Program Review and Assessment Committee

Thursday, December 13, 2001
9:00-11:30 a.m. UC 115
Ingrid Ritchie, Chair
Sara Heiliger, Recorder

AGENDA –

MINUTES –

Present: W. Agbor-Baiyee, D. Appleby, S. Baker, T. Banta, J. Bjork, K. Black, D. Boland, C. Dobbs, K. Duckworth, C. Guba, S. Hamilton, S. Heiliger, B. Jackson, K. Johnson, S. Kahn, J. Kuczkowski, J. Mac Kinnon, J. McDonald, H. Mzumara, A. Olson, R. Osgood, M. Phillabaum, M. Plummer, I. Queiro-Tajalli, I. Ritchie, D. Schuetz, E. Sener, R. Vertner, R. White, G. Williams, C. Yokomoto

Guests: Hasan Akay, Mechanical Engineering
Cliff Goodwin, Organizational Leadership and Supervision

Agenda Item 1. Approval of October minutes (I. Ritchie)

o Minutes approved

Agenda Item 2. Assessing the PULs in the Student Electronic Portfolio (S. Hamilton, D. Appleby)

Hamilton Presentation

S. Hamilton, chair of the campus-wide committee that is developing the IUPUI Student ePortfolio, and D. Appleby, chair of the subcommittee charged with defining the contents of the ePortfolio, presented an update on the status of the ePortfolio initiative. Hamilton explained that the campus-wide committee has divided into three subcommittees, one working on assessment issues (chaired by Hamilton), one on content issues (chaired by Appleby), and one on security

issues (chaired by N. Byrer). Her report today focused on the work of the Assessment Subcommittee, while Appleby's report focused on the Contents Subcommittee. (The attached PowerPoint presentation, updated to reflect suggestions in the PRAC discussion, provides additional details.)

The Assessment Subcommittee has been discussing approaches to identifying levels of achievement in the PULs, in order to help departments, schools, and the campus use the student portfolios to assess and demonstrate learning of the PULs in more meaningful and systematic ways. The subcommittee's current scheme defines "competence" in the PULs as what all IUPUI graduates should know and be able to do, regardless of major, and "proficiency" as more advanced achievement in the PULs related to a student's specific major field. For example, some majors and professions may require more highly developed skills in quantitative and information literacy, while other majors and professions may call for especially strong skills in other domains. "Competence" under this scheme will be defined according to rubrics created by the campus community as a whole; rubrics for evaluating "proficiency" will be determined by the major program, school, and/or profession. Beyond "competence" and "proficiency," some students may achieve "exemplary" development in one or more PULs, in cases where skills go far beyond expectations or where students have made very strong contributions to the university or the community related to one or more specific PULs.

The student ePortfolios will include examples of student work that demonstrate achievement in the various PULs, as well as student reflection on whether, how, and in what ways a given example illustrates achievement in a particular PUL. Students should be engaged, through the portfolios, with self-assessment of their learning of the PULs from the outset of their education at IUPUI, ideally starting in their first-year learning community courses and progressing through their major fields and senior capstone experiences. Faculty evaluation of the student work examples will be included in the portfolios, along with the examples themselves. In addition, the technical platform for the portfolios, which is being developed by A. Jafari and his group, will be integrated with student records, including transcripts, from the Office of the Registrar. Students will have the ability to determine who has access to the various types of information included in their portfolios.

Hamilton noted that several committees have already done some preliminary work on rubrics for PUL 1. The Assessment Subcommittee hopes that rubrics for "competence" in all six PULs can be completed during the spring semester and that departments will develop rubrics for "proficiency" during the fall semester. Hamilton concluded with a discussion of issues that will need to be addressed to make all this possible. For example, how should faculty governance be involved? What are the best approaches to involving University

College and Learning Community faculty? What will be required in terms of faculty development, technology development, and PRAC leadership?

Committee members had a number of questions and comments. C. Yokomoto suggested that we begin with a pilot involving several departments, rather than aiming for full-scale implementation in the next year. Hamilton noted that the portfolios are already being piloted by Organizational Leadership and Supervision and Anthropology. I. Ritchie was concerned about the importance of the Learning Communities to the plan, since not all students take learning community courses; B. Jackson responded that currently about 85 percent of entering students participate in Learning Communities and University College faculty aim to increase this percentage to as close to 100 percent of new students as possible. She added that the Assessment Subcommittee's ideas fit the template for learning community courses.

A. Olson commented that the term "proficiency" may imply mastery of a narrow set of technical skills and suggested that another term might be more useful. W. Agbor-Baiyee asked whether students would have separate transcripts for "competence"/"proficiency" and grades. Hamilton explained that grades will be linked to assessment of "competence" and "proficiency" in several ways. In Gateway courses, students will be given several common assignments designated as demonstrations of achievement in specific PULs to be included in the ePortfolio, along with the grade and faculty comments on the assignment. The portfolios will be integrated with official transcripts in such a way that viewers (i.e., those viewers given access to this information by the student) will be able to see students' work examples, along with grades, and rubrics and faculty comments that explain the grade. The combination of the ePortfolios with the official transcripts will provide a rich source of information to advisors, potential employers, graduate programs, and other viewers.

J. Kuczkowski noted that some schools and departments have already defined levels of achievement in the PULs that may not fit the proposed scheme and that the issue of transfer students will need to be addressed. He also commented that the early version of the portfolio was technologically unwieldy for the "Windows on Science" course, one of the Gateway courses; for full implementation to be feasible, the portfolio needs to be more user-friendly and will require training for both students and faculty.

