

# 2007 August Teaching Workshop



Rose-Hulman Institute of Technology  
Terre Haute, Indiana

## Electronic Resources

**This file contains the annotated electronic references and Web links referenced in the printed Workshop Binder. *Only the electronic resources are included in this document* – for the full set of recommended resources, please see the printed Workshop Binder.**

To access these electronic resources simply copy and paste a link URL into your Web browser, or, from within Microsoft Word, hold down the 'Control' key and click on a link of interest.

<b>References from Workshop Binder section</b>	<b>Page</b>
1. Student Cognitive Development .....	1
2. Writing Learning Objectives .....	2
3. Lecture Skills and Teaching Media .....	2
4. Active Learning .....	2
5. Classroom Assessment Techniques .....	3
6. Giving Feedback to Students, Getting Feedback From Students.....	3
7. Developing and Growing as a Teacher and Learner .....	3
8. Understanding Rose Students .....	8
9. What I Wish Someone Had Told Me My First Year at Rose.....	9

## 1. Student Cognitive Development

Providing applications to engineering education...

Wankat, P.C. and F.S. Oreovicz. Models of Cognitive Development: Piaget and Perry. In *Teaching Engineering*. Published online at

[https://engineering.purdue.edu/ChE/News\\_and\\_Events/Publications/teaching\\_engineering/index.html](https://engineering.purdue.edu/ChE/News_and_Events/Publications/teaching_engineering/index.html) (and references contained therein).

Additional information readily available on the web:

[http://www.cse.buffalo.edu/~rapaport/perry\\_positions.html](http://www.cse.buffalo.edu/~rapaport/perry_positions.html)

This site, authored by a computer scientist and philosopher, summarizes Perry's scheme and provides a suite of references to his own work and general websites on the scheme. The description on this site illustrates the more complete version of Perry – nine stages, where individuals are firm in their thinking and where they are transitioning.

<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Columns/Perry.html>

A lovely little scene, probably acted out by your students after your last test, that provides the opportunity to see Perry's scheme through the eyes of the student. Additional description of the scheme is provided, but no suggestions for support or nudging.

<http://faculty.tamu-commerce.edu/jreynolds/cogdevelop.pdf>

Reynolds, J. Cognitive development theories can be tools in our classrooms. Listed as Published in *University Studies Today*, the newsletter of the TAMU Teaching Center (Warning: do not cite as a published work). Overall, the article is general in nature but provides different and so useful descriptions of Perry's model and some direction for usage in the classroom.

<http://www.perrynetwork.org/>

The official site of the Center for the Study of Intellectual Development, this website is a compendium of resources on Perry and how to measure cognitive development. Warning: this site is rarely updated and the formatting makes the text sometimes impossible to read.

<http://www.diversityweb.org/digest/fw02/cognitive.html>

This site is a summary of research relating diversity and social justice education to cognitive development. The applications of this work are important: “[Students] socially homogeneous backgrounds have poorly prepared them for the diverse social identity groups they encounter on campus, the complex intergroup conflicts and perspectives they experience in residence halls, the multicultural content of some of their classes, and the multicultural norms, policies, and programs articulated generally on our campus.” In other words, students in dualism are strongly challenged by the college environment.

<http://www.iienetwork.org/page/85077/>

Stecker, E. Study abroad as a catalyst for student development: the case of engineering students. From the Institute of International Education, this short article touches on similar ideas as the

diversity work cited above, and argues that engineering students in particular benefit from the growth-encouraging experiences of overseas study.

## 2. Writing Learning Objectives

Arreola, Raoul A. "Writing Learning Objectives."

[http://www.utm.edu/grad/MISCELLANEOUS/Learning\\_Objectives.pdf](http://www.utm.edu/grad/MISCELLANEOUS/Learning_Objectives.pdf)

A good overview of accepted best practices in learning objectives, based (like most similar resources) on Bloom's taxonomy.

