Exploring . . .
the Scholarship of Teaching Vol. 3

Appropriate Methods

It is with pleasure that we present the third in our series of Scholarship of Teaching booklets.

We invite you to:

Use the materials contained in this booklet to evaluate your teaching style.

Western Kentucky University's
Center for Teaching and Learning

http://www.wku.edu/teaching
Spring 2001

Exploring . . . The Scholarship of Teaching
Volume III: Appropriate Methods

Center for Teaching and Learning
Western Kentucky University --- Bowling Green, KY 42101
http://www.wku.edu/teaching

Table of Contents

Dear WKU faculty:

In early fall 2000, we asked Western's faculty to provide us with brief (1 to 2 page) articles with citations discussing the methods they have found to be effective in their courses. We were overwhelmed by the response. We received enough material not only for this booklet but for a second one as well, *Effective Presentation*.

We are so grateful to the faculty of WKU for their enthusiasm and contributions!

In these pages, written by WKU faculty, you will find articles that represent the breadth of reflection about instructional activities. The articles range from very applied and explicit activities to deeply philosophical expressions regarding the fundamental principles. Although they appear clothed in particular disciplines, if you read them all you will see general principles and ideas that can work for you regardless of content. You may also discover how varied our teaching populations and objectives are but that we are united in our passion to involve our students in the learning process.

This is not a cookbook, but more like a tour guide of all the places a teacher's heart and mind can go in the journey that is teaching. It is an opportunity for you to connect with others, sharing your approach to instruction.

This booklet -- *Exploring the Scholarship of Teaching, Appropriate Methods, Vol. 3* --carries on the objectives of the prior two booklets in this series:

1. to encourage us to be explicit in our choices as teachers
2. to evaluate the effectiveness of our teaching process against the body of literature and from our experiences as teachers
3. to offer options for written reflection on teaching.

Sally Kuhlenschmidt
Center for Teaching and Learning
Spring 2001

*** "All works of scholarship, be they discovery, integration, application, or teaching, involve a common sequence of unfolding stages. We have found that when people praise a work of scholarship, they usually mean that the project in question shows that it has been guided by these qualitative standards:

1. Clear goals
2. Adequate preparation
3. Appropriate methods
4. Significant results
5. Effective presentation
6. Reflective critique"

Glassick, Charles E.; Huber, Mary Taylor; & Maeroff, Gene I. *Scholarship Assessed: Evaluation of the Professoriate.* San Francisco: Jossey-Bass, 1997.

Method Selection Worksheet

Use the following selected list of teaching methods to identify your overall approach and possible areas for exploration. As you read them think of a particular course taught in recent terms. Place an "R" next to those you have regularly used in that course. Place an "A" next to those you have attempted once or twice. Place an "E" next to those you want to explore further. In which area do you have the most checks? the least? Which one of your "E's" will you explore first?

_____

(Class / Time Period)

1. Active Learning

(For more about these kinds of activities, see: *Classroom Assessment Techniques* by Thomas A. Angelo & K. Patricia Cross. Ask for this book at the Center for Teaching and Learning by this access number: LB2822.75.A54).

___had students write a short response to a question and then share their responses with other students
___assigned one-minute paper at end of a lesson:
  ___asking for most important thing learned during a lesson
  ___requesting unanswered questions about material
  ___asking for muddiest point in course material
___had students complete a note-checking activity **(See Thad Crew's article in this booklet)**
___administered a student background-knowledge probe
___had students fill out a misconception/preconception checklist
___had students complete a pro and con grid
___requested an analytic memo from students
___explained to students how to create applications cards
___administered a classroom opinion poll
___had students generate a concept map
___required journaling/double-entry notetaking
___helped students create focused autobiographical sketches
___had students fill out interest/knowledge/skills checklist
___instructed students in ways to self-assess their ways of learning
___had students create a productivity study-time log
___asked for email feedback
___administered a teacher-designed feedback form
___taught group instructional feedback techniques
___taught use of student quality control circle/s
___instructed groups in ways to perform self-evaluations
___other_____

2. Critical Thinking

___engaged in Socratic dialogue with students
___taught students methods to logically analyze a content problem/question **(See Joe Glaser's article at: http://www.wku.edu/teachingapmeth.htm.)**
___had students use an analysis method to prepare an argument for or against a proposition in an oral or written project
___organized student debates on selected content topics
___brought complex world questions/problems which relate to content area into classroom for discussion/analysis
___had students debate/argue in writing for a position on a content topic or broader topic that they were not in sympathy/agreement with
___had students critically evaluate sources of documents (popular media, Webpages, journals, etc.)
___other_____

3. Problem-based Learning

___used simulations or games to explore concepts
___used problem-based questions to generate discussion, papers, projects, etc.
___used the Critical Incidents Technique to help students to collect/generate options/information **(See Elizabeth Shoenfelt's article at: http://www.wku.edu/teachingapmeth.htm, under Job Analysis Project)**
___encouraged discussion of a problem of an international, national, or regional nature
___other_____

4. Case-based Learning

___presented case studies to students for discussion/resolution
___used case studies of regional, national, or international interest
___had students share their answers to problems or assigned cases
___used cases to place students in touch with the community **(See Lynn Austin's article at: http://www.wku.edu/teachingapmeth.htm)**
___used role-playing to explore concepts such as cause/effect, understanding individual attitudes & motivation
___used existing Websites as sources for case studies
___used directed case studies to achieve specific learning objectives (**See Byron Sleugh's article at: http://www.wku.edu/teachingapmeth.htm)**
___used prepared and student-written scripts to illustrate concepts, explore ways judgements are made, etc.
___other_____

5. Collaborative/Cooperative Learning

___used student group presentations
___paired students to discuss questions and then share their responses with other students
___formed small groups to discuss questions and then share responses with other students
(See Johnston A.K. Njoku's article at: http://www.wku.edu/teachingapmeth.htm)
___interacted with students via computer: email, discussion boards, chatrooms
___paired students for an activity
___paired students across regional or international borders using Internet communication tools
___used small groups organized only for 1 or 2 lessons
___used small base groups organized at the beginning of the semester
___used small base groups reorganized at least once during a semester
___used peer teachers
___other_____

For what purpose(s) did you use cooperative or collaborative learning techniques?

___to discuss questions posed by the student
___to work on an assigned project
___other_____
___to serve as study groups
___to discuss assigned readings, problems, or cases

6. Service Learning

___had students working with community-based projects
Some examples of community-based projects/activities:
___used instructional technology tools to provide a service (e.g., building a Website for a community organization)
___had students do a needs assessment of a particular content-related population
___had students develop a plan of action from the needs assessment
___used student research/fieldwork to expand the knowledge base about a given group/organization (e.g., senior citizens in Bowling Green) or location/event (Big Band concerts at Lost River Cave in the forties)
___had students schedule time to assist a particular group with an activity/problem (e.g., child care essentials for young, single parents given by nursing students)
(See Beverly Siegrist & Susan Jones' article on nursing students at: http://www.wku.edu/teachingapmeth.htm)
___other_____

7. Learning Communities

___had students pair with students from another course to complete a presentation/writing/research project
___engaged in partnership with teachers and students at other schools using technology to unite them
___coordinated assignments with another teacher from a different content area (e.g., writing assignments in English paired with research projects in biology)
___with the cooperation of administration, entire groups of students channeled through a series of courses over a number of years (e.g., a class of Freshman Seminar students all taking the same introductory English and biology classes one semester and continuing as a group the second semester with an introductory history class and a second biology class, etc.)
(See Carol Graham's article at: http://www.wku.edu/teachingapmeth.htm)
___other_____

8. Instructional Skills

___created a clear, well-organized syllabus, including University requirements and written learning objectives for student activities, shared with students
___ **(see Syllabus Checklist in CTL booklet--Syllabus Ideas: helping students make it to the top. Checklist available only in the hard copy of the booklet.)**
___set desired tone for course in first lesson
___prepared and organized materials, handouts, demos in advance
___reviewed, in class, material from previous lesson
___provided outline/overview of lesson
___used legible & well-designed media presentation, (such as chalkboard, transparencies, PowerPoint)
___prepared students for next lesson, summarizing or raising a question to consider
___responded effectively to student questions about material
___encouraged student-to-student interaction
___used expressive voice tone and gestures, personal photo on Webpage
___offered a variety of learning activities within a lesson (e.g., alternate 15-20 minutes of lecture with discussion or demo)
___paused every 15-20 minutes for extended activities such as Q&A, ungraded quiz, or demonstration
___preceded activity, such as video, with a clear introduction and followed it with integration into the lesson
___prepared well-constructed exams & other evaluation activities
___returned carefully graded work quickly
___brought course to effective conclusion
___arrived early and waited after for informal conversation
___encouraged prosocial behavior in students
___responded effectively & appropriately to student misbehavior
___paused, when making a presentation, at least 10-20 seconds for questions
___other_____

9. Mastery Learning

___used self-paced projects/activities with definite student goals/objectives
___used effective evaluation methods
___worked with individual students until they learned the material
___other _____

Other Instructional Types. If there are teaching techniques you use other than those indicated above, please describe them:

Instructional Change

Compared to five years ago (or for new faculty, the first semester you taught), have you changed the way you teach? ___**yes** ___**no**
If yes, how?

What prompted the change?

___response to end-of semester student evaluations
___informal conversations with students
___informal conversations with faculty colleagues
___collaboration with faculty colleagues
___on-campus workshops with outside consultants
___on-campus in-house workshops
___other _____
___departmental peer review of teaching
___peer review of teaching by someone outside my department
___department chair review
___off-campus workshop/conference on teaching in my discipline
___interdisciplinary off-campus workshop/conference on teaching
___my own reading and reflection

Your Teaching Philosophy.

Look back at the items marked "R."
How representative of your overall teaching philosophy are the methods you chose?

___very representative
___somewhat representative
___somewhat unrepresentative
___very unrepresentative

Is the class you chose and the way you taught it representative of your teaching style?

___very representative
___somewhat representative
___somewhat unrepresentative
___very unrepresentative

Which **one** of the items marked "E" will you try next week?

In which area do you have the most checks?

The fewest?

Active Learning . . .

Assumes that for learning to occur the student must be actively mentally engaged, that only listening is insufficient. Instruction becomes involving students in doing activities to enhance learning and in thinking about their learning while they are doing it. The role of the instructor is facilitator of student activity, not deliverer of information. A major challenge is reaching students accustomed to passively learning. Many of the other terms in common use (e.g., cooperative learning, service learning) can be seen as subcategories of Active Learning.

Dodge, Bernie. Active Learning on the Web (no date). Available: http://edweb.sdsu.edu/people/bdodge/active/ActiveLearning.html.

Seeler, D. C., G. H. Turnwald and K. S. Bull. From Teaching to Learning: Part III. Lectures and Approaches to Active Learning (9/17/99). Available: http://borg.lib.vt.edu/ejournals/JVME/V21-1/Seeler1.html

Bonwell, Chuck. Active Learning and the Internet (7/15/97). Available: http://www-cs.canisius.edu/~mcconnel/AL_Archive/Bonwell.html

Classroom Suggestions for Active Learning
by Thad Crews, Jr.

Introduction

The more students are involved with their education process, the more they learn. From this simple premise follows the concept of active (or involved) learning. Active learning may be broadly defined as "anything that involves students and causes reflection about the things they are doing."