Appleby Presentation

Referring to the previous discussion, Appleby suggested that instead of differentiating "competence" and "proficiency," we might use the concepts of "introductory," "intermediate," and "advanced" levels of competence to define and assess student achievement of the PULs.

Appleby distributed a handout that uses the attached matrix to define portfolio contents by PUL and student year (i.e., freshman, sophomore, junior, senior). The matrix also takes into account the types and purposes of assessment of portfolio contents at earlier and later stages of baccalaureate education, as well as the differences in how the portfolios will be used by internal and external audiences/viewers. Generally, internal viewers, such as faculty and advisors, will use the portfolios for formative assessment aimed at helping students improve and further develop the broad skills and abilities defined by the PULs. By the senior year, the portfolios are likely to be viewed by external audiences, such as potential employers and graduate program faculty, who will be interested in summative, discipline-specific information about student academic achievement. The Contents Subcommittee is working to develop examples of portfolio content for each box in the matrix.

To ensure that the ePortfolios include work examples and assessments relevant to the interests of various viewers, the Contents Subcommittee has met with staff from the Career Center, with faculty teaching in graduate programs, and with a former student. Appleby reported that the former student commented that if we want students to feel that they own their portfolios, they shouldn't be compelled to include specific assignments. This issue will need to be dealt with at some point. Hamilton added that she has held five meetings with student focus groups, who were very interested in the ePortfolios as a vehicle for allowing them to see the kinds of work that students in different majors do. The portfolios could potentially be helpful to students in choosing a major and in understanding the types and levels of work expected by the major department/program.

Agbor-Baiyee asked whether students might confuse the portfolio with their personal home pages and emphasized that we will need to ensure that students understand the academic purposes of the ePortfolios. Hamilton replied that the technical infrastructure and design features will make the ePortfolios obviously identifiable; students will have the ability to link their ePortfolios to their personal home pages, but these will be clearly external to the portfolios.

Kuczkowski asked whether IRB issues had been addressed. Hamilton replied that she had taken the pilot version of the ePortfolio to the IRB last year and will meet with this group again as the portfolio design and content are refined. She expects that the IRB will determine that the ePortfolios have exempt status; we will develop a simple way for students to give permission for information and work to be extracted from their individual ePortfolios for various purposes (such as inclusion in IUPUI's electronic institutional portfolio).

Agenda Item 3. NCA Self-Study Outline and Plan (Banta, Kahn, and Black)

T. Banta passed out a revised version of the NCA Teaching and Learning Special Emphasis Self-Study outline that incorporates comments from the last PRAC meeting.

S. Kahn briefly reviewed the revisions. She noted that, at the last meeting, PRAC discussed the possibility of listing "Best Practices" as a separate goal under "Excellence in Teaching and Learning," but that the NCA Steering Committee decided against that. In response to a question from Ritchie, Kahn added that the Steering Committee wanted to avoid the appearance of segregating "Best Practices" from other goals related to teaching and learning and planned instead to weave discussion of Best Practices throughout the other teaching and learning goals.

Agenda Item 4. Report from Subcommittee on Annual Reports. (K. Black and S. Baker)

K. Black and S. Baker reported that the subcommittee has completed a review of the annual school PRAC reports aimed at identifying overall strengths and weaknesses of our approach to annual reporting. Group members divided up to review the various schools' reports and found a number of inconsistencies among them: for example, some schools submitted a new report each year, while others submitted additions or updates to reports from prior years. Some schools developed a school-wide report, while other schools compiled separate reports from each department. Integration of the PULs into school and department assessment processes was uneven. In addition, not all schools have reported.

In general, schools subject to specialized accreditation tended to have stronger assessment procedures. The weakest areas of the reports tended to be the sections discussing improvements made as a result of assessment findings. This may be due in part to ambiguous wording of the question on improvements, which asks "what improvements *might* be made" as a result of assessment findings. Some schools responded with information on improvements actually implemented, others with plans not yet implemented, and others with speculation on possible improvements.

Ritchie asked whether schools were interpreting the categories in the report in consistent ways. Black replied that those schools that used the matrix seemed to interpret the categories more uniformly in their narratives than those that didn't use the matrix. Baker added that the reports had many gaps; for example, some schools focused on only one degree program.

Agenda Item 5. Report from Subcommittee on Grant Reports (B. Jackson)

No action to report.

Agenda Item 6. Election of Officers for 2002 (T. Banta)

Banta passed out ballots with the following nominations:

Ingrid Ritchie for Chair
Joyce Mac Kinnon for Vice Chair

Both were elected by acclamation.

Agenda Item 7. Additional Details on Assessment in Engineering and Technology (C. Yokomoto, H. Akay, C. Goodwin)

Yokomoto Report

This presentation was a follow-up to Yokomoto's presentation at the October meeting. Yokomoto introduced his colleagues, H. Akay, Chair of the Department of Mechanical Engineering and C. Goodwin, Chair of the Department of Organizational Leadership and Supervision, then briefly summarized his earlier presentation. He noted that no two departments in the school use the same assessment strategies, especially in the area of "soft" outcomes—outcomes related to ethics, for example. Approaches to these outcomes tend to be related to specialized accreditation requirements. These variations make it difficult to aggregate school-wide assessment findings in meaningful ways; thus, each department decides for itself whether its students are meeting desired performance levels.