St. Clair, Sean. *IOWA: Instructional Objective Writing Assistant*.

<http://epitome.ce.gatech.edu/iowa/>

Provides surprisingly little help in actually generating specific learning objectives (especially given the title), but valuable in considering and planning a course and reflecting on its general learning outcomes. Good as a precursor to the development of more specific outcomes.

## 3. Lecture Skills and Teaching Media

American Society of Civil Engineers "ExCEED" (Excellence in Civil Engineering Education) seminars on Board Notes, Communication Skills, and other teaching topics – viewable online, at <http://www.asce.org/exceed/seminars.cfm>

Mittendorf, Joan and Alan Kalish. "The 'Change-up' in Lectures," *The National Teaching and Learning Forum* 5:2, 1996. <http://www.ntlf.com/html/pi/9601/article1.htm>

Lockhart, M., "10 Suggestions for Improving a Lecture," Teaching and Learning Committee, Montana State University, <http://www.montana.edu/teachlearn/Papers/lecture.pdf>

"How to Create Memorable Lectures," *Speaking of Teaching Newsletter*, produced by the Center for Teaching and Learning (CTL), Stanford University (<http://ctl.stanford.edu/Newsletter/>), Winter 2005, Vol. 14, No.1.

Suggestions for good and bad lecturing: <http://www2.glos.ac.uk/gdn/gold/ch2.htm>

## 4. Active Learning

Places to check on the web (for ideas, examples, and links to papers and references for digging deeper into this area):

*Dr. Richard Felder's web page(s):*

### **Resources in Science and Engineering Education,**

<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/>

There are lots of places you can go on the web (Google on “active learning” returns no less than 1.7 million, yike! ‘ “active learning” engineering’ yields a paltry 700,000), but if you want a solid start, this is a good place. This is the main page, and the link below goes to the page on active (and cooperative) learning.

### **Student-Centered Teaching and Learning**

<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Student-Centered.html>

Lots of great articles with lots of great references (wide-ranging).

*The Foundation Coalition’s page(s):*

### **Introduction to Active/Cooperative Learning**

[http://www.foundationcoalition.org/home/keycomponents/collaborative\\_learning.html](http://www.foundationcoalition.org/home/keycomponents/collaborative_learning.html)

Another excellent resource, and has lots of accessible publications.

## **5. Classroom Assessment Techniques**

Hard-copy resources provided for this session – please see Workshop Binder.

## **6. Giving Feedback to Students, Getting Feedback From Students**

Hard-copy resources provided for this session – please see Workshop Binder.

## **7. Developing and Growing as a Teacher and Learner**

### **Soft-side of Teaching**

Palmer, Parker J., *The Courage to Teach: Exploring the Inner Landscape of a Teacher's Life*, 10th Anniversary Edition. Jossey-Bass, San Francisco, 2007.

Parker Palmer has been speaking about teaching for many years. This is one of his most recent books on the teaching life. (Search the web to find other articles and books by this author.)

From the publisher’s website for the book: “ ‘This book is for teachers who have good days and bad — and whose bad days bring the suffering that comes only from something one loves. It is for teachers who refuse to harden their hearts, because they love learners, learning, and the teaching life.’ — Parker J. Palmer [from the Introduction]”

“For many years, Parker Palmer has worked on behalf of teachers and others who choose their vocations for reasons of the heart but may lose heart because of the troubled,

sometimes toxic systems in which they work. Hundreds of thousands of readers have benefited from his approach in *The Courage to Teach*, which takes teachers on an inner journey toward reconnecting with themselves, their students, their colleagues, and their vocations, and reclaiming their passion for one of the most challenging and important of human endeavors.”