> *Studies of classrooms show repeatedly that nearly 90 percent of time in college classrooms is filled with teacher talk. National reports criticizing higher education have called for the use of instructional strategies that more actively engage students in learning and help them to acquire better skills in writing, speaking, thinking critically, and solving problems.*[1]

> *Students learn both passively and actively. Passive learning takes place when students take on the role of "receptacles of knowledge"; that is, they do not directly participate in the learning process. ... Active learning is more likely to take place when students are doing something besides listening.*[2]

> *Active inquiry, not passive absorption, is what engages students. It should pervade the curriculum.*[3]

There is no one "correct" way to achieve active learning in the classroom. Within the class the teacher selects suitable active learning strategies. Such activities often take only a few minutes but may last for the entire class period. The activities may involve the students as individuals or in groups.

Teaching strategies that promote active learning include group discussions, problem solving, case studies, role plays, journal writing, and structured learning groups. The benefits to using such activities are many, including improved critical thinking skills, increased retention and transfer of new information, increased motivation, and improved interpersonal skills.

One Example: Paired Activities

If you are looking for a place to start, let me recommend having students work in pairs. It represents a low-risk activity and can be used in classes of any size (large classes simply have more pairs). It virtually guarantees participation by every member of the class and can be easily adapted to almost any content. (The following activities are taken from *A Handbook for Teaching Assistants at the University of Minnesota*.)

Paired Activity #1: Think/Pair/Share

The objectives are to engage the class with the material on an individual level, in pairs, and finally as a large group. The activity can help to organize prior knowledge; brainstorm questions; or summarize, apply, or integrate new information. Approximate time: six to eight minutes.

The procedure is as follows: 1) individuals reflect on and write brief notes for one minute in response to a question; 2) students pair up with someone sitting near them and share their answers verbally for two to three minutes, or they may choose to work together to create a better answer; 3) the instructor randomly chooses a few pairs to give thirty-second summaries of individual or joint answers.

Paired Activity #2: Question and Answer Pairs

The objective here is to engage students with outside-of-class readings and then to pair them to answer particular questions. This helps to increase motivation to read before the class, to deepen the level of analysis of articles, and to practice explaining difficult concepts. Instructors may choose to model the kinds of questions that are appropriate to this exercise or somehow indicate the level, content, or scope of appropriate questions. Approximate time: five to ten minutes.

The procedure is as follows: 1) students read the assignment before class and compose one or two questions about it; 2) in class, the students pair up; A asks a prepared question and B responds; then B asks a prepared question and A responds; 3) the instructor may ask students to turn in their questions and summary answers.

Paired Activity #3: Note-checking Pairs

The objective is to engage students with their notes during class in order to integrate their notes on new material with previous material, to clarify major and minor points, and to increase accuracy in note-taking. Approximate time: two to five minutes.

The procedure is as follows: 1) at the end of a lecture segment (15 minutes is a good length), students pair up to complete a task with their notes; for example, they could summarize the three major arguments of the lecture, choose the most important idea that will appear on the exam, check the accuracy of some information, or use the notes to solve an example problem; 2) when comparing notes, the instructor should encourage the pairs to ask questions if there is any discrepancy in their understanding; when solving problems, the instructor may ask students to turn in their answers.

Keys to Success

Incorporating active learning does not necessarily require more effort that traditional lecture preparation. What it does require is the desire to improve the students learning process and the commitment to explore new teaching approaches. Here are some guidelines to consider.

1. Start small and be brief
2. Always try the question or task yourself first. Whenever possible, also try it on a colleague.
3. Develop a plan for an active learning activity, try it out, collect feedback, then modify and try it again.
4. Be candid with the students as to why you are asking them to do these things. Explain attention span, the need for engaging material individually and socially, and that research shows better learning occurs by using active learning.
5. Vary the accountability by occasionally having students turn in the work. Read a sample then comment specifically on them.
6. Incorporate some of the informal activities in the formal evaluations in some way. For example, include a short essay question that was used in a think/pair/share.
7. Find a colleague or two to plan with (and perhaps teach with) while you're implementing active learning activities.
8. Continue learning through workshops, reading, and practice.

Obviously there is much more to say (and—more importantly—to learn) about this topic. Below are some recommended information sources for your consideration.

[1] Michigan State University Teaching Assistant Handbook. http://www.msu.edu/~taprog/hb.htm

[2] Ryan, Michael P., and Gretchen G. Martens. 1989. Planning a College Course: A Guidebook for the Graduate Teaching Assistant. Ann Arbor, Mich.: National Center for Research to Improve Postsecondary Teaching and Learning. (p. 20)

[3] Johnson, Joseph, Jane Spalding, Roger Paden, and Abbie Ziffren. 1989. Those Who Can: Undergraduate Programs to Prepare Arts and Science Majors for Teaching. Washington, D.C.: Association of American Colleges. ED 316 682. (p. 68)

Suggested Web Links

http://www.active-learning-site.com/

This excellent site supports the scholarship of teaching by providing research-based resources designed to help faculty use active learning successfully in college and university classrooms. Includes bibliographies, research summaries, and additional internet links.

http://www2.ncsu.edu/unity/lockers/users/f/felder/public/Cooperative_Learning.html

Articles and columns written by Dr. Richard Felder on active learning (AL) and cooperative (team-based) learning (CL) in engineering and college science education.

http://www.atl.ualberta.ca/articles/idesign/activel.cfm

A handbook that presents the idea of interactivity as it applies to a cohesive design including high interface, content, and instructional design.

Suggested Readings

Bonwell, Charles C. and James A. Eison, Active Learning: Creating Excitement in the Classroom, 1991, ASHE-ERIC Higher Education Report, Washington, D.C., ISBN # 1-878380-08-7.

Campbell, William E. and Karl A. Smith. New Paradigms for College Teaching. San Francisco, CA: Jossey-Bass Publishers, 1995.

Johnson, David W., Roger T. Johnson, and Karl A. Smith, Active Learning: Cooperation in the College Classroom, 1991, Interaction Book Co., Edina, MN, ISBN # 0-939603-14-4.

Critical Thinking . . .

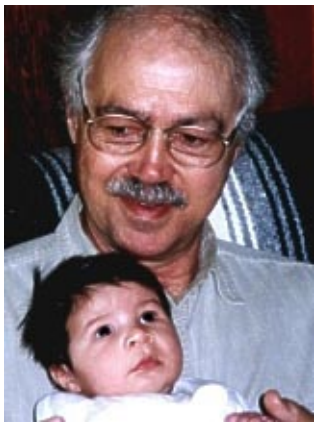
". . . is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue; assumptions; concepts; empirical grounding; reasoning leading to conclusions; implications and consequences; objections from alternative viewpoints; and frame of reference." Scriven, Michael & Richard Paul, Statement for the National Council for Excellence in Critical Thinking Instruction (no date). Available: http://www.criticalthinking.org/university/defining.html.

Center for Critical Thinking (no date). Available: http://www.criticalthinking.org/

Thoms, Karen Jarrett & Najmi Junaid. Developing Critical Thinking Skills in a Technology-Related Class (no date). Available: http://www.mtsu.edu/~itconf/proceed97/thinking.html

Raths, Louis E., Selma Wassermann, Arthur Jonas, & Arnold Rothstein. *Teaching for Thinking: Theory, Strategies, & Activities for the Classroom.* 2nd edition. New York: Teachers College Press (Columbia University), 1986. [This book available at CTL.].

Steven Toulmin, A Resource for Teaching Critical Thinking by Joe Glaser, English



Dr. Glaser and his grandchild

Stephen Toulmin, born 1922, studied mathematics and physics at Cambridge and, perhaps oddly, became interested in human rationality during WWII. His most important book, *The Uses of Argument*, takes aim at classical logic modeled on the cool precision of mathematics. Truth in the real world, says Toulmin, is more often fuzzy, based on probability, experience, and culturally conditioned suppositions. Toulmin appeals to conceptual psychologists, cultural anthropologists, sociologists of knowledge, and, in a humbler fashion, specialists in speech and writing. He has much to offer teachers of critical thinking, an area we all salute—though usually from a safe distance.

Forget Aristotelian formulas, says Toulmin in essence. Any argument can be reduced to three elements, which may be stated or merely implied. Every argument must stake a *claim*. Every argument must rest on *evidence.* (If there's no evidence, there's no argument, just a claim.) And every argument must offer a *warrant*—some guarantee that the evidence does indeed justify the claim.[1] This basic model is as simple and sturdy as a three-legged stool. *Claim, evidence, warrant*: if you know these you can analyze other people's arguments or do

justice to your own. If you don't, you can't.

Take the oldest logical chestnut under the tree. *Claim*: Socrates is mortal. *Evidence*: Socrates is a man. *Warrant*: All men are mortal. Classifying this as a deductive argument and appealing to the arcana of syllogisms misses the point, says Toulmin, by implying the form of the argument is somehow more important than its truth. *Is* Socrates a man? *Are* all men mortals? That's what's important, not major and minor premises.

Besides confusing students, emphasizing form leads to a wrongheaded view of truth, he says. There are no perfect arguments, even in the airy realm of deduction. How do you know all men are mortal? You can't remember one who wasn't. How do you know Socrates is a man? Peek under his *himation*, I suppose. Either way, you must consult experience, and either way your experience may be wrong. There is no certainty outside closed systems like mathematics. Accordingly, Toulmin-style arguments leave lots of room for "probably," "perhaps," "I guess," and other qualifiers.

Toulmin's model works as well for inductive as for deductive arguments. From 1979 to 1987, says a *New York Times* articles in one of my textbooks, 57,000 women a year complained of being assaulted by their husbands, while 210,000 a year reported assaults by their ex-husbands. This proves, says the article, that women are safer from abuse in stable marriages. *Claim*: Women are safer from abuse in stable marriages. *Evidence*: The *Times* statistics. *Warrant*: Those statistics justify that claim.

Toulmin's model demystifies thinking by dragging its structure out so you can examine its unspoken purposes and assumptions. Students armed with Toulmin can examine their own beliefs systematically without getting unduly involved with its form. Each belief is a *claim* they value. Each is based or not based on *evidence*. The evidence may or may not *warrant* the claim. Looking at things this way detoxifies emotional issues and helps students get a grip on pragmatic ones. Their government papers will be more persuasive if they can isolate and examine the steps in their own thinking or in the theory they're critiquing. On the personal side, they may still choose to believe god will burn you in hell for playing bingo, but they'll have to admit the evidence for this is scanty enough to be reasonably ignored by the woman with the eyeshade filling in eight cards.

The Toulmin approach strips arguments down to the essentials—not always easy in a world where all the parts of an argument are rarely stated in so many words. Look again at the *New York Times* argument. Even if the statistics are accurate, what do they really prove? Could women in stable marriages be less eager than divorced women to report abuse? Mightn't a few ex-wives report abuse where there isn't any? How would these possibilities skew the paper's conclusion? Can you know without more research?

Besides, aren't there other claims involved in that argument? Saying women are less likely to be abused in stable marriages than when they're divorced is like saying they're less likely to be burnt if their houses are not on fire—if that's all you mean. But doesn't the paper want us to think that marriage of itself *causes* relative safety from abuse? Its wording nudges us in that direction. *Real Claim*: Marriage is an intrinsically safe, desirable state. *Evidence*: 57,000 married women get beat up each year. *Warrant*: only 57,000 documented cases of spouse abuse a year means that married women are safe. Whoa! You could use the same statistics to argue with equal logic that more women would do well to walk out of their marriages.

Toulmin has a lot more to say about thinking than I'm qualified to discuss, but his deceptively simple basic model is a great tool for teachers and students alike to strip arguments to their bones and test their strength. If you want to build critical thinking into a course, there's no better way than to introduce Toulmin's model early and keep coming back to it until it becomes second nature for the students. When they start demanding evidence and warrants for what you say, you'll know you've succeeded.