Currently, the school is piloting assessment of graduate programs, with slightly different rubrics for students in thesis and non-thesis tracks. Faculty also are working on a prototype of a database that stores student papers electronically, by course, then allows papers to be called up according to specific PULs or ABET outcomes. The school is also developing standardized forms for various aspects of assessment.

Akay Presentation

Akay began by noting that Mechanical Engineering implemented a systematic assessment process about eighteen months ago. Course outcomes are surveyed every semester for all courses. In senior capstone courses,

students are evaluated by a jury, so that more than one faculty member is involved in making judgments about outcomes. Responding to a question from Ritchie, Akay explained that the department tries to minimize demands on faculty time by centralizing as many aspects of assessment as possible—for example, processing of survey results—and by using already available information. Kuczkowski asked about numbers of students and majors; Akay replied that the department offers one degree program with three subspecialties for approximately 200 students. Agbor-Baiyee remarked that the strong assessment culture in Engineering and Technology may be unique to IUPUI; Hasan commented that ABET requirements are making such a culture typical for schools accredited by ABET.

Goodwin Presentation

Goodwin provided an overview of Engineering and Technology degree programs, which require 124 hours and can be divided into three parts: General Education, introduction to Science and Technology, and the major. In OLS, the major includes three sub-parts: leadership, supervision, and an area of specialization. Three years ago, the department undertook a self-examination and found that many of its members' assumptions about teaching and learning were unverified. For example, with 18-20 associate faculty and only four full-time faculty members in the department, syllabi varied tremendously among different sections of the same course, were inconsistent about stating course objectives, and were not always tied to program objectives. Examination of the entire program revealed both overlaps and gaps among courses.

The department has been working to make the program more consistent and cohesive, using approaches derived from TQM. Assessment is now on every department meeting agenda. These efforts have led to better collaboration and teamwork across the department and greater agreement about learning goals. Faculty are developing a two-semester capstone and are working on a standardized test for graduating seniors. These efforts have not stifled creativity, as some department members feared, in part because faculty choose their own materials, assignments, and approaches to the commonly agreed-upon core learning objectives. One problem the department has found is that it's very difficult to communicate to students what makes a paper "A" work, "B" work, and so on; rubrics have been helpful here, including standardized rubrics tied to the PULs for major assignments. In response to a question from J. McDonald, Goodwin added that the department also uses standardized course evaluations.

Appleby asked whether academic freedom had come up as an issue. Goodwin responded that this had not been a major concern, perhaps because most OLS faculty are part-time and because faculty choose their own materials, assignments, and teaching approaches to help students achieve commonly

agreed upon learning outcomes. Faculty see the value of collaborating to create a coherent learning experience for students.

Agbor-Baiyee asked how "success" in applying TQM is defined. Goodwin cited increased collaboration among faculty on issues of assessment and improvement and the sense of self-sustaining motivation to continue assessment as evidence for the success of the TQM approach. He added that OLS takes a descriptive rather than an evaluative approach to assessment, which is also consistent with TQM principles. Agbor-Baiyee also asked whether there might be some academic value in overlap among courses. Goodwin replied that there is, but it's important for the department to be intentional about overlap and to be aware of what overlaps exist in the curriculum and where. A valuable aspect of the OLS approach is that students now have a better understanding of what's expected of them and are thus better equipped to meet these expectations. Finally, he noted that two E & T faculty members, E. Fernandez and D. Williamson, are developing a prototype for an assessment database, the "Course Information System."

PowerPoint presentations from all three presenters of this session are attached.

NEXT TIME: Since the January agenda includes four presentations, presenters are asked to limit their time to 35 minutes apiece. Banta also announced that the group welcomes updates, additions, and more information to supplement past presentations.

NEXT MEETING: JANUARY 10TH, 2002
9:00-11:30 a.m.
UL1126

Eportfolio Content Matrix

General

Formative

PUL-Specific

Specific

Summative

Department-Specific

Internal Audience: *Advisors, Faculty, Students, NCA, Institutional Review*

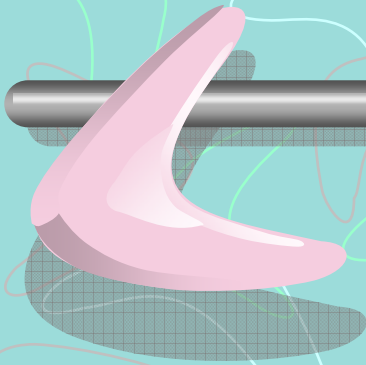External Audience: *Employers, Graduate Schools, Potential Students, Community*

	Core Communication & Quantitative Skills	Critical Thinking	Integration & Application of Knowledge	Intellectual Depth, Breadth, & Adaptiveness	Understanding Society & Culture	Values & Ethics
Freshman	English Composition paper					
Sophomore	Paper from intro class in major					
Junior	Paper from advanced class in major					
Senior	Paper from capstone class					

Student development focus utilizing reflection in learning
Encompasses the personal, professional, & academic aspects of the student's life

IUPUI Student ePortfolio
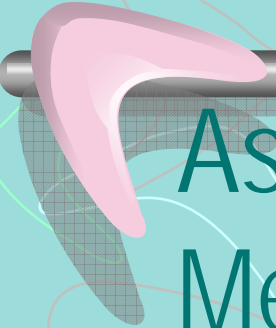
Presentation to PRAC