“This book builds on a simple premise: good teaching cannot be reduced to technique but is rooted in the identity and integrity of the teacher. Good teaching takes myriad forms but good teachers share one trait: they are authentically present in the classroom, in community with their students and their subject. They possess "a capacity for connectedness" and are able to weave a complex web of connections between themselves, their subjects, and their students, helping their students weave a world for themselves. The connections made by good teachers are held not in their methods but in their hearts — the place where intellect, emotion, spirit, and will converge in the human self — supported by the community that emerges among us when we choose to live authentic lives.”

Publisher’s website for the book:

<http://www.josseybass.com/WileyCDA/WileyTitle/productCd-0787996866.html>

### **Learning from Cognitive Psychology and Learning Research**

Bransford, John. D., Ann L. Brown, and Rodney R. Cocking (eds), *How People Learn: Brain, Mind, Experience, and School*. National Academy Press, Washington, D.C, 2000. Also available online at <http://www.nap.edu>.

This is one of the most frequently cited references on what cognitive psychology has to teach us about student learning and how we should teach.

One of the best summaries of this work as it applies to engineering and science education is presented by Philip Wankat, a professor of chemical engineering at Purdue: Wankat, Phillip C., “*Improving Engineering and Technology Education by Applying What is Known About How People Learn*” *Journal of SMET Education*, Vol. 3, No. 1-2, January-June 2002, pp. 3-8. Online at [http://journal\\_of\\_smet.tripod.com/pdfs/Wankat.pdf](http://journal_of_smet.tripod.com/pdfs/Wankat.pdf)

Halpern, Diane F. and Mildon D. Hakel, “Applying the Science of Learning to the University and Beyond: Teaching for Long-Term Retention and Transfer”. *Change*, July/August 2003.

Presents ten principles drawn from research in the learning sciences to answer the question “How can we apply what research on human learning can tell us to both higher education institutions and the many other places where adults learn?” For additional information including a download of this paper go to

<http://berger.claremontmckenna.edu/asl>

Marton, Ference, Dai Hounsell and Noel Entwistle (eds), *The Experience of Learning: Implications for teaching and studying in higher education*. 3<sup>rd</sup> (Internet) edition. Edinburgh: University of Edinburgh, Centre for Teaching, Learning and Assessment. (2005). Available online and as a free PDF download at <http://www.tla.ed.ac.uk/resources/EoL.html>.

This study laid the groundwork for much of the work in Australia and Great Britain on approaches to learning. An approach to learning is the way a student tackles the learning process based on their experience and current motivation. By changing our approach to teaching it is possible to move students from a *surface* approach to a *deep* approach to learning.

See an article in *The National Teaching & Learning Forum* for a brief introduction to approaches to learning: Rhem, James, "Deep/Surface Approaches to Learning: An Introduction." *The National Teaching & Learning Forum*, Vol. 5 No. 1, 1995. (<http://www.ntlf.com/html/pi/9512/download.pdf>)

### **Approaches to Higher Education**

Knowles, Malcolm., *The Adult Learner: A Neglected Species*. 4<sup>th</sup> edition. Gulf Publishing Company, Houston, 1990.

Knowles coined the word "andragogy" as an alternative to "pedagogy" when discussing the unique problems of adult education. This article by Knowles talks about how to promote lifelong learning:

[http://www.newhorizons.org/future/Creating\\_the\\_Future/crfut\\_knowles.html](http://www.newhorizons.org/future/Creating_the_Future/crfut_knowles.html)

### **Scholarship of Teaching and Learning**

*International Journal for the Scholarship of Teaching and Learning*  
(<http://www.georgiasouthern.edu/ijstol/>)

From the web site: "*International Journal for the Scholarship of Teaching & Learning* is an open, peer-reviewed, international electronic journal published twice a year by the Center for Excellence in Teaching at Georgia Southern University to be an international vehicle for articles, essays, and discussions about the scholarship of teaching and learning (SoTL) and its applications in higher/tertiary education today."