[2] Warrants isolate the steps in thinking most useful to examine and least likely to be stated. Toulmin is a qualified nominalist—that is, he thinks most effective warrants appeal to standards respected by certain cultures and subcultures. That's why an argument that holds up perfectly well in an economics class may be viewed with disdain in an ethics course or considered irrelevant in science. Much of the acculturation function of education is teaching students what warrants carry weight with what groups.

Sources:

Because Toulmin's logic is so useful in the classroom, there's an abundance of practical and theoretical information about

him on the Internet.

(The following URL's were collected by CTL staff. They were operational at press time. Inclusion here indicates no endorsement of the material other than for illustration purposes.)

http://www.unl.edu/speech/comm109/Toulmin/index.htm
Toulmin Project Home Page, created by Charles Soukup and Scott Titsworth, Department of Communication Studies, University of Nebraska-Lincoln.

http://rjohara.uncg.edu/darwin/files/biblio.toulmin
(A bibliography compiled by Robert J. O'Hara and Patricia C. Dew, Center for Critical Inquiry in the Liberal Arts and Department of Biology, University of North Carolina at Greensboro.)

http://www.wright.edu/~chall/toulmin.htm
(Toulmin's system explained for a writing class assignment with illustrations.)

http://www.wam.umd.edu/~gaines/toulmin.html
(An illustration of the system as used in a communications class.)

Or look for

Foss, Sonja K., Karen A. Foss, and Robert Trapp, eds. *Contemporary Perspectives on Rhetoric*. 2nd ed. Prospect Heights, IL: Waveland Press, 1991.

Problem-based Learning . . .

Assumes learning follows from exploring an authentic problem. Students are presented with an appropriate real-world problem and small groups of students work to resolve the problem. The role of the teacher is to facilitate or guide, asking key questions. The outcome is an integrated set of knowledge and skills. A major challenge is to guide the student in acquiring self-directed learning skills.

Barrows, H. "Problem-based learning in medicine and beyond: A brief overview." *New Directions in Teaching & Learning*, 68 (1996): 3-12.

Duch, Barbara J., Deborah E. Allen, and Harold B. White, III. "Problem-Based Learning: Preparing Students to Succeed in the 21st Century." *Teaching at UNL.* Teaching and Learning Center, University of Nebraska-Lincoln, 22:2, October 2000, 1-3. [Available at the CTL]

Engel, J. "Not Just a Method But a Way of Learning." D. Boud & G. Feletti (eds.) *The Challenge of Problem-Based Learning.* New York: St. Martin's Press, 1991.

PBL, especially in the context of large classes. (no date). Available: http://chemeng.mcmaster.ca/pbl/pbl.htm

Rehm, J. (1998). Problem-based learning: An introduction. 8(1), (October 30, 2000). Available: http://www.ntlf.com/sample/pbl.htm.

Southern Illinois School of Medicine. Problem Based Learning Initiative (8/25/00). Available: http://edaff.siumed.edu/dept/

Tries, Dan. Problem-Based Learning: A Case Study (5/12/97). Available: http://www.udel.edu/pbl/dancase3.html

U of Delaware. Problem-based Learning (5/18/200). Available: http://www.udel.edu/pbl/

Wilkerson, LuAnn & Wil H. Gijselaers, editors. *Bringing Problem-Based Learning to Higher Education: Theory and Practice. New Directors for Teaching & Learning.* 68 (1996). [See this entire jornal edition which is available at the CTL.]

Utilizing Applied Projects in Undergraduate Industrial/Organizational Psychology Courses

Elizabeth L. Shoenfelt, Department of Psychology

Introduction to Industrial/Organizational Psychology

A recent study (Gasser, Whitsett, Mosley, Sullivan, Rogers, & Tan, 1998) indicated that less than 15% of the general population had ever heard of the profession of Industrial/Organizational (I/O) Psychology. Accordingly, it is likely a brief introduction to the field of I/O Psychology will benefit most readers. Industrial/Organizational Psychology is the application of psychological principles to improve performance in work settings, both from the perspective of the organization in terms of increasing performance effectiveness and from the perspective of the worker in terms of maximizing worker contribution and satisfaction. The focus of the "I" side of I/O Psychology is on the "ability" component of the "Performance = ability x motivation" equation. This is operationalized by developing and implementing human resource management (personnel) procedures such as job analyses to identify the knowledge, skills, and abilities (KSAs) needed on the job; selection instruments such as ability tests and interviews to ensure workers with the requisite KSAs are hired into the job; performance appraisal systems to measure performance on the job; and training programs to develop KSAs needed for the job. All of this is done within the EEOC guidelines and fair employment laws. The focus of the "O" side of I/O Psychology is on the "motivational" side of the performance equation. Organizational Psychologists apply principles of motivation, leadership, satisfaction, commitment, organizational justice, organizational theory, design, and development to ensure that workers capitalize on their job-related knowledge, skills, and abilities.

The Use of Applied Projects in I/O Courses

To many undergraduate students enrolled in an Industrial/Organizational Psychology course, the field of I/O appears to be something of a paradox. I/O Psychology claims to be an applied discipline yet the portion of the course devoted to personnel

issues is quite technical and quantitative while the portion devoted to organizational issues is theoretical and abstract. Instructors of I/O are often confronted by students with questions of how all of this is put in to practice. A very positive approach to answering this question is through the use of applied projects as part of the course requirements. Specific projects may be used throughout the semester to increase student understanding of the principles and applications of topics covered in the typical undergraduate I/O course. The projects involve a variety of applications. Some are completed outside of the classroom through independent efforts while other are completed in group sessions during the class period. The relationship between different aspects of I/O is emphasized through carryover from one topic to another (e.g., data generated in a job analysis project are later used in a criterion development project). Projects have proven to be a very useful tool in teaching the undergraduate I/O course, providing students with experiential learning opportunities and bringing to life the theories and technologies of the discipline.

Examples of Applied Projects

Across semesters, the actual projects assigned for the course may vary. Typically six to eight projects are assigned and completed in a semester. Several examples of projects follow.

Job Analysis Project. The Critical Incidents Technique is a method of collecting job information that may be used for multiple purposes. In this project students are required to follow prescribed procedures to generate two critical incidents for the job of college instructor. That is, they are to generate an example of actual instructor behavior that illustrates very good performance and an example that illustrates poor performance. Students are then provided with a number of other critical incidents for this position. Again following the appropriate procedure, students sort all of the incidents into dimensions of college teaching. These dimensions are then named. Based on the collective information, students write a job description for the position of college instructor.

Behaviorally Anchored Rating Scale (BARS) Project. This project is completed by a "team" of four to six students. The materials developed in the Critical Incidents Project are used in this project. The team selects one dimension of performance for a college professor. The critical incidents sorted into this dimension are identified and are listed on a format that is provided to the students. Each member of the team independently rates each incident on a 5-point rating scale of performance effectiveness. The students then calculate the average and the standard deviation of the ratings for each incident. Based on the ratings statistics, incidents are identified to anchor the BARS scale. The actual BARS rating scale for the selected performance dimension is developed.

Weighted Application Blank (WAB) Project. Students are provided materials that include completed application blanks and job performance measures for the same 40 individuals. Following the correct procedure, students score the WAB. Students then plot the WAB data and the performance data to determine the validity of the WAB. Students are required to compute and report relevant statistics such as the accuracy of the WAB in predicting job performance and the utility of the WAB for selecting employees.

Decision Making in Work Teams Project. Students are placed in teams of four to six students. Students are trained in the Consensus Method of decision making. They are given a group decision-making exercise. The students initially complete the exercise independently. Next they complete the exercise utilizing the Consensus Method. Students are then required to write a evaluation/critique of the consensus method, referring to the stated objectives of consensus decision making.

Support for the Use of Applied Projects

There are several theory-based rationales supporting the appropriateness of applied projects. The first of these rationales is rooted in Anderson's (1982, 1995) theory of skill acquisition. Anderson identified three stages involved in cognitive skill acquisition: (a) declarative knowledge or the cognitive stage, which consists of facts and data related to task performance; (b) knowledge compilation or the associative stage, which involves a transition from memory-based declarative information to a procedural based representation of the performance; and (c) the autonomous stage, in which the performance becomes more automated as less effort is required to recall facts or the procedure.

Kraiger, Ford, and Salas (1993) concluded that as students gain experience with a task through structured activities, their declarative knowledge is not only compiled into procedural rules, it also becomes more meaningfully organized in memory in knowledge structures such as scripts, schemas, mental models, and cognitive maps. As more experience is gained (through projects and later on the job) and students move from novice to experts, the underlying knowledge structure becomes more

relevant to the specific task domain in terms of both broader and deeper content and better organization of that content (Smith, Ford, & Kozlowski, 1995).

A second rationale supporting the use of applied projects is found in the empirical literature on guided discovery learning. Guided discovery either reduces or restricts the response options available to the student (Greenockle & Lee, 1991), or provides the student with the general strategy or approach for addressing the assigned project, requiring the student to discover the specific actions required (McDaniel & Schlager, 1990). Applied projects may incorporate either of these strategies to direct the students in their learning of how to complete the project. As the student discovers the appropriate solution to the applied problem, he/she must infer and learn rules, principles, and strategies for effective performance. Because the student is actively engaged in the learning, he/she may feel more motivated and personally responsible for the learning, and may better integrate what they learn into their knowledge structure.

In addition, applied projects allow the student to learn from the errors they make. Errors indicate an incorrect assumption in the student's knowledge structure and provide students with an opportunity to learn to cope with and recover from errors. Students should learn what caused the error and how to avoid the error in the future. Error-based learning should provide methods to assist students in managing errors (Frese & Altman, 1989). For example, in a project with sequential components, students might be given feedback on one component before moving to the next. Other examples might include forewarning students of likely errors or a grading key that counted off minimally for a computational error if the correct tactical procedure was followed (Ivancic & Hesketh, 1995/1996). Both error-based learning and discovery learning can lead to the development of higher quality knowledge structures.

A final rationale for the use of applied projects rests in the applied nature of I/O Psychology. In an applied discipline, it is important that students not only know what to do, but also are able to do it. This requires a deeper level of learning than simply memorizing techniques or theories. Gist and Stevens (1996) and Gist (1997) distinguished operational levels of a learning hierarchy that begins at the cognitive level and proceeds to demonstrated behavior. This hierarchy focuses on the increasing complexity of learning that may be required in moving students from cognitive tasks (e.g., memorization) to behavioral tasks (i.e., performance). The first three levels of learning in the hierarchy are cognitive: (1) Recall - the ability to reproduce what has been taught; (2) Comprehension - the understanding of the material taught; (3) Synthesis - the ability to make cognitive connections between the material taught and other relevant material or knowledge, applying the learned principles to different contexts. The final two levels in the hierarchy are behavioral: (4) Practice - behavioral demonstration of appropriate knowledge in a simulated context that may provide feedback and reinforcement and where the student knows the situation is not real; and (5) Performance - behavioral demonstration in the transfer setting (e.g., on the job) which is typically less supportive and more distracting than the practice setting.

Different levels of learning are likely required for performance to be satisfactory in different situations. Take for example a student who becomes a manager who must make decisions regarding the legality of a number of different employment practices. If the manager merely needs to recite the law, recall would be sufficient. If the manager needs to explain the law, comprehension would be sufficient. If however the manager needs to know these laws to determine whether or not his/her organization's employment practices create organizational liability, synthesis is required. If the manager is required to act on this knowledge to implement or prevent the implementation of certain employment practices, the learning should progress to the behavioral level of the learning hierarchy.