December 13, 2001

Sharon J. Hamilton

Sub-Committees

- Contents Sub-Committee: Drew Appleby, Chair

- Security Issues Sub-Committee: Nathan Byrer, Chair

- Assessment Sub-Committee: Sharon Hamilton, Chair

Assessment Sub-Committee Members

- Donna Boland
- Vic Borden
- Charlie Feldhaus
- Linda Houser
- Susan Kahn

- David Koerner
- Samuel Milosevich
- Howard Mzumara
- Bob Rigdon
- Gayle Williams

Goals and Challenges

- Demonstrate improvement in learning (in relation to the PULs)

- Demonstrate achievement in learning (in relation to the PULs and major or profession)

- Keep it time effective for faculty

- Keep it easy to manage for students

Three Levels of Competence

- **Introductory**: What all undergraduate students at IUPUI should know and be able to do in relation to the PULs within the first 26 credit hours;

- **Intermediate**: What all undergraduate students at IUPUI should know and be able to do in relation to the PULs within the first 56 credit hours

- **Advanced**: What all baccalaureate students at IUPUI should know and be able to do in relation to PULs in their major or profession or academic program.

Introductory Competence

- What all undergraduate students at IUPUI should know and be able to do in relation to the PULs within the first 26 credit hours;

- To be determined at the campus level and delineated by multi-disciplinary, multi-level teams.

- Faculty grade to determine degree or gradation of introductory competence

- Technology infrastructure to enable campus-level information-gathering or overall assessment of introductory competence.

Intermediate Competence

- What all undergraduate students at IUPUI should know and be able to do in relation to the PULs within the first 56 credit hours;

- To be determined at the campus level and delineated by multi-disciplinary, multi-level teams.

- Faculty grade to determine degree or gradation of introductory competence

- Technology infrastructure to enable campus-level information-gathering or overall assessment of intermediate competence.

Advanced Competence

- What all baccalaureate students at IUPUI should know and be able to do in relation to PULs in their major or profession or academic program.
- To be determined at the School, Department, or Programmatic Level
- Faculty grade will indicate level of achievement
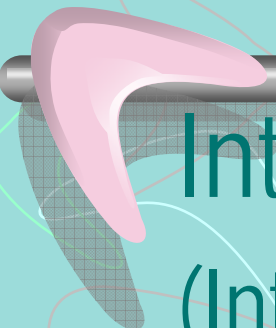- Technology infrastructure will enable campus-wide information collection and assessment

Exemplary Achievement

- Student learning achievement that goes above and/or beyond the levels of competence
- Academic: Honors; national exams or awards
- Certifications
- Practica, clinical work, service learning, volunteerism, community work
- Student governance; student athletics; co-curricular activities

Introductory Competence: PUL 1a: (Written Communication) (1999)
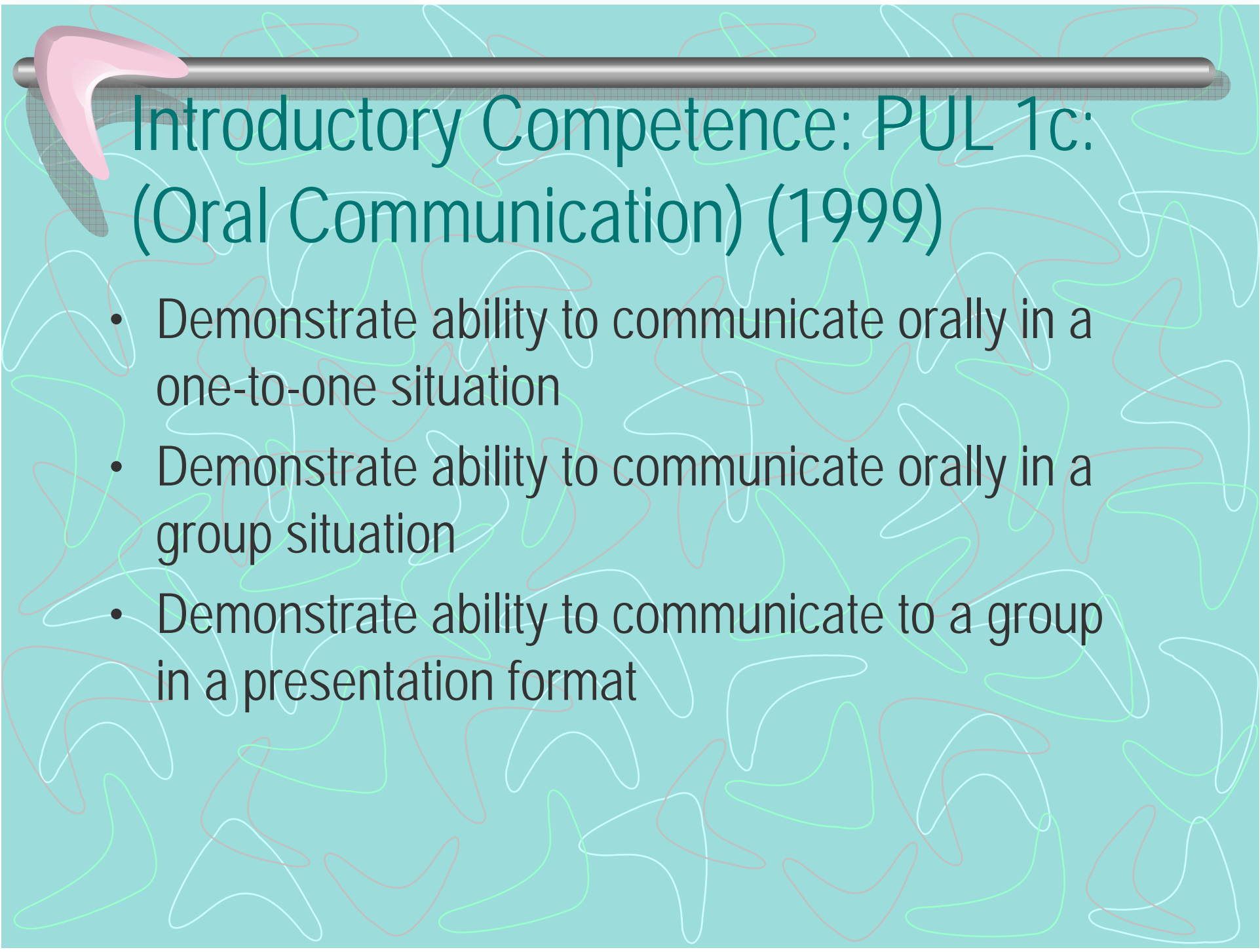
- Demonstrate understanding of the **rhetorical context** (respond to needs of different audiences, different kinds of writing, different purposes for writing)
- Use writing for inquiry, learning, thinking, and communication
- Develop a repertoire of writing processes
- Demonstrate knowledge of writing conventions
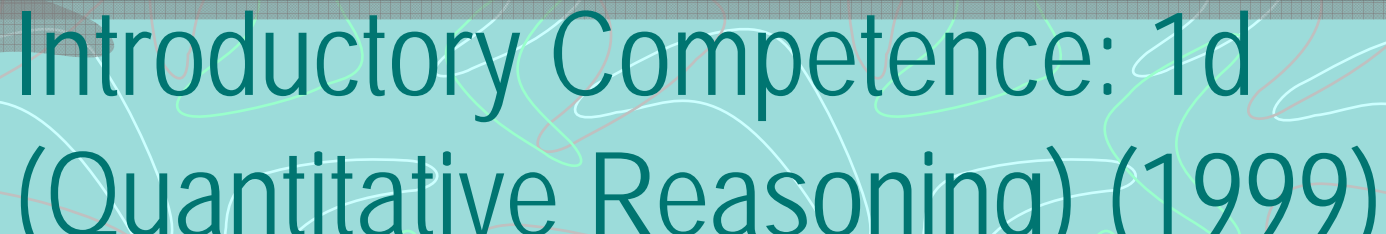
Introductory Competence: PUL 1b
(Interpret and analyze written text) (1999)