*Journal on Excellence in College Teaching* ( <http://celt.muohio.edu/ject/> )

From the web site: "The *Journal on Excellence in College Teaching* (ISSN 1052-4800) is a peer-reviewed journal published at Miami University by and for faculty at universities and two- and four-year colleges to increase student learning through effective teaching, interest in and enthusiasm for the profession of teaching, and communication among faculty about their classroom experiences. It answers Ernest Boyer's (1990) call for a forum to present the scholarship of teaching and learning. The *Journal* provides a scholarly, written forum for discussion by faculty about all areas affecting teaching and learning, and gives faculty the opportunity to share proven, innovative pedagogies and thoughtful, inspirational insights about teaching."

*The Journal of Scholarship and Teaching* (<http://www.iupui.edu/%7Ejosotl/>)

From the web site: “**JoSoTL** is designed to encourage all instructors to engage in the discussion of the Scholarship of Teaching and Learning (SoTL), and to become involved in the sharing of knowledge and learning about the teaching-learning process. Any report about an investigation into what works (or does not work) for a particular teaching-learning context will be considered for publication. Those submissions that include reflective commentary about the result of the investigation will be considered of greater value to our readership and more appealing for publication. The journal shall also consider submissions that offer opinion, thoughtful reflection, commentary, or theoretical ideas related to SoTL.”

Center for the Advancement of Scholarship on Engineering Education — CASEE.  
(<http://www.nae.edu/nae/caseecomnew.nsf?OpenDatabase>)

This is a project of the National Academy of Engineering. Information is provided about many national initiatives to improve engineering education.

The Carnegie Foundation for the Advancement of Teaching (<http://www.carnegiefoundation.org>)

From the website: “Founded by Andrew Carnegie in 1905 and chartered in 1906 by an act of Congress, The Carnegie Foundation for the Advancement of Teaching is an independent policy and research center with a primary mission ‘to do and perform all things necessary to encourage, uphold, and dignify the profession of the teacher and the cause of higher education.’”

### **Pragmatic Teaching Tips**

ABET Assessment Planning with Dr. Gloria Rogers, Ph.D.  
(<http://www.abet.org/assessment.shtml>)

This site provides many different resources on the assessment of student learning against program objectives. Dr. Rogers spent many years at Rose-Hulman and is one of the foremost experts on assessment in engineering programs.

Felder, Richard., “Richard Felder’s Resources in Science and Engineering Education” at  
<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/RMF.html>

This is one of premier websites for information about engineering education. Take a few minutes and just check this one out. (If you do any reading in the field of engineering education you run into this name and be directed to this website.) Felder, Rebecca Brent and Jim Stice annually teach the National Effective Teaching Institute which is run in conjunction with the summer ASEE meeting.

Fink, L. Dee, *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*. Jossey-Bass, San Francisco, 2003.

A 37-page workbook that uses this approach and several other free PDF downloads can be found at Dr. Fink’s website <http://www.finkconsulting.info/index.html>

Foundation Coalition (<http://www.foundationcoalition.org/>)

This website grew out of Rose-Hulman’s participation in the Foundation Coalition—an NSF-funded Engineering Education Coalition. Online resources are found for many different topics:

*Classroom Resources*

Active/Cooperative Learning  
Student Teams in Engineering  
Women and Underrepresented Minorities  
Technology-Enabled Learning  
Course Modules

*Curriculum Resources*

Curriculum Integration  
First-Year Engineering Curricula  
Sophomore Engineering Curricula  
Upper-Division Curricula  
Assessment and Evaluation

Honolulu Community College, Faculty Development Program *Teaching Tips*

<http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/teachtip.htm>

This is an *exceptional* website with multiple links under each of the topics shown below:

The first day	Assessment
Preparing a course syllabus	Teaching organization
Preparing a lesson plan	Human development
Teaching techniques	How people learn
Course design	Paying attention to core academic and workplace skills
Professional ethics for teachers	Motivating students
Communication	Dealing with difficult behaviors
Critical Thinking	Dealing with stress
Using questions effectively in teaching	Feel good about teaching
Tools for students	