In most work situations, cognitive learning needs to be demonstrated in performance on the job. Behavioral practice as gained through applied class activities is integral for ensuring mastery of the course material and increases the likelihood students will be successful in appropriate performance on the job. When the target performance involves learning motor or interpersonal skills, behavioral practice such as that required by applied projects becomes essential.

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Case-based Learning . . .

Assumes the learner must construct his/her learning in order to advance from theory to practice. Students review a specific, realistic, complex event (case) requiring some type action on their part (e.g., a recommendation). The role of the teacher is to facilitate student analysis, discussion and resolution of the cases through effective questioning. A major challenge is to create meaningful and appropriate cases and questions.

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The Use of Case Studies to Teach in Science
by Lynn D. Austin, Allied Health & Human Services

Instruction in science courses has traditionally used the lecture method. More recently, however, the effectiveness of the didactic lecture has been questioned.

The case study method of instruction offers a more problem-based approach to instruction. The case method stresses the development of students' communication and higher order thinking skills exemplified by encouraging them to engage in critical analysis.

Cases are stories with a message, not simply narratives for entertainment. Often times, case-based situations have no single solution or answer but, instead, are meant to provoke thoughtful discussion.

There are several steps to realize when writing/teaching a case. The example used here involves a case I wrote for the University of Buffalo's website.* I was addressing the issues of a needle stick, how it could have been prevented, and sequelae. First, the situation must be analyzed. Who are the major characters, their background, their motivation? From whose view-point does the story develop? A dental student treating a patient with a communicable disease was the focus of my case. Characters were developed with a significant amount of background information. Dialogue was also a prominent portion of the case to make it more "reader-friendly." The second step in case writing involves deciding what action should be taken, considering both short and long-term solutions.

I have found that using cases to teach specific content areas is more relevant than many other strategies because it brings the students closer to reality. The case method approach is a scholarly undertaking that offers students the opportunity for inquiry and reasoning.

*http://ublib.buffalo.edu/libraries/projects/cases/ubcase.htm
"Needles and Pins: A Case Study in the Management of Occupational Exposure to Percutaneous Injuries"

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Using a Directed Case: Pointing Students in the Right Direction
by Byron Sleugh, Agriculture

In all my years in the classroom, I have used a number of teaching methods, to varying degrees of success. Some methods were mergers of several different ones to create an approach that I thought would be appropriate for the situation. I have also seen other teachers use a variety of methods, some masterfully, others not. Having discovered the Directed and the Interrupted Case Study approaches, I find them very useful and applicable to any subject area. However, I find that a blend of both methods is even more effective at times. Also, my students usually have positive feedback regarding the exercise.

The directed case method is content driven and built around specific learning objectives (Cliff and Wright, 1996). Students are given a series of specific questions about the case that is presented, by answering the questions the students will be forced to review material, relearn, and apply knowledge gained from lecture or the text. Since this is a directed case, it is not open ended. There should be a specific answer for almost all of the questions posed. In the interrupted case, you provide information at key points (you interrupt) in the case instead of giving all the information at once.

Cliff and Wright (1996), suggest 4 parts to the directed case approach or method.

1. Defined, inclusive learning objectives
2. An engaging and informative case scenario or narrative (I suggest it be credible also). I often use journal articles or newspaper clippings as the case scenario.
3. Pertinent, instructive questions
4. Information needed to answer the questions should be readily available to the students.

In preparing a case, I often use current affairs. In this regard, students can observe the relationship and application of the class material to real life. This is of utmost importance, especially in some science classes where students tend to ask “why do I have to learn this anyway?” The events you put in the case scenario should be realistic, but the plot itself can be fictitious. In doing so, the case will be easier for them to read and follow and it will get them more involved. Where possible, add characters to the narrative to put a personal spin on it. It is well known that people tend to remember characters in a story, and their experiences, better than if there were no names or “real people” involved.

The hardest part of developing a directed case is writing the level of in-depth and analytical questions required. To us, as we read the newspaper or watch television, we can read between the lines and understand certain cause and effect relationships. Our students don’t always understand that relationship, even though they are more than capable of doing so. For the best result, the questions should show direct use of the subject matter in a “real world” situation.

This method works best for me, when I have students tackle the problem in groups during class. This way they will discuss the questions and often weigh various answers before deciding on a particular one. I provide the reading assignment or case narrative for the students to read prior to the class period in which we will discuss the case. I do not provide the questions at that point. If the case is brief enough, we will do everything in class. The new 75-minute class periods on Tuesdays and Thursdays will facilitate this well. Cliff and Wright (1996) gave students the case studies to work on individually outside of class, but they were free to form groups to work on it. Many students find that a lab partner or friend taking the same class will make an excellent teammate. Having completed the assigned reading or the case narrative, the students should be ready to tackle questions of varying complexity.

This case approach has been used successfully in a number of disciplines and at every class level. I have had success particularly with it in my Environmental Science and Crop Physiology classes. Crop physiology students welcome the opportunity to see that the metabolic pathway that appears so complex on paper is actually easily manifested in the field. The recent drought problem in some parts of the state has made it easy to develop a case. I would begin by developing the case around the corn that is turning brown in the field and the parched soil. I will continue to build the case around the visible signs of the drought. Having laid that ground work, I can ask questions about how this drought will affect the physiology of the plant: cell expansion, photosynthesis, respiration, carbohydrate partitioning, structural strength, and most importantly, yield. It would not be adequate for a student to provide an answer that simply says "yield will be decreased." The student will have to know the physiological processes that are affected by water stress and demonstrate how drought affects yield through a cascade of metabolic/biochemical pathways. I am always amazed at how happy the students look when they realize that they knew so much "stuff" and had been given the opportunity to use their knowledge.

If you would like to get students excited about a particular topic, tell them a story and then ask them questions (with specific answers). That's basically what the directed case method involves.

Good luck and happy teaching.

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Collaborative Learning . . .

Assumes that "learning is a naturally social act." (Gerlach, p. 8). We learn from sharing our ideas with others in an active, constructive manner that encourages participants to collectively work through problems. The connections between the learners (telling and listening) are a vital part of the process.
The role of the instructor is to create the conditions (e.g., setting up student roles) and help the class to synthesize the outcome. The challenge is teaching students how to work in a collaborative environment.

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Cooperative Learning

Assumes that learning happens when participants realize they are interdependent and seek outcomes beneficial to everyone in the class. Cooperative Learning occurs when students "work together to maximize their own and each other's learning." (Johnson, Johnson, & Smith, p. 3) Small groups work on assignments until everyone understands and can do them. It is often associated with Collaborative Learning. A major challenge is managing group activities.

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Increasing Knowledge through Collaborative Learning
By Johnston A. K. Njoku, MLIS

Introduction:

This article is about increasing knowledge through a collaborative learning method. The method allows students to take part in the construction of their knowledge by sharing with one another skills, ideas, and information on any subject that they are studying. Collaborative learning encourages positive individual commitment, relative independence, mutual interdependency, and healthy dynamic intra-group exchange. In small group collaborating learning contexts, students do realize that each of them has a responsibility to make a maximum input to their group's knowledge of the subject or object of study. I know from the classes that I teach on cultural diversity that when students engage in a healthy exchange in a collaborative learning context, they work hard as individuals in order to succeed as a group. In the process, each increases their individual knowledge bases.

The biggest challenge of collaborative learning at a college level is that every classroom consists of people from different regional, environmental, linguistic, religious, occupational, social and cultural backgrounds. As such, there is bound to be some misunderstanding and often conflict. For this reason, there is always a need for negotiation and intercultural understanding. Two other challenges of the collaborative learning are these: First, the instructor has to know how to generate and promote the spirit of positive self-image and collective integrity. Second, students must learn how to use group meetings or classrooms as contact zones for

healthy exchange. Other challenges exist and the critics are quick to point these out to the proponents of the collaborative learning method.

Irrespective of its challenges, studies also show that when students in collaborative learning contexts own the collective responsibility to learn, they increase their group knowledge as well as their individual knowledge bases. Comparative studies on cooperative, competitive, and individualistic learning at college level found cooperation to promote greater intrinsic motivation to learn, enables more frequent use of cognitive processes, higher-level reasoning, cognitive elaboration, and greater long-term maintenance of the skills learned. The studies also show that students learning cooperatively felt more social support (both academically and personally) from peers and professors than did students working competitively." Another outcome is this: "When students worked cooperatively, positive and supportive relationships tended to develop, even among students from different ethnic, cultural, language, social class, ability, and gender groups."[1]

In this article, I use the subject of diversity to show how to increase college level student knowledge of cultural diversity in the United States through collaborative learning from various intellectual perspectives and multicultural dimensions. Before demonstrating how this method plays out in my classrooms, let me first present an outline of the steps in collaborative learning:

Step One: State the subject, issue, or study object. Remember that nobody comes to a classroom blank. Make it clear that we both the teacher and students want to learn from one another.

Step Two: Brainstorm with students. Call for what students already know about the subject. This is will become the basis of their additional knowledge.

Step Three: Develop a conceptual frame of reference. Ask students to stop and think of the underlying ideas of the subject to determine the conceptual focus.

Step four: Relate concepts to Facts. Ask students to state how they can relate the core ideas and issues of the study object to facts in their specific areas of interest and in their various communities.

Step five: Compare the differences and similarities. In small group discussions, ask students to examine and evaluate the essential differences and overlapping similarities of the facts that have established and help them to view rival explanations as alternatives.

Step six: Explore the academic and social relevance. Be sure to give students time to discuss what they have learned from one another and how their contributions have enhanced teacher and learner effectiveness and increased group knowledge from various dimensions and perspectives. You can ask students to submit suggestions of how what they have learned can be useful to them in their workplaces and/or communities

Step seven: Formulate hypotheses or intellectual assumptions

Drawing from what the students have learned and observed, formulate the hypotheses or intellectual assumptions that will guide further case studies of the subject.

Step eight: Evaluation. Design examinations and projects to assess the understanding and skillful application of the skill learned and concepts of subject from different perspectives and dimensions in academically and culturally significant ways.

Application of the Method to a Course on Cultural Diversity in United States:

Throughout the course, I assign readings and video documentaries that relate to concepts, major issues, and classroom discussions. When or if necessary, ask students to use specific examples or sections of the videos to illustrate their understanding of why you have covered or are covering in the period.

I started using this method[2] when I found that, because my course on cultural diversity fulfills several General Education requirements, students come to my class from various disciplines with diverse epistemological backgrounds. Some students take the course to fulfill writing requirements, others take it for ethics, but most others take it to satisfy their world culture requirements. Furthermore, each class has students who are at various levels of school knowledge—freshmen, sophomores, juniors, and seniors—who come from diverse cultural backgrounds with different social conditions.

Nevertheless, no matter their majors and knowledge levels or social and cultural backgrounds, I take it that students do not come to my classroom blank. I therefore consider their intellectual, social and cultural backgrounds, as well as their purposes for taking the class to be the bases of their additional knowledge. I assume that students come to my class in search of and will get additional knowledge whether they know it or not. I also keep at the back of my mind that my students will find the additional knowledge and experience they gain from taking my course to be useful to them, both in the classroom and in their various communities. Specifically, what follows is how I apply the collaborative learning method outlined above in the college level cultural diversity course.

The Application of Step 1:State the subject, study object, or issue.