- Students will include in their portfolio at least one piece of writing that demonstrates – through interpretation or analysis – their comprehension of a written text, other than text from a textbook. For many students this may be a book encountered in an introductory writing class or a book from the current Bookmarks list.

Introductory Competence: PUL 1c: (Oral Communication) (1999)

- Demonstrate ability to communicate orally in a one-to-one situation

- Demonstrate ability to communicate orally in a group situation

- Demonstrate ability to communicate to a group in a presentation format

Introductory Competence: 1d (Quantitative Reasoning) (1999)

- Demonstrate ability to comprehend tables and graphs
- Demonstrate ability to gather and interpret statistical information
- Demonstrate ability to identify strategies and approaches to solving quantitative problems
- Demonstrate ability to solve mathematical problems

Introductory Competence 1e (Information Literacy) (1999)

- Demonstrate ability to use the following software and systems programs: database, spreadsheet, word processing, power point.

- Demonstrate ability to use communication programs: e-mail, listservs, Oncourse, etc.

- Demonstrate ability to use technology to access library resources and technology support resources.

Assessment of Competence

- All student evidence of competence will already have been graded by the instructor.
- In some cases, faculty may use tracking and rubrics or videotape to present evaluation
- Students will write reflective analyses of their learning achievements
- Assessment at the campus level will be supported by technology infrastructure

Implementation (student perspective)

- Students write a preliminary view of the PULs during their learning community experience
- Students demonstrate introductory competence in PULs within their first 26 hours if possible.
- Student demonstrate intermediate competence in PULs within their first 56 hours if possible.
- Students demonstrate advanced competence in all PULs before graduation.
- Students write a reflective overview of PULs during their capstone experience

Implementation: Faculty Perspective

- Need to define expectations for introductory and intermediate competence at the campus level

- Need to determine which courses and which assignments within those courses would effectively demonstrate introductory and intermediate competence

- Need to define advanced competence at department level

- Need to determine which courses and assignments would effectively demonstrate advanced competence

- Need to provide opportunity during learning community for first view and opportunity during capstone for overview of learning in the PULs

Implementation timetable: (we hope)

- January: Determine whether we need/want levels or gradations at campus level in relation to competence
- February: full day campus workshop to define and determine introductory and intermediate competence (leadership by PRAC) OR set up committees for each PUL
- Fall semester: departments define and determine advanced competence (could be done this spring??)
- Begin the ePortfolio with entering freshman by fall 2002???

