th unit?) to further address these problems of transition. (The Task Force did note concerns with this suggestion, since having the current Insight advisors assign work and grades would significantly alter the current kinds of interactions that take place.)
- Provide resources so that students encounter writing and team/project experiences in more/most/all first-year courses. Structure competitive opportunities for faculty to propose changes in their first-year courses and provide grants (\$1000 for a week in the summer?) to restructure, say, 10 courses a year. Math might be a special target of opportunity in that projects used to be more widely used there.
- Concentrate efforts to increase the level of academic challenge for our best students, who we surmise are most likely to be bored in the current first-year curriculum. Several interventions were suggested such as 1/6 or 1/3 unit first-year courses introducing students to potential majors through exemplary figures (Dave Ollis from the SUCCEED NSF coalition proposed the theme of "heroes of engineering.") Another possibility was PQPs affiliating advanced first-year students as appropriate with IQPs or MQPs in progress. (A brief discussion with many of the engineering departments indicated some interest in implementing this concept, especially since most engineering programs have first-year courses aimed at introducing students to specific disciplines.)

Social and Intellectual Environment

Problem Statement

Lack of "engagement" is not something that can be addressed solely through academic solutions, though many suggestions that rise to the top are concerned solely with "curriculum." If we value community, we should pay more attention to recommendations such as bringing outside speakers to WPI, restructuring housing arrangements, and the like. The success of the PLC probably results as much from the faculty's enthusiasm for interacting academically and socially with students as from the curriculum itself; we need to understand how this kind of "learning community" can best be duplicated in other modes. We also might reflect on the disjuncture between the way academic departments serve as learning communities for upper-level students and the relative absence of similar support structures for first-year students.

In his book, *Involving Colleges*, George Kuh considers the impact of the entire college experience. “It seems reasonable to assume that when out-of-class environments complement the institution’s educational purposes, they contribute significantly to student learning and personal development.” Further, we know through the literature that those students who are engaged out of the classroom and find connections to their campus have a higher rate of graduation and report a more positive college experience.

Possible Solutions

- Bring more outside figures to WPI, not only to give public lectures but also to come into classrooms and residences. Incorporate material from outside sources, whether from speakers, the web or whatever, to make the first year more stimulating.
- Develop residential theme housing to cluster students with similar professional or personal interests together into residential learning communities. Potential themes include explorations of a particular discipline, sport, music, drama, community service, language, culture, or other life interest.
- Sponsor co-curricular activities during New Student Orientation and throughout the first year that bring students, faculty, and staff members together to create an engaging community of scholars. Examples include Outward Bound activities and colloquia with featured speakers.

Overseeing Teaching and Learning Outcomes and Strategies

Problem Statement

As observed in the Overview, no one at WPI is held responsible for the first year. Many people play larger or smaller roles in facilitating learning, but (unlike the disciplinary departments) no organization or office at WPI looks after the integrity, effectiveness, or assessment of learning in the first year.

The work of the Task Force also made apparent the need to continue discussions of the underlying problems we glimpsed in first-year learning. One member of the Task Force, for example, argued that by D ‘03 we had just begun to scratch the surface of the problems and that continued study was needed. (See Appendix 4).

Possible Solutions

- Provide on-going leadership for WPI first-year programs to 1) ensure collaborations leading to curricular improvements including better coordination and 2) effect cultural changes within WPI to make recognition of contributions to student learning commensurate with its importance.

In its last meeting, the Task Force discussed at some length how to achieve this sustained leadership. One approach, a minority view of the Task Force, was to create a Division of First-Year Studies (based on the current IGSD) to move first-year activities into the hands of adjunct faculty recruited and rewarded largely for such contributions. (See Appendix 5 for Prof. John Zeugner's case for this approach.).

The alternative preferred by the majority was some kind of on-going extension of the Task Force itself, with a mandate to bring governance and curricular issues to the appropriate faculty committees as well as to participate in Provost Office decisions about resources, including faculty development. One possible way of achieving these ends is to create a "First-Year Council," with faculty, administration, staff, and student members. Such a Council could pick up where the Task Force and the "Mathematics Advisory Group" left off in terms of facilitating discussions about curricular cohesion, but could also monitor outcomes, formulate proposals and plans, and take action steps appropriate for the Provost's Office to improve learning in the first year.

We conclude as we argued earlier in this report: The current culture at WPI must change so that facilitating learning in the first year is valued more than at present. For example, our best faculty in every discipline, including engineering, should be in first-year classrooms. WPI must support the development of all faculty and staff engaged in facilitating learning in the first year, and must reward their achievements. Only through sustained attention to issues of improving first-year teaching and learning can the problems we have identified be addressed.