This is how I begin by teaching of cultural diversity. You have heard of the word diversity especially with the qualifying adjective cultural. Therefore, I take it that we are all familiar with the term cultural diversity. Cultural diversity

in the United States is our subject for this course. We shall be exploring this subject from many dimensions and perspectives in culturally significant ways. I would like you to write a paragraph of what you understand by cultural diversity. Keep your notes for we will come back to them in our class or in our small group discussions

The Application of Step 2: Brainstorming

I get the students in small groups and ask them to brainstorm based upon what they already know about the subject. Here is when they use the paragraphs, which they had written as a point of departure. During this brainstorming session, the students will give all kinds of responses drawing from various backgrounds and stands on diversity issues. Usually the key words that come out of this exercise are works like communities, people, conflict, racism, etc.

The Application of Step 3: Developing of a Conceptual Frame of Reference:

I ask students to stop and think of the underlying ideas of the subject to determine the conceptual focus of the subject matter. The intention is to make students think conceptually or intellectually and to develop a conceptual frame of reference for the study of cultural diversity. I try to help students to derive the defining ideas of the subject from their different perspectives. I ask each of the students to jot down and be prepared to submit to the class three ideas that come to their minds as they thought about the subject. Working with students, we categorize their responses. Usually their responses will fall into two broad categories: First, issues (racism, segregation, prejudice, etc. and second, concepts or defining features.

At this point, I try to help students to think more about the defining ideas of the subject from their different perspectives. I ask students to reflect critically upon the underlying ideas of the two words "cultural" and "diversity" to determine the conceptual focus. Then the students actually begin to think of the defining ideas of the subject. Sometimes I guide their thinking by suggesting that they look closely at the two words to determine their parts of speech. Expectedly, we will arrive at the conclusion that the focus of the subject matter is really diversity and that the term cultural is an adjective that indicates from what perspective we will be looking at diversity. Here are some defining ideas of diversity:

1. Diverse
2. Difference
3. Divergence
4. Variegated, various and variations
5. Multiple or many
6. Assorted
7. Multi
8. Identities

These words have different connotations and ramifications. A few examples will illustrate this point. Divergence implies the capacity to go into many or different directions. In that sense, malleability is a crucial element in the nature of diversity. The word multi means more than two, therefore having many parts, elements, or identities. Then we should consider identity as a factor of diversity. Various imply variants, variegation, etc.

The Application of Step 4: Relating concepts to facts

As we have seen diversity is not just an abstract idea, it is also a factor of culture. You cannot just overlook the social issues of cultural diversity. I ask each student to go in small groups and discuss how to relate the core ideas and issues of diversity to facts in their specific areas of interest and in their various communities. During this exercise, we establish the fact that people perceive diversity according to their various environmental, linguistic, religious, occupational, social and cultural backgrounds.

We then define cultural diversity as any kind or a combination of the kinds of diversities we identified that make sense from cultural perspectives. We use the following working definitions to explain how these kinds diversity can make sense in cultural significant ways.

Six Kinds of Diversity:

1. Environmental Diversity. We can relate the idea of difference, variation, and multiplicity to our environment in terms of different climates and weather conditions, many kinds of vegetation and landmarks in various regions of the country.
2. Linguistic Diversity. Many languages are spoken in the United States, in addition to the American English language. Many people especially in the southwest also speak Spanish. There is the Pennsylvania Dutch, which is a form of German language. The French language is spoken in certain parts of Louisiana. Many American Indian groups have their own languages. Even the English language spoken in the United States has many dialectical variations. A good illustration of linguistic diversity is found in the documentary, "The American Tongues."
3. Religious Diversity. There is hardly any religion in world that is not found in the United States. The most prominent ones are Christianity, Judaism, Hinduism, and Islam. Of these, Christianity has the largest numbers of believers. Christianity is also divided into the Protestant and Catholic faiths and each of

them, especially the Protestant, has many denominations.

4. Occupational Diversity. There are so many occupations in the United States. Farming, cow ranching, fishing, trading and banking, teaching, etc. Some regions of this country attract particular kinds of workers. There are potato farmers in Idaho, cattle ranchers in Texas, miners in Kentucky and Michigan, etc.

5. Social Diversity. The population of the United States is made up of a variety of gender, racial, age, class, ethnic, linguistic, religious, and other groups.

The Application of Step 5: Comparing differences and overlapping similarities:

In small group discussions, I ask students to examine and evaluate the essential differences and overlapping similarities of the facts that they have established. I encourage them to pay attention to how their facts, ideas and experiences challenge, refine and complement each other. Helping students to view rival explanations as alternatives they may wish to consider is a good strategy. It lets them know that there could possibly come a time when, in different circumstances, it may become necessary to go back to the contrasting viewpoints or alternatives previously considered.

Step six: Explore the academic and social relevance:

Periodically, I give students time to discuss what they have learned from one another and how their contributions have enhanced teacher and learner effectiveness and increased group knowledge from various dimensions and perspectives. I encourage them to submit suggestions of how what they have learned can be useful to them in their workplaces and/or communities. We also, at this point, pay special attention to the ways in which people from diverse gender, racial, age, occupational, and ethnic group respond to the major issues they fact in the greater American experience.

Step seven: Formulate hypotheses or intellectual assumptions

Drawing from what the students have learned and observed, formulate the hypotheses or intellectual assumptions that will guide further case studies of the subject Here are some of the intellectual assumptions underlie collaborative learning of cultural diversity in the United States:

1. Most people in the United States live in multiethnic and multicultural communities rather in clearly defined homogeneous communities.

2. New immigrants and ethnic groups do undergo some forms of social change and cultural transformation in order to integrate and function effectively in multiethnic American work and public places.

3. Although immigrants are made to conform to or gradually assimilate American ways of life, they tend to retain some characteristic behaviors and practices that they brought with them from their original countries.

4. Whenever people from different regional, environmental, linguistic, religious, occupational, social and cultural backgrounds live and work together, there is bound to be some misunderstanding and conflict, and for this reason there is always a need for negotiation and intercultural understanding.

5. Through constant dialogue, negotiation and re-negotiation, different ethnic groups begin to recognize, appreciate, and expect or anticipate essential differences and overlapping similarities among them, and to engage in healthy intercultural understanding and multicultural exchange.

6. Intercultural understanding starts with self-definition. Therefore, to understand the cultures of other ethnic groups and to effectively engage in multicultural exchange, you should know your own community traditions and ethnic heritage(s).

7. The more you know your own ethnic heritage(s) and community traditions as well as the ethnic heritages and community traditions of other ethnic groups, the more diverse your perspective. But the knowledge of your family values, ethnic heritage(s) and community traditions is the basis of additional knowledge.

8. Self-cultural understanding, intercultural understanding, and multicultural exchange are essential dimensions of multicultural education.

Conclusion:

Increasing knowledge through collaborative learning entails that students own the collective responsibility to increase their individual and group knowledge of any subject or object of study from various perspectives and dimensions. Knowledge is increased by engaging the students in the construction of additional knowledge by learning and sharing with one another ideas, information, skills, intellectual assumptions, and issues of any subject that they are studying does this.

Notes:

[1] According to David Johnson and Roger Johnson, "The research on achivement found cooperation to promote greater intrin-

sic motivation to learn, more frequent use of cognitive processes such as reconceptualization, higher-level reasoning, metacogintion, cognitive elaboration, and networking and greater long-term maintenance of the skills learned. . . .Futhermore, "students learning cooperatively felt more social support (both academically and persoanally) from peers and professors than did students working competitively." Another outcome is "When students worked cooperative, positive and supportive relationships tended to develop, even among students from different ethnic, cultural, language, social class, ability, and gender groups." See their article on "What We Know About Cooperative Learning at the College Level." http://www.2.emc.maricopa.edu/CCL/whatweknow.html.

[2] I use a combination of the question and answer, brainstorming, and the knowledge construction, collaborative, and cooperative learning method. and the following scholarly works are relevant:

1. In the past education was too often Eurocentrically based. When alternative images were examined, they were most often subjugated to the metaphor of the melting pot: quaint reminders of colorful customs that some days would be little more than intriguing relics of the folksy past (Jo Farb Hernandez 1994, 62)
2. Dinesh D'Souza in Illiberal Education (1991, 214-15) criticizes multicultural education programs as "bullying pedagogy," "ethnic and female cheerleading," and finds the efforts of multicultural educators as less than adequate in terms of intellectual rigor (Gay 1994, 38).
3. Pluralistic education is based on the notion that the United States has many ethnic groups (Haut 1994, 26). Within this new conceptualization, we cannot but accept that a society of such diversity would enjoy multiple aesthetics and cultural values (Hernandez 1994, 63).
4. Teaching styles should match the learning styles of different ethnic individual and cultural groups. Education should help students accept their ethnicity as an essential component of their personal development.
5. Multicultural content, experiences, and perspectives improve learning for culturally different students. Students should learn about the contributions that diverse groups have made to humankind and culture in the United States (Gay 1994, 47).
6. Now it is important to see ethnic characteristics as powerful resources for learning. . . . Rather than being denied in the classroom, they can and should be used to promote educational achievement (Burger 1973, 18).
7. We need are leaders and educators of good will, from all political and ideological persuasions, to participate in genuine discussions, dialogues, and debates that will help us formulate visionary and workable solutions. We need solutions that will "enable us to deal creatively with the challenges posed by the increasing diversity in the United States and the world. We must learn to transform the problem related to racial and ethnic diversity into opportunities and strengths" (Banks 1994, 3; and Banks 2000).

Service Learning . . .

Assumes that student motivation to learn is enhanced when course activities are involved in fulfilling real world needs. Civic responsibility, as well as critical thinking, is enhanced with this method. The role of the instructor is to reinforce the links between the service activity and the course. Major challenges are to sustain programs and to sustain the depth of learning of the content.

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Nursing Education Beyond Classroom Walls: Service Learning Through Collaboration with Community Partners

by Beverly Siegrist, Nursing, and **Susan Jones,** Nursing

Susan Jones (left) & Beverly Siegrist

Introduction

A continuing challenge for nursing educators in institutions of higher learning is to identify teaching methods that contribute to the development of moral judgement, civic responsibility, cultural competency and global awareness in students while developing basic professional skills set forth in the nursing curriculum (Halstead & Billings, 1998). The integration of structured service learning activities throughout the curriculum is one teaching strategy that assists in meeting these challenges. Service learning is defined as purposeful, planned experiences designed to connect academic learning with service to the community (individuals, groups and special populations). The expected outcome is for the student to develop a commitment to social responsibility both as an individual and member of his or her chosen profession. This outcome is more likely achieved when faculty collectively identifies service learning as an important program emphasis.

Service learning is appropriate for the discipline of nursing which like other service disciplines exist to meet the needs of society. The nature of the relationship between nursing and society is outlined in Nursing's Social Policy Statement (American Nurses Association, 1995):

> Nursing can said to be "owned by society" in the sense that "a profession acquires recognition, relevance, and even meaning in terms of its relationship to that society, its culture and institutions and its other members."(p. 2)

The American Nurses Association, the Pew Charitable Foundation and both accrediting bodies for nursing (The American Association of Colleges of Nursing and the National League for Nursing) all identify "service" as a value vital to nursing as a profession and interdisciplinary community-based skills as essential competencies for nurses in the 21st century. The integration of service learning into the nursing curriculum creates educational opportunities for students to internalize the value of "service" while achieving these essential professional competencies.