Implications and issues

- Involvement of faculty governance
- Involvement of University College and Learning Community faculty
- Faculty development organization and leadership for defining levels of competence
- PRAC leadership
- Technology

OUTCOMES ASSESSMENT IN THE PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY

Presented to the IUPUI Program and Assessment Committee, Dec. 13, 2001

Charlie Yokomoto

E&T Assessment Committee Chair and Director of Assessment

Professor of Electrical and Computer Engineering

Department of Electrical and Computer Engineering

Indiana University-Purdue University Indianapolis

Contents

- School-side process

- Assessment methods common to all departments

- Departmental strategies

- Assessment of non-technical outcomes

- Assessment of writing and speaking

- Some findings (by department)

- Using a survey of continuing students satisfaction

- Looking at retention rates and graduation rates from IMIR data

Contents

- Improvements planned or implemented

- Graduate assessment

- Current projects in assessment

- Scholarship of assessment

- Current assessment problems confronting the school

- Difficulties in engaging faculty

- What has helped to get faculty involved?

- What would encourage more faculty to become involved?

- How can the university help?

School-Wide Process

- Assessment committee with members from all departments, TCM, and the dean's office

- Monthly meetings since Fall, 1996, when Dean Yurtseven took office

- Faculty member chairs the committee

- Eight departments and a technical writing program (TCM) follow a common, general assessment process.

School-Wide Process

- Departments have tailored the general process to their cultures.

- ECE, ME, EET, MET, and CNT assessment is ABET/EAC based, with professional accreditation outcomes mapped to the PULs.

- CPT is not professionally accredited but has chosen to follow an assessment process used by EET, MET, and CNT..

- OLS assessment is PUL based.

Assessment Methods
Common to All Departments

- Retention rates, graduation rates, and number of degrees conferred

- Writing and speaking (developed by Marj Hovde)

- Alumni satisfaction

- Employer satisfaction

- Continuing students satisfaction

- Industry advisory group feedback

Department Strategies

- Computer Technology
  - **A core set of courses has been identified to assess student learning in the major.**

Department Strategies

- Construction Technology
  - **All courses will be assessed**.

Department Strategies

- Electrical and Computer Engineering
  - **A core set of courses has been identified to assess student learning in the major.**
  - **Strong dependence on our capstone design course**
  - **Feedback from parents of students.**
  - **ECE may assess student confidence in their ability to demonstrate the learning outcomes in each course.**

Department Strategies

- **Electrical Engineering Technology**
  - Use collaborative groups in the microprocessor course at the AS level and appropriate courses at the BS level to assess teamwork through peer evaluation of teamwork
  - Use project reports to evaluate problem solving and mastery of the discipline
  - Use assessment of problem solving to assess creativity.

Department Strategies

- ## Mechanical Engineering
  - **Core set of courses selected for assessment**
  - **Ethics, society and culture, contemporary issues, and working in teams will be assessed in a required ethics course team taught with the ECE Department.**
  - **Student will be asked to report their confidence in their ability to demonstrate the learning outcomes in each course.**
  - **Exit interviews**
  - **Feedback from parents of students**

Department Strategies

- Mechanical Engineering Technology
  - **Comprehensive exam in some programs**
  - **Portfolio in other programs**

Department Strategies

- Organizational Leadership and Supervision
  - Core set of courses
  - Includes the senior capstone project

Assessment of Non-Technical Outcomes

- In ABET circles, "soft outcomes" refer to any outcomes that are directly related to technical topics, writing, speaking, and teamwork. This includes ethics, global impact, cultures, and contemporary issues.

- CPT, ECE, ME, and OLS have required courses in ethics that include the soft outcomes.

- MET and EET have developed units on the soft outcomes in their design project courses.

Assessment of Writing and Speaking

- The School has decided to assess speaking and writing in the context of the workplace.

- Marj Hovde (TCM) has developed a process for training faculty in the assessment of workplace writing and speaking.

- She received an IUPUI assessment grant to develop her program

- She received a School summer grant to train her first two teams

- She has since completed the training of faculty teams in each of the school's seven departments.

Some Findings in Computer Technology

- Students met desired levels of performance in:
    - **Communicating effectively**
    - **Functioning effectively in teams (related to civility)**
- Students did not meet desired levels of performance in:
    - **Identifying, analyzing, and solving technical problem (linked to problem solving)**
    - **Appropriate Mastery of knowledge, techniques, skills, and modern tools of their discipline (related to depth of knowledge)**

Some Findings in Construction Technology

- **Students met desired levels of performance in:**
  - **Solving technical problems**
  - **Communicating effectively**
  - **Mastering the discipline**
  - **Quality, timeliness, and continuous improvement**
  - **Applying creativity**
  - **Improving processes**
  - **Understanding ethical and professional responsibilities**

- **Students did not meet desired levels of performance in:**
  - **Identifying, analyzing, and solving technical problem (linked to problem solving)**
  - **Appropriate mastery of knowledge, techniques, skills, and modern tools of their discipline (related to depth of knowledge)**

Some Findings in Electrical and Computer Engineering

- **Students met desired levels of performance in:**
  - **Library and Internet research**
  - **Application of design and engineering principles**
  - **Writing a technical report**
  - **Oral presentation in a technical course**
  - **Discussing elements of workplace ethics**
  - **Applying principles of ethics and models of right/wrong**
  - **Resolving ethical dilemmas**
  - **Solving problems involving basic principles**

Some Findings in Electrical and Computer Engineering

- Students did not meet desired levels of performance in:
  - **Analysis and interpretation of data**
  - **Creativity**
  - **Writing conclusions in a technical paper or for a technical presentation**
  - **Using visuals in a technical paper**
  - **Citing sources in a technical paper**
  - **Solving challenging problems**