Idea Center — Individual Development & Education Assessment, Kansas State University

“This is the home website of the IDEA Student Ratings of Instruction system. The IDEA system takes a positive approach to soliciting student input. Rather than emphasizing the instructor’s teaching techniques or personality, the IDEA system focuses on student learning.” As part of the rating process, each student comments on the instructor’s use of twenty different *teaching procedures* and on their individual progress on twelve different *learning objectives*. Although Rose-Hulman does not use this system for evaluations, the teaching procedures and learning objectives upon which the IDEA system is based are of interest to all teachers. The following resources are available online at the IDEA website <http://www.idea.ksu.edu/index.html>:

**POD – IDEA Center Notes** (two-page notes) provide guidance on employing each of the twenty teaching procedures assessed by the IDEA Rating form, e.g. #2 – Found ways to help students answer their own questions, or #6 – Made it clear how each topic fit into the course.

**POD – IDEA Learning Center Notes** (four-page notes) provide suggestions to facilitate progress on the twelve learning objectives central to the IDEA Ratings system. Sample

learning objectives include #1 – Gaining factual knowledge, #4 – Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course, and #12 – Acquiring an interest in learning more by asking questions and seeking answers.

**IDEA Papers** (various lengths) provide useful ideas related to many classroom issues, e.g. #36 – Appraising Teaching Effectiveness: Beyond Student Ratings, or #40 – Getting Students to Read: Fourteen Tips.

Johnson, David W., Roger T. Johnson, and Karl A. Smith, *Active Learning: Cooperation in the College Classroom*. Interaction Book Company, Edina, MN, 1991.

A classic book about using cooperative learning techniques in the classroom. The Johnson brothers championed the approach in general education and Karl Smith has worked to share this approach with the engineering community. The Cooperative Learning Center at the University of Minnesota (home school of all three authors) has additional information at <http://www.co-operation.org/>.

Kearsley, Greg, *Explorations in Learning & Instruction: The Theory Into Practice Database* <http://tip.psychology.org/>

Quick resource for learning about various learning theories. From the website: “TIP is a tool intended to make learning and instructional theory more accessible to educators. The database contains brief summaries of 50 major theories of learning and instruction. These theories can also be accessed by learning domains and concepts.”

Wankat, Phillip C. and Frank S. Oreovicz, *Teaching Engineering*. Mc-Graw Hill, New York, 1993. Out of print. Available free at [https://engineering.purdue.edu/ChE/News\\_and\\_Events/Publications/teaching\\_engineering/index.html](https://engineering.purdue.edu/ChE/News_and_Events/Publications/teaching_engineering/index.html)

Excellent resource and the price is right!

## **8. Understanding Rose Students**

Check out the wide variety of student groups on campus. Our students are broadly-talented, interesting people.

<http://www.rose-hulman.edu/people.html#group>

Issues of the Rose Thorn, the student newspaper, will be placed in your campus mailbox every Friday. Current and back issues are viewable online here:

<http://www.rose-hulman.edu/thorn/>

## **9. What I Wish Someone Had Told Me My First Year at Rose**

Cashin, William E. (1995) Student Ratings of Teaching: The Research Revisited. IDEA Paper No. 32. Center for Faculty Education and Development. IDEA Center, Kansas State University. <http://www.idea.ksu.edu/products/Papers.html>

National Research Council (2003) "Evaluating and improving undergraduate teaching in science, technology, engineering and mathematics" , Edited by Marye Anne Fox and Norman Hackerman. Committee on Recognizing, Evaluating, Rewarding, and Developing Excellence in Teaching of Undergraduate Science, Mathematics, Engineering, and Technology. Washington D.C.: National Academies Press, 2003  
<http://www.pkal.org/documents/NRCEvaluatingandImproving.pdf>