Service Learning Projects: Essential Component of Collaboration

For the past seven years service learning activities have been an integral part of community health nursing courses in the baccalaureate-nursing program at Western Kentucky University. These planned activities have expanded learning experiences beyond the walls of traditional clinical practice settings. Partnerships have been created with community agencies/ organizations resulting in the development of a model for community-based experiences. Partnerships were created with

diverse community groups such as the Kentucky Cancer Program, the March of Dimes, Family and Youth Service Centers at county and city schools, the Kentucky Farm Bureau in five south central Kentucky counties and the Kentucky Partnership for Farm Family Health and Safety, Inc. (KY Partnership). Creating community partners and collaborating with these partners to achieve mutual goals is essential for the success of any service learning project.

Description of a Specific Project

One specific project (Jones & Siegrist, 1999) conducted in collaboration with the KY Partnership during the 1996-97 academic year is described to illustrate a model for integrating service learning activities into core program courses. The KY Partnership is a community-based organization with a basic goal to promote the health and safety of farm families in Kentucky. Since 1993, nursing students and faculty have partnered with this organization to maximize resources to achieve a common goal: to provide health promotion for local farmers.

Ten baccalaureate-nursing students collaborated with the KY Partnership to serve farmers through the provision of health education in 10 sites throughout Warren County. Working through the Partnership they were directed in how to access, assess and educate the farmers at gathering sites where they gather daily to eat and meet. These sites located in Warren county included Kitchen's Grocery, Richpond Market, Baldock's Lumber and Supply Co., Greenwood Market, Steff's Pro Hardware & Supply, Martin's Farmhouse, Donita's Diner, Hadley's One-Stop and the 231 Market.

Assessment

During the fall semester, the students contacted each site and provided free blood pressure screenings. Farmers and other patrons were requested to complete a survey indicating their priority health concerns. Findings from a review of the literature were used to generate the items on the survey tool and included topics related to agricultural health and safety. The students assured the farmers they would return to the communities in the spring to provide the health information the farmers identified as priority.

Assessment Findings

Results of the survey revealed that 373 individuals were screened for hypertension with 274 completing parts of the survey form. One-third of the individuals participating in the blood pressure screening had an elevated reading (>114/90). Priority health promotion topics identified by the participants were stress management (5 sites); skin cancer education (4 sites); respiratory illnesses and prevention (1 site) and emergency care of tick, snake and insect bites (1 site).

Planning and Implementation

For the spring semester, the students returned to each meeting site to share information on the topic ranking as priority concern at each site. As the students prepared and shared the educational posters and handouts, they collaborated with experts on each topic to validate the health education message planned for the poster presentation. For example, the students used the resources, information and services of personnel at the Kentucky Cancer Program in preparing and presenting the poster on skin cancer prevention. Other partnerships were formed as additional posters were designed and shared.

Evaluation

All collaborators (students, farmers and community partners) were pleased with the outcome of this project. The *students* reported that the project provided experiences in developing and utilizing teamwork, collaboration, health screening and communication skills. Creating the poster displays fostered creativity and enhanced critical thinking skills. The *farmers* obtained increased accessibility of health care information as they received health education in their own community. The method established a new network for health care delivery and identified farmers needing immediate referral for high blood pressure readings. The *community agencies/organizations* were provided the opportunity to enhance their visibility in the rural communities and achieve their goal of providing community education to improve the health and safety of farm families. In addition, the partnerships created with these groups resulted in continued service learning projects in future semesters.

Faculty evaluation of students included both process and summative, using qualitative and quantitative methods. Student journals became important in the evaluation process as students were guided in understanding the needs of rural people outside the walls of their regular clinical settings. While students were required to record the "numbers of contacts," equally important were the lessons learned informally (educational surprises) from the farmers. The farmers not only discussed their health needs but also shared information about the dangers and importance of their chosen occupation. These experiences contributed to the students' development of communication skills and cultural competence. Students wrote group papers based on criteria predetermined by faculty (program planning guidelines, group process, etc.) and individual papers that included self-evaluation, lessons learned and the significance of the service learning project to their developing roles as professional nurses in society.

Faculty Lessons Learned and Recommendations

Faculty and student roles sometimes became blurred as both learned from and took advantage of the educational surprises of service learning experience. Faculty learned alternative teaching strategies and skills related to guiding and facilitating, community building and the sharing of faculty roles with the community coalition members. The faculty has learned that an understanding of chaos and empowerment theory is helpful when using service learning projects to assist students to achieve their educational goals. Faculty may find the biggest challenge is in redesigning their role as clinical

expert within a new setting outside the walls of the traditional clinical setting. This can be accomplished but may require that faculty learn new skills related to community based teaching and practice such as program planning, community assessment, coalition building and servant-leadership. Faculty with the need for control will perhaps have the greatest difficulty in moving from the traditional faculty role to one of coach and resource person that is needed for service learning. Some nursing faculty find the movement to community-based settings a threat to traditional clinical settings; however, these authors have found that the multiplicity of relationships which have evolved from involvement with service learning projects have been an opportunity for personal and professional growth. The stress caused by changes in faculty role have been balanced by helping students develop a set of core values essential for health professionals in service to society and helping to ensure that learning is authentic and sustained (Drunker, 1989). Service learning may be a challenge but as Lineman stated (Wilson & Porter-O'Grady, 1999), " Don't be afraid to go out on a limb. That's where the fruit is."

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Learning Communities . . .

This approach takes a curricular perspective. Learning is assumed to be enhanced when learning activities from two or more courses are integrated or coordinated. Models for accomplishing that integration range from coordinating a single activity for several courses, such as a speaker, to blending a group of interdisciplinary courses in such a way that the separation between the courses is lost. The interdisciplinary focus requires cooperation and coordination by the instructors of the involved courses. A major challenge is sustaining coordination.

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and/or families and/or other classes without fully digesting ideas they study. Most attend classes so they can simply

Learning Communities Transform Drive-Through Credentialing Into Rewarding Education: Curricular coherence, connections among students and faculty promote digestion of ideas

by Carol Graham, Management & Information Systems

For too many years I have served up intellectual snacks to students who rush to my classes and then rush off to jobs and/or families and/or other classes without fully digesting ideas they study. Most attend classes so they can simply finish their programs — they get undergraduate degrees but fail to receive an education.

Although I sometimes think of myself as a fast-food chef, I am also an excellent teacher. I use active and collaborative classroom methods, encourage students to take responsibility for their own learning, and develop students' critical thinking skills. Often over the course of a semester, our work together in a class leads to a sense of community: we know each person's name, discuss issues, practice skills, and learn from each other in a supportive community.

Learning Communities. However, this is not what I mean by "learning communities" (LCs). Learning communities change the traditional structure of course offerings rather than the methodologies used by teachers in courses. LCs include a variety of approaches that link or cluster classes during a given term, often around an interdisciplinary theme, and enroll a common cohort of students. In addition, the curricular structure also often includes collaboration among teachers.

Learning communities address the needs for: greater intellectual interaction between student and student, student and faculty, and faculty and faculty; curricular coherence through reinforcement and/or integration of ideas; understanding issues which cross subject matter boundaries; active and collaborative learning; exploring and understanding diverse perspectives; and faculty development. LCs are found in developmental studies, freshman year experiences, strategies for coherence in general education, writing and speaking programs, study in a minor, study in the major, and graduate school programs.

Learning Community Models. Usually, teachers teach separate courses to separate sets of students, and students experience their separate courses in unrelated fragments. By the time students graduate, they have collected impressive piles of bricks rather than built strong foundations for their houses of life-long learning. By intentionally pairing or clustering courses into programs, both teachers and students experience a more coherent and enriched teaching and learning environment. I am familiar with three basic types of learning community models: paired or clustered classes; student cohorts in larger classes; and team-taught coordinated study programs. Variations of two models have been tried at WKU.

One simple structure links a skills course, perhaps English 100, to a content course, say sociology. That is, students who sign up for the English course are required to sign up for the sociology course also. To complete the link, the English teacher and the sociology teacher meet and discuss how to organize it. Since sociology courses usually have a higher enrollment that composition courses, there may be students in the sociology class that are not in the linked English class. A similar linking took place at WKU and linked UC 101, Freshman Seminar, and chemistry where the UC 101 cohort all took the same chemistry lab and also were enrolled in the same large chemistry lecture section. In another case, one section of UC IO 1 was linked with a section of English 100. In both examples there was no need for faculty coordination because the English teacher also taught UC 101; the chemistry teacher taught UC 101, the chem lab, and the chemistry lecture class. I think WKU's UC 101 requirement is ripe for linking or clustering with other courses. These links may not require faculty coordination if integration and discussion of ideas takes place in the Freshman Seminar setting.

In a second model, programs of two or more classes, which a cohort of students takes together, are linked thematically or by content. The faculty do plan the program collaboratively. WKU's's Humanities Semester might follow this example; however, I do not know how much collaborative planning is done by the teachers in this program. The WKU Community College formed a learning community of students and teachers where the student cohort was enrolled in four classes: Freshman seminar, developmental math, developmental English, and an elective, sociology.

In another model, a small cohort of students enrolls in several larger classes that faculty do not coordinate. Intellectual connections and community building can take place in an additional integrative seminar. Perhaps a cohort of Honors Program students could enroll in courses and have a colloquia serve as the integrative seminar.

At this time at WKU, I cannot imagine a team-taught program of three or four courses where work is embedded in an integrated program over the course of a semester.

Learning Community Outcomes. Learning communities are effective in promoting student outcomes such as increased retention and achievement; increased involvement and motivation; shorter time to degree and degree completion;

and intellectual development. Faculty outcomes include an expanded repertoire of teaching approaches, revised course content, and new scholarly interests; faculty mentoring; and faculty engagement with beginning students and general education requirements. The institution benefits from an opportunity for curriculum development and the strengthening of teaching and learning.

Successful learning community implementation requires extensive *cross-unit coordination. In addition, LCs are exciting and time consuming—don't try this if you do not have tenure; beware of local politics; find a friend who wants to try this, too.*

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A more complete bibliography can be found at the Center for Teaching and Learning. There are also listservs on learning communities.

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Much of the material presented in this article was gained from a presentation by Jean MacGregor at the Learning Communties Workshop held in March 1998 at the University of South Florida.

Teaching in the New Millennium: Two Enduring Principles
by Rob Byrd, Computer Science

Teaching is a profession. And by definition, a profession is an "occupation requiring advanced training ... and usually involving mental rather than manual work" (Webster's, 1953). Mastering and employing techniques which result in reducing the profession of teaching to a manual skill is not only demeaning for teachers, but ineffective as well. Whether explicitly stated elsewhere in this booklet or not, no teaching method described herein is meant to be mechanically implemented. Without the expertise and wisdom of a qualified professional — that's you and me — a technique is no more than a checklist of how to bake brownies or assemble a bicycle.

Of course, the primary purpose of teaching is not actually teacher teaching, but student learning. In this light, two core principles become visible which, if internalized, will hopefully increase the effectiveness of every teaching method described in this booklet. One core principle I hold to is that, as a teacher, I am a leader of students, not a manager of students or classrooms. The difference may seem insignificant now, but my intent is to demonstrate how their difference is essential in fulfilling the purpose of teaching. And, in an attempt to be completely removed from any educational taxonomy or jargon for which you may already have a preconceived understanding, I will label the other core principle true learning. My goal in teaching is not to simply increase a student's knowledge of a subject, but to increase his/her understanding and capacity for subsequent independent learning of that subject. Without accomplishing this goal I am effectively handicapping the future graduate and not providing to society what it has already paid for, competent and self-sufficient citizens.