Findings in Mechanical Engineering

- Presented by Hasan Akay next

Findings From Organizational Leadership and Supervision

- Presented by Cliff Goodwin following Hasan Akay's presentation

Example of Using a Survey
of Continuing Students Satisfaction (ECE)

- **Students are satisfied with the following:**
  - Quality of advising and textbooks
  - Access to advisors

- **Students enjoy:**
  - Courses with hands-on experiences and design projects
  - Courses that include computer exercises
  - Courses that give students an idea of what engineers do on the job

- **The department plans to investigate student dissatisfaction with:**
  - Laboratory (computer) equipment
  - Hours of availability of laboratory facilities outside the formal laboratory period.
  - Opportunities to interact with faculty
  - Opportunities to interact with other students

What Has ECE Found About Retention and Graduation Rates?

- ## Retention
  - ECE retention rates from 1995 to 1999 (low 78.1%, high 84.6%) are generally at or above retention rates for the School and the campus
  - One datum on concern is the retention of first year students in 1999 (49% compared with 67% to 79%)

- ## Graduation rates
  - Generally speaking, graduation rates seem to be quite reasonable.
  - True beginners graduate at lower six-year and eight-year (under 20%) rates than transfers (34% to 44%)

Improvements Planned or Implemented--CPT

- Course overlaps have been eliminated
- More hand-on experiences put into networking course
- Pre-requisites organized more logically
- More advisors available
- Advising manual produced
- Course descriptions on Web have been revised
- Increased emphasis on basics (CPT 115/116)
- Continuity of learning enhanced by bridging courses

Improvements Planned or Implemented--CNT

- Develop scoring rubrics for used in multi-section courses

- Reduce degree of subjectivity in assessment process

- Expand use of surveys to assess student self-reported learning w.r.t. course outcomes

- Increase involvement of associate (part-time) faculty

- Include more group projects throughout curriculum

Improvements Planned or Implemented--ECE

- Consider two-semester capstone to improve workmanship
- Redesign course scheduling to front-load information
- More experiences in critical thinking in the ethics course
- More emphasis on global impact of engineering
- Use peer tutoring in technical writing and presentations
- Teach general processes of problem solving
- Spend $20,000 to improve computer systems
- Hire work-study student to keep ECE laboratories open 10 hours in the evening
- Find ways to improve graduation rates of direct admits by improving retention in the freshman year

Improvements Planned or Implemented--ME

- Work on improvements in probability and statistics, design of thermal systems, global and societal impact, contemporary issues, and lifelong learning
- Work to reduce deficiencies in student self reports of confidence in learning of course outcomes
- Improve lab and computing facilities, advising, course scheduling, career planning
- Require students to see advisor at least once a year
- Add sections to capstone course on safety, environmental and societal impact.
- Include more modern engineering tools in courses

Improvements Planned or Implemented--OLS

- Write behavioral objectives in all courses taught by full-time faculty and half of all courses taught by part-time faculty

- Create standardized objectives for courses with multiple sections

- Identify knowledge, skills, and abilities (KSA) desired of all OLS graduates

- Identify courses where the KSA are taught

- Develop scoring rubric for at least one learning activity in all required courses

Graduate Assessment in ECE and ME

- Based on "Assessment of Student Learning in Graduate Programs" by Patricia D. Murphy, distributed at a PRAC meeting.

- Focuses on the assessment of Masters theses and project courses.

- Scoring rubrics are being tested for the scoring of theses and project report presentations.

Current School-Sponsored Projects in Assessment

- Training manual for associate (part-time) faculty, Laura Lucas

- EAST: Electronic Assessment and Storage Tool, Eugenia Fernandez and David Williamson

- Course Information System, Eugenia Fernandez and David Williamson

- Assessment of writing and speaking, Marj Hovde

- Web interface for uploading assessment data, Charlie Yokomoto and Hasan Akay

Scholarship of Assessment 2000-2001

- "Measurable Outcomes: What Are They and How Do We Write Them?" Assessment Institute, Nov. 7, 2000, Yokomoto.

- "Assessing Your Measurable Outcomes—Decisions and Options," Rose-Hulman Assessment Symposium IV, April 2001, Yokomoto.

- "Redesigning and Assessing the ECE Capstone Design Course For EC2000," ASEE Annual Conference, June 2001, Rizkalla and Yokomoto

- "EAST: Developing an Electronic Assessment and Storage Tool," 13th Intl. Conf. On Assessing Quality in Higher Ed., July 2001, Edward, Fernandez, Milionis, and Williamson.

- "Outcomes Assessment in E&T," presentation to Universiti Tenaga Nasional, Malaysia, July 2001, Yurtseven.

Scholarship of Assessment 2001-2002

- "Designing Communication Assessment in a School of Engineering and Technology: Enhancing Faculty Development and Gaining Usable Results,“ Assessment Institute, Nov. 2001, Hovde.

- “Developing your Assessment Process—Questions, Options, and Decisions,” Assessment Institute, Nov. 2001, Yokomoto.

- “Documenting Progress on Assessment,” Assessment Institute, Nov. 2001, Appleby and Akay.

Current Assessment Problems Confronting the School

- Handling large amounts of assessment data

- Reducing the large amounts of data to a more meaningful form

- Making the process more efficient

- Making the process self-sustaining

What Are the Difficulties You Face in Engaging Faculty?

- Research emphasis, demands, and financial rewards, particularly in the engineering programs.

- Heavy teaching loads, particularly in technology programs.

- Questions of necessity, especially if we have gone through professional accreditation and internal review.

What Has Been Successful in Getting Faculty Involved?

- Persistence from the chair of the school assessment committee

- Attitudes of a few leaders

- Credit toward P/T for technology faculty for scholarship component

- Continual vocal and financial support from the dean

- Participation from the dean's office

What Actions Would Encourage More Faculty to Become Involved?

- For faculty typical of our culture, faculty become involved when they see assessment as a duty and responsibility.

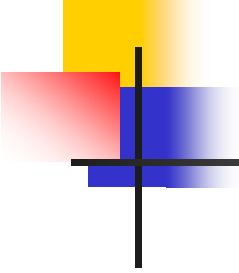- A few faculty have found assessment interesting and/or personally rewarding

What Can the Campus Do to Help Engage Faculty?

- Larger faculty assessment grants

- Pragmatic workshops, not pie in the sky workshops

- More time at PRAC meetings for conversations of typical hurdles and ways to overcome them

Next—Hasan Akay, followed by Cliff Goodwin

Findings and Changes Based on Program Assessment

Presented to the IUPUI Program and Assessment Committee, Dec. 13, 2001

Hasan U. Akay

Professor and Chair

Department of Mechanical Engineering

Indiana University-Purdue University Indianapolis

Assessment Tools Defined

- Mission and vision statements
- Program constituencies
- Program objectives
- Program outcomes (based on ABET a-k)
- Course learning outcomes
- Key courses for direct assessment

Assessment Tools Established

- Industrial advisory board
- Mapping of course outcomes to program outcomes
- Linking ABET outcomes to PULs
- Student satisfaction survey
- Course outcome surveys in all courses (indirect assessment)
- Exit survey for program outcomes
- Employer and alumni surveys
- <u>Documentation on the web</u>

Deficiencies Found
"Based on surveys of two semesters"

- $\approx$ 23% of outcomes out of 220 were not met adequately (based on a threshold score of 3.75 out of 5.0)

- Advising perceived to be inadequate

- Experimental labs perceived to be inadequate

- Found weak on:
  - Thermal design
  - Multidisciplinary applications
  - Statistics, probability and data analysis

Deficiencies Found (Cont'd)
"Based on surveys of two semesters"

- **Also weak on soft ABET outcomes h and j:**

  h) Understand the impact of engineering solutions in a global and societal context

  j) Demonstrate the knowledge of contemporary issues

Changes Implemented
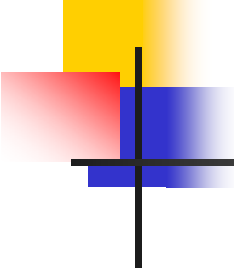## *"Based on Student Satisfaction Surveys"*

- Lab equipment upgraded

- A new advising system established

- Standard lab report format and rubrics developed

- Standard design report format and rubrics developed

Changes Implemented (Cont'd)
"*Based on Outcomes Surveys*"

- Introduced modern computer software in design courses

- In capstone design course:
  - Students are required to comment on environmental, safety, and societal impact of the design in their reports
  - Added a seminar component with speakers from industry to advocate professionalism
  - Awards for best design and best poster are established
  - A jury evaluation process is adopted

Changes to be Implemented
"*Based on Outcomes Surveys*"

- ## A new thermal design course
  - to complement the capstone design for multidisciplinary applications

- ## A new statistics and data analysis course

- ## Restrict part of general education electives in the program (18 credits)
  - To address the weakness in soft ABET outcomes (h and j):

December 13, 2001   IUPUI Program and Assessment Committee

Future Steps
"Based on Assessment"

- Assess the selected key courses more directly
- Form a student advisory board
  - For more feedback
- Establish some objective testing methods – (*under consideration)*:
  - Prerequisite tests
  - Competency exams
  - Exit exams
  - Mandatory FE Exams

Future Steps (Cont'd)
"Based on assessment"

- ## Establish an interactive web-based assessment management software for:
  - ### Interactive surveys
  - ### Documenting and retrieving data
  - ### Interactive entering of pertinent data
  - ### Analysis of data
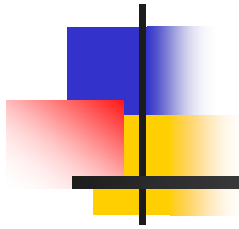
  Requires institutional support or a professional system

What Did We Gain?

- A systematic approach for evaluating and detecting the strengths and weaknesses of the program

- Systematic feedback approach to make changes

- More attention given to specific outcomes in the courses

- Continuity among the changing instructors of the same course

Important Improvements in Organizational Leadership and Supervision Due to Assessment

Clifford Goodwin

Associate Professor and Chair

Department of Organizational Leadership and Supervision

Indiana University-Purdue University Indianapolis

Standardized Syllabi

- **Contents: GLO's & SLO's (performance based-observable & measurable)**

- **IUPUI's Principles of Undergraduate Learning**

- **Specific grading criteria (rubric) for "major" assignments**

Redesigned Cap-Stone Experience

- **Summative assessment of student learning will be done in OLS 410 & 490.**

Learning Matrix

- **ID gaps and overlaps in curriculum and make corrections**

Spirit of Continuous Improvement

- **We have questioned assumptions about courses and curriculum**

- **Improved teamwork and interpersonal relationships**

- **We have successfully applied TQM principles within our department**