Paradoxically there are techniques, or at least guidelines, for implementing these core principles. In Part A: Leadership, not just Management, I explain the difference between leadership and management by introducing transformational/transactional leadership. I then give some quick examples of what leadership may look like in the classroom. Part B: Learning in Spite of Technology contains some probing questions and an illustration of how I have tried to create true learning in a laboratory situation. These articles may at first seem to some readers negative or even antagonistic, but are intended to only make all of us think about how we practice our profession of teaching and to consider ways of making our mission more successful.

Part A: Leadership, not just Management

Managing is about efficiency, resources, and organization. In a classroom all of these are necessary. Any unorganized teacher who has to track grades for 150 students per semester will not last. Leadership, on the other hand, is about people, and inspiring them to do more than they would have done otherwise — more than they thought they *could* do. The concept of transformational/transactional leadership probably (Bass, 1990) evolved from the Ohio State Studies, where the leadership concepts Task Initiation and Individualized Consideration originated (Seltz & Bass, 1990). While the terms and definitions vary from study to study, transformational leadership is generally considered to have four elements: Charismatic Leadership, Inspirational Leadership, Intellectual Stimulation, and Individual Consideration.

Specifically, Charisma is the aspect of leadership that provides a clear vision and a sense of mission for the follower. It instills pride in the organization, giving a sense of belonging to the followers. Charismatic leaders gain respect and complete trust of their followers. Inspirational Leadership communicates expectations to followers and uses symbols to focus efforts toward the mission. An inspirational leader has the ability to express important purposes in simple ways. Intellectual Stimulation promotes intelligence, independent thinking, rationality, and the development of problem solving skills. Individualized Consideration is the personal attention given just at the right time in order to carry along the follower's interest, understanding of, and commitment toward the vision or mission. Coaching, advising, and showing consideration even for personal/private concerns of the follower are part of this concept as well. Different researchers (e.g., Lowe, Kroeck, & Sivasubramaniam, 1996; Burns, 1978; Conger & Kanungo, 1987; Yukl, 1989) have given slightly different descriptions of transformational leadership than presented above, but all present it as a leadership style that encourages cultural change and the adoption of a new mindset.

Transactional leadership includes elements which could be considered as more traditional management styles, namely, Contingent Reward, Management by Exception (Active and Passive), and Laissez Faire. First, the concept of Contingent Reward suggests that contracts (written or not) are required in order to get the follower to perform some task. If the task is performed according to the predefined agreement, then the reward is given to the follower. Leaders displaying Contingent Reward will recognize accomplishments. With the second concept, Active Management by Exception, a leader watches and searches for deviations from rules or standards and attempts to take corrective action. This characteristic will not allow for recognition of unexpected successes or accomplishments. One only looks for defects and the negative side of performance.

Leaders practicing Active Management by Exception will, however, try to look for deviations before they occur or at least as they are occurring, and attempt to minimize the cost of the poor performance or incorrect action. Passive Management by Exception is characteristic of the leader who intervenes only if standards are not met. Laissez Faire, often considered a form of non-leadership rather than an element of Transactional leadership, would describe the one who avoids making decisions altogether. This leader would likely be out of the office whenever an important decision needs to be made.

While transactional leadership, including Contingent Reward and Management by Exception (Active and Passive), may not embody all aspects of management, it could generally describe several management roles and affect the outcomes of decisions regarding efficiency, resources, and organization. Researchers have repeatedly found in studies that transformational leadership is more effective than transactional leadership alone, calling the phenomenon the one-way augmentation effect (Bass, 1997). By leading students and not just managing classrooms, we can be effective as well as efficient. The concept of leadership presented here is not to be confused with the educational term Teacher as Leader, which generally entails taking on school-wide responsibilities, committees, bearing some of the administration's burden, etc. All those endeavors are fine, and I'm sure, constructive, but don't directly address the present discussion of leading students.

Is it necessary or even possible to be a transformational leader in the classroom? If our primary purpose is student learning, I don't see how we have a choice. Almost by definition, we will be practicing this leadership style as we increase understanding and capacity for subsequent independent learning. This can only be realized by changing the student — or more correctly — allowing the student to change and providing support and direction for that change. Some simple examples of how to practice transformational leadership follow.

Managers-only don't see the point in learning all the student's names. Leaders learn them and use them to show consideration for the individual. This small act instills great motivation and self-esteem in the student. Managers wouldn't ask hard, provoking questions during class time. It would only result in "dead air time" and not be efficient. Leaders ask those intellectually stimulating questions and don't get nervous when no one answers until after ten or fifteen seconds of quiet. It is only then that the students really believe the teacher wants a meaningful answer rather than a rote spout. When handled properly these situations often result in complete engagement of the students. Managers prepare lessons and present them: it's called being organized. Leaders also know the material in the lesson and communicate it to the students in whatever fashion necessary, even if it means using unrehearsed analogies to provide a clearer picture of the concept. Similarly, managers may put staying on schedule with their syllabus ahead of making sure the students understand the material. Leaders know that if today's material isn't understood, tomorrow's lesson won't mean anything anyway. Managers look at the clock to make sure they are going to finish their presentation in a timely manner. Leaders look into the eyes of the students to make sure there is still an open communication line, and adjust as necessary to keep the line open. Managers reward accomplishment with grades. Leaders additionally provide praise for effort irrespective of the accomplishment. Managers know they control the reigns because they turn in the grades. Leaders also foster a sense of community, allowing the students to take pride in knowing they had something to do with the success of the course....Well, I hope you get the idea.

There are, undoubtedly, some professors who are very skeptical about this type of charismatic, inspirational, wishy-washy hogwash. I have met them. But in my experience over the past several years, the more I try to become a transformational teacher, the more satisfying my work is, and the more effective college teacher I think I have become. Remember, transformational elements of leadership are to augment those of management, not replace them.

Part B: Learning in Spite of Technology

From the Internet to the electronic chalkboard and from ACT scores to computer lab manuals, technology is a dominant factor in every aspect of education. Is it possible to develop a computer-based computer lab with no direct "instructor" contact? Sure it is. *Simply* (ha ha) write a set of instructions in a clear enough format that all students can understand (after throwing away the concepts of learning styles and multiple intelligences), develop a software tutoring system to guide the learner through the exercise, and computerize a grading system which simultaneously evaluates the student's work and records a score in the teacher's grade book. But before fully committing to such a ~~mythology~~ methodology we need to determine its possible consequences.

It's one thing to mass produce rifles using an automated assembly line, but quite another to automate an assembly line of students using tutorials on a computer. Has education already gone too far in automating education? Employers expect their workers to think on their feet, yet teachers hand each student a calculator and implicitly say not to be bothered with quick recall or memorization. Managers want supervisors with effective verbal and written communication skills, yet teachers give multiple choice tests and students think word processing spell checkers correct homonym errors and other inappropriate word usage. And I apologize for not having time to joust every academic department, but I personally have been guilty on all charges listed above.

[Surprisingly,] I'm not blaming teachers. One cause for this behavior may be the external pressure for teachers to be more efficient, as opposed to being effective. Pressure to get students with ACT scores of 14 to learn the material just like every other student. Pressure to produce. Produce more research. Produce higher retention. Produce, produce, produce. Another

source of degraded education is the evolution of the meaning of learning. Ages ago, learning (at the university level) meant gaining understanding as well as knowledge. That was the distinction between liberal arts schools and technical schools. Now, no matter what is stated in the university's mission statement or the department's degree program, bachelor's degrees are obtained by some students with less than four years of college knowledge and almost no understanding. How do they slip through? Just maybe, technology is not the silver bullet we were looking for to increase the level of true learning on campuses today. Since most of the constraints just described are not about to go away, what is a teacher to do?

Just by recognizing the ensuing technological barrage and its possible effect on true learning is a great start. Although I may have come down hard on technology, I think it is necessary to do so, given the overwhelming attention technology has recently been receiving. Every technology, whether ACT and IQ scores, pencil and paper, or a virtual university, is not either good or bad, but both. And it is impossible to determine the final outcome of a newly unleashed technology. Secondly, by continually refocusing on our core principles of leadership and true learning, we can develop strategies which incorporate technology, yet make the student aware that their true learning is what is important to us.

Here is an example from my computer science lab taught primarily to freshmen and sophomore students. One teaching method could be (and in some schools is) to write specific instructions for the student to follow, down to the specific command or keystroke. By the end of the two-hour lab he/she will have completed the assignment and "learned" the topic. The student passes with an A and thinks the material is understood. It never really was comprehended. Another, less extreme, method would be to explain in great detail the primary operations and algorithmic processes which must be properly coded to complete the assignment in the most efficient manner, even though a class lecture has already been presented on the topic. This may work in some cases, but prevents the student from thinking for him/herself and usually doesn't prepare the student for harder problems unless given the proper algorithm the next time as well. A third method could be to only define the problem to be solved and give total freedom to develop any operations and processes which may (or may not) solve the problem.

The roles of the teacher in the most recently described method would be to empower students to be creative, vigilantly watch as frustration levels get high enough to produce true learning, and to intervene before frustration is high enough to break the student's spirit. When students accomplish something that seems difficult to them there is enormous intrinsic reward, increased motivation, and a craving to be challenged even greater the next time. Students want to be challenged. They also want to be recognized by a real person, not a computerized "_Super job! Bob_." Furthermore they want to know you, the teacher, are in the trenches with them. (Sounds kinda like leadership, doesn't it?) A lab assistant in the computer lab is good, but not the same as a caring professor in the computer lab who will immediately recognize when the student's program works. I don't mean to patronize at all — it's human nature, but they want to be able to say, "Look Dad, I did it." What's really pathetic, I feel like a proud father and all I really did was encourage them when they didn't think they could do it. Sure, this method takes more energy out of a teacher. But the reward is well worth it. It's a phenomenon that technology can't reproduce for the student or for the teacher. I have applied this nontechnical, empowering approach to the other areas originally mentioned (math, multiple choice tests, and writing challenges) with similar success. When we understand that technology is not the cure-all, but a set of tools at *our* disposal to produce true student learning, our teaching will be effective and our methods will be appropriate.

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Other Models of Teaching & Learning . . .

Instructional Skills approaches

Actually a collection of several models, these approaches assume learning follows from particular instructional events or skills. The skills can be inadequately characterized as effective communication using all channels (verbal, nonverbal, materials). These models tend to suggest specific steps and even sequences for instruction and remind instructors of the importance of "the basics." The role of the teacher is to move the students through the steps of learning. A major challenge is translating abstract or global skills, such as critical thinking, into "steps."

Travis, J. *Models for improving college teaching: A faculty resource.* ASHE-ERIC Higher Education Report No. 6. (1995) Washington, D.C.: The George Washington University Graduate School of Education and Human Development.

Mastery Learning

Learning occurs when the student receives clear performance feedback in progress toward specified learning objectives in the course. Students continue with instructional activities until they achieve mastery on the criterion. The instructor guides the student toward this goal. A major challenge is managing the activities.

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Ryan, Doris. "Implementation of Mastery Learning and Outcome-Based Education: A Review and Analysis of Lessons Learned." Department of Human Resources, Canada (10/24/00). Available: http://www.hrdc-drhc.gc.ca/arb/publications/research/abr-96-4e.shtml

The Roles of the Student in a Project-Based Engineering Curriculum

Joel Lenoir and John Russell, Engineering

Introduction

The Department of Engineering at Western Kentucky University (WKU) has been given the rare opportunity to create an entirely new engineering program, with the challenge to develop a unique undergraduate curriculum centered upon the needs of current and future regional industrial partners. Although WKU has a foundation of more than thirty years of engineering technology education, these programs in Civil, Electrical, and Mechanical Engineering are entirely new. The existing engineering technology programs are being phased out, with completely new engineering courses being developed for the three programs. A mixture of existing and new faculty is being assembled to deliver these new programs, and new physical facilities are under development in the science college.

The core of these new programs is a project-based curriculum centered on "design-build-test" learning experiences. A major goal of this curriculum is the preparation of graduates for the transition from student to practitioner, with recognition that the last semester is too late to begin learning the art of design and the fundamentals of practice. The introduction of project-based experiences into the engineering technology program began over six years ago, and responses from regional

employers have been enthusiastic. Students are recognized for their ability to work in teams to find optimal solutions to engineering design problems. They are familiar with successful product development methodologies. They understand project management and scheduling, and are comfortable with critical path analysis and structured problem solving.

The key to this success has been the integration of practice-based experiences into every academic year of the curriculum. Students have repeated opportunities to practice the "art and science" of engineering in projects of the appropriate sophistication at the appropriate time in the curriculum. This concept of project-based learning is now the cornerstone of the new Engineering Department and the individual programmatic missions.

Historical Perspective

Engineering education, in the period prior to World War II, was very practice-based with considerable emphasis on standard design according to codes and well-defined methods outlined in standard handbooks. Engineering curricula in the various disciplines contained a significant component of "skills" or "crafts" courses, and many of the engineering disciplines we know today did not yet exist or were subdisciplines of the more traditional fields.

Demands on the science and engineering community in support of wartime technological needs demonstrated that the traditional handbook methods were not adequate for the rapid emerging technologies. With the rise of Cold War military and aerospace competition and the associated funding supporting basic research in the universities, the pre-war engineering curricula had to change drastically. A much stronger foundation in mathematics, basic sciences, and engineering sciences was introduced, with university effort and interest directed towards graduate programs and students. This "paradigm shift" was given form and impetus with the 1955 ASEE report commonly called the "Grinter Report".[1]

Although these new research-driven schools were successful in the context of the national priorities of the era, there was growing concern that engineering education had moved too far in the direction of basic and engineering sciences and that a "correction" was in order. Numerous calls for change occurred, correlating to a shift in engineering practice from the support of defense and national R&D to the support of commercial competitiveness and service delivery during the period of the 80's and into the decade of the 90's. Increasingly, engineering college advisory boards and national organizations such as the National Science Foundation and the National Academy of Science began to call for engineering education to be more responsive to the demands of actual engineering practice in an increasingly global economy.[2-6] A variety of studies and reports demonstrated that, although graduates had strong technical skills, they were not as well prepared in the other skills needed for professional success.[2,7] In editorials, reports, and other media, an ever-increasing body of opinion supported the idea that the model for engineering education stimulated by the Grinter Report was not sufficiently responsive to the current context and that change was imperative.

In the latter portion of the 90's, a move towards a project-based learning model began to be supported in the American engineering education community.[8-9] Universities in the U.S. are beginning to embrace some of the concepts of project- or practice-based learning. Project-based learning is seen as one model for engineering education that responds to many of the issues raised for engineering education by a changed and changing engineering work place. It modifies the model resulting from the Grinter Report by re-introducing practice into the curriculum. Rather than returning to the time of limited and rigid "handbook" engineering, project-based learning enriches the engineering science experience and better prepares the graduates for a successful start of a professional career.

A Model of Experiential Learning

The theory of preferred learning styles proposed by Kolb[10-11] has been successfully applied to engineering education in a number of different ways.[12-13] A superior enhancement of his model of experiential learning is given by McCarthy as summarized by Sharp, et.al.[14] Kolb's model suggests that individuals have preferred styles of learning based on the manner in which they view the material presented in a learning situation. McCarthy assigns a basic explanatory question to each of these four learning styles, with these authors' words in parentheses: "Why?" (justification), "What?" (details), "How?" (procedures), and "What If?" (new directions). Those who successfully implement the Kolb model maintain that the successful educator will repeatedly teach in all four quadrants and will help students grow beyond the preferred style.

Anecdotal discussions with educators who have tested engineering students reveal the majority of these students are in the "What?" and "How?" styles. This is not surprising since most engineering students appear to be very structured thinkers focused on facts and procedures. However, the most successful engineering practitioners and designers are those who work in all four styles, with particular creative ability in the "What If?" style.

The Roles of the Student

The Western Kentucky University model of project-based learning is similar to the Kolb model in that four unique "Roles of the Student" are recognized and the educational experience moves through these roles. Students will cycle through these four roles, finally becoming dominant in the last role at the end of the college educational experience. The roles align fairly closely with the normal four college years, but great variation will occur in a given group of students.

The first role is **"The Student as Learner"**. Students often arrive at college unprepared for the challenges of higher education. Leaving home is often a major life change, and new habits of study and development must be established. Our challenge as an engineering program is to assist these students with this transition while providing a sense of identity as engineering students. Social and professional events are of equal importance to these young students. They need activities that help build a sense of community that will become important later as the course loads become more difficult. Field trips to regional industries are well received by these students, for they have little knowledge of the industrial and professional world around them. Projects such as mechanical dissection (disassembly of common devices) and simple student design competitions help them build confidence and foster their interest in engineering. It is important to recognize these students are in the Kolb "Why?" stage in their development: they may well need justification and support for their decision to study engineering or even attend school. It is the responsibility of the faculty to provide appropriate experiences to help these "Learners" in what may be a difficult introduction to higher education.

The second role is **"The Student as Observer"**. Students at this stage are beginning fundamental engineering science courses, which provide new and increasingly complex analytical tools to the student. College life can still be difficult during this period, with many students leaving school or feeling lost as they move through difficult mathematics and science courses with seemingly little connection to engineering. Design experiences intended to stimulate teamwork and creative problem solving can help build a bridge back to the engineering faculty. Focused tours to selected industrial sites may be of great value, for these students have moved beyond the "tourist" stage tour but still have little first hand knowledge of how engineers practice in daily life. They benefit greatly from simply "observing" professionals being professionals, in particular observing their own faculty being "engineers in education" rather than simply "engineering educators". Students are definitely operating in the Kolb "What?" learning style since the second-year engineering, mathematics, and science courses are so rigorous in format.

The third role is **"The Student as Assistant"**. The student has matured and grown in his or her ability to assist faculty with a wide range of projects. The "Assistant" is well suited to collecting engineering data or performing standardized experiments and tests. The design and documentation of components and machine parts is an increasingly familiar task to the students at this level. Experiences that provide growth in project management skills are very valuable to students now. They have an increased understanding of professional practice, engineering ethics, and the role of engineers in society. Design projects utilizing the technical and analytical expertise gained in engineering courses, combined with teamwork and creative effort, can help avoid the early onset of "paralysis by analysis" which can limit their ability to grow to the next level. Student competitions are an ideal way to build professional confidence. This role of the student corresponds well to Kolb's "How?" learning style since so many of the engineering courses are still very analytical and procedural.

The fourth role is **"The Student as Practitioner"**. Students at this level are involved in courses that synthesize material together from a wide variety of previous engineering courses. Common areas of study may include design methodologies, advanced system analysis courses, and experimental laboratory design courses. The Senior Capstone Design course is an integral part of the growth of the student practitioner. The successful completion of a substantial open-ended design and development project is the best indication that a student has reached the level of practitioner, someone who is ready for a successful start as an engineering professional. However, the capstone design course is not the only avenue for student professional development. Students entering this level are capable of independent practice under the supervision of another engineering professional. They may be entirely suited to work on collaborative projects with regional industries. This final role should find students in the mode of Kolb's "What If?" style as they work to solve open ended design projects, often attempting to answer Kolb's question as they seek optimal solutions to these problems.

The Roles of the Faculty

A discussion of the roles of the student is not complete without a mention of some of the roles the faculty must fulfill in a project-based curriculum. The three roles presented here may not be often cited as part of the project-based curricular experience, but the authors believe them to be important to the success of the educational experience.

First and foremost, the faculty member must be a practitioner. In order to become practitioners themselves, the students must have practitioners to "observe" and "assist". In addition, the students have to believe the faculty member has struggled with similar projects in the recent past. A sense of trust and respect is built over time in multiple projects conducted throughout the curriculum. The best approach is to work as a practitioner with the students early and often on a wide range of projects.

Second, the faculty member often functions in the role of "Vice-President of Engineering". The most important VP task is to break technology "logjams" that could threaten the success of a given project. Students have to do the work, but they do sometimes need assistance before they reach an intractable impasse. In addition, the faculty member manages the resources external to the group, often minimizing the effect of external pressures on the students. Examples may include pressures to change project requirements, problems with purchasing departments, and budget management.

Third, the faculty member must also occasionally function as a project team member, stepping in to assist in difficult

or tedious fabrication and testing steps. This helps build a sense of respect and community with the team and improves morale during tough moments. The faculty member sometimes helps the team make decisions as a fellow practitioner rather than as VP. The goals are to listen, give advice if asked, and allow the students to learn from the faculty member's experience. In addition, the students sometimes need a sounding board, a person who can listen as someone who has been in these difficult student roles before. The challenge is to let the students be students, maintaining a professional role and reserve while being sensitive to the struggles they may be experiencing.

Summary

The purpose of this paper is to help engineering faculty with one key element in the creation of a practice- or project-based curriculum. The development of successful engineering professionals is a process beginning early in the curriculum and nurtured over time. When coupled with appropriate experiences in an integrated curriculum, the recognition of the "Roles of the Student: Learner, Observer, Assistant, and Practitioner" can greatly facilitate this development process.

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Instructor Methods and the Student Input to Teaching Evaluation (SITE)

by Sally Kuhlenschmidt, CTL & Psychology

How do these methods relate to the Student Input to Teaching Evaluation (SITE)? The following are some possible applications.

Item 1: My instructor displays a clear understanding of course topics.
Item 4: Performance measures are well-constructed.

While effective use of all the methods requires instructor ability, the Instructional Skills and Mastery Learning Approaches emphasize clarity of presentation. These approaches also give attention to construction and use of performance measures. The Problem-based and Case based approaches may be seen positively because the evaluation is consist with real-world developments.

Item 2: My instructor displays interest in teaching this class.

Using a variety of methods not only helps the student learn, but also helps the teacher to retain his/her motivation for loving the material. A change in orientation by using a new method can reinvigorate ones feeling about a course, giving us a new puzzle to resolve.

Item 3: My instructor is well-prepared for class.

Booklet 2 in this series explored preparation to teach., but it is also pertinent for implementation of any of these methods. Trying these without adequate preparation and thought will hinder performance in class and may lead to rejection of the method without give it a fair chance.

Item 5: My instructor is actively helpful.

Implementation of all of the methods is improved if you help the students adjust to the change. They have been well-trained to listen to lectures passively. If you chose to implement the more active methods, expect to increase your helpfulness as your students adjust tot he change.

Item 6: Overall, my instructor is effective.

Active learning approaches (most of the methods presented) are considered by experts and researchers to be the most effective forms of learning. Students learn.

Item 7: My instructor treats me fairly with regard to race, age, sex, religion, national origin, disability, and sexual orientation.

Offering a variety of learning experiences provides options to meet our increasingly diverse student population.

Evaluation of this booklet --Appropriate Methods

1. Please indicate below how effective this booklet was in helping you explore effective methods for instruction.

not effective very effective

1 2 3 4 5 6 7

2. What were the two most helpful sections of this booklet?

3. What were the two least helpful sections of this booklet?

4. What teaching behavior have you changed or plan to change as a result of this booklet?

Thank you. Please send this evaluation in Campus Mail to:
Center for Teaching and Learning, Cravens Ground Floor