**Design and Implementation of Cooperative Learning**

***Facilitator: Karl A. Smith***, *Cooperative Learning Professor of Engineering Education, Purdue University and Morse-Alumni Distinguished Teaching Professor and Emeritus Professor of Civil Engineering, University of Minnesota*

***Clarkson University Workshop: Monday, Tuesday & Wednesday, June 3-5, 0900 – 1630***

The overarching framework for the workshop is an integrated content, assessment and pedagogy approach, which starts with the identification of student learning outcomes (that is, identifying what it is you want students to know, to be able to do, and the modes of thinking and habits of mind you wish to develop), proceeds with determining acceptable evidence (assessment of student learning) and closes the loop with selecting an appropriate pedagogy. Higher order student learning outcomes as well as deep learning (versus surface learning) requires pedagogies of engagement (such as cooperative learning).

Common challenges for faculty include engaging students with one another and with the instructor, and deeply engaging the students with the concepts, principles and heuristics of the field. Many faculty members are exploring cooperative learning or other forms of active engagement to encourage students to be active participants in their own learning as well as the learning of other students. But how do we structure these experiences to ensure that they lead to enhanced learning?

This workshop emphasizes the instructor’s role in designing and implementing individual and group strategies in connection with cooperative learning. Strategies include individual reflections follow by pair discussion, book ends on a class session, problem-based and case-based learning, and several classroom assessment techniques. Special attention will be given to redesigning content intensive courses with enrollments of 50 or more students. Key elements of cooperative learning that are research-based are explained. These include positive interdependence, individual and group accountability, face-to-face interaction, teamwork skills, and group processing.

Participants will learn more about their role in designing, structuring, and implementing cooperative learning activities that support higher achievement and greater productivity by all students. Specific learning outcomes include:

* Describe key features of Cooperative Learning
* Explain rationale for Pedagogies of Engagement, especially Cooperative Learning & Challenge Based Learning
* Describe key features of the Understanding by Design and How People Learn
* Describe design and facilitation decisions and options associated with implementing active and cooperative learning
* Apply cooperative learning to classroom practice
* Apply measures of individual learning in cooperative learning (assurance of learning that demonstrates both individual and group accountability for the task output)
* Develop an application of active and cooperative learning to a deep learning task in course.
* Identify additional active and cooperative learning techniques and associated applications in course

Challenges and barriers to implementing cooperative learning and how to overcome them will be addressed. Participants will experience hands-on activities, video examples, small and large group discussion, and have the opportunity to design and review activities for their own courses.

Tentative Agenda

Workshop Preparation:

* Identify a course that you will use as the re-design site
* Bring current syllabus and course level learning objectives
* Reflect on aspects that work well and those that need improvement

Pre Readings:

* Streveler, R.A., Smith, K.A. and Pilotte, M. 2012. Aligning Course Content, Assessment, and Delivery: Creating a Context for Outcome-Based Education. In Dr. Khairiyah Mohd Yusof, Dr. Shahrin Mohammad, Dr. Naziha Ahmad Azli, Dr. Mohamed Noor Hassan, Dr. Azlina Kosnin and Dr. Sharifah Kamilah Syed Yusof (Eds.). *Outcome-Based Education and Engineering Curriculum: Evaluation, Assessment and Accreditation*. Hershey, PA: IGI Global.
* Smith, K.A., Sheppard, S.D., Johnson, D.W. and Johnson. R.T. 2005. Pedagogies of Engagement: Classroom-based Practices (cooperative learning and problem-based learning). *Journal of Engineering Education*, 94: 87–101.

Session 1: Introduction to Cooperative Learning and Foundations of Design of High Performance Learning Environments

* Cooperative Learning – Essential Elements
* Course Design (based on Content, Assessment and Pedagogy (CAP): An Integrated Engineering Design Approach)
	+ Course Design Foundations
		- How People Learn (HPL) Framework
		- Understanding by Design (UdB) process
* Course, learning module, class session planning with UdB and HPL

Session 2: Identification and articulation of enduring student learning outcomes (big ideas, at the heart of the discipline, students often misunderstand, require uncoverage for student mastery)

* Identification and Mapping of Learning Outcomes
	+ Enduring Outcomes
	+ Important to Know
	+ Nice to Know
* Taxonomies of Learning Outcomes
	+ Bloom (1956 & 2001), Fink, Wiggins & McTighe
* Connecting outcomes and assessment strategies
	+ Classroom assessment , e.g., muddiest point, concept questions

Session 3: Informal Cooperative Learning for Large Enrollment Classes

* Informal cooperative learning with emphasis on content mastery and deep learning
	+ Informal Cooperative Learning Strategies
		- Formulate-Share-Create (Think-Pair-Share) examples
		- Book-ends on a class session
	+ Formative assessment strategies
		- Classroom assessment , e.g., explain or give an application
* Design and implementation of informal cooperative learning

Session 4: Formal Cooperative Learning in Large Enrollment Classes

* Problem-based cooperative learning – exercise and modeling of faculty role with processing and monitoring of teamwork
* Design and implementation of cooperative learning and challenge-based learning with emphasis on developing/refining student’s conceptual understanding (deep learning)

Session 5: Assessing Students in Informal and Formal Cooperative Learning

* Engaging Faculty and Students in Talking about Teaching and Learning (Informed by Assessment Data)
	+ Formative and Summative Assessment
	+ Rubrics for Assessing Individual Learning
* Formal Cooperative Learning (Team) Assessment Strategies
	+ Group Processing, e.g., Plus/Delta
	+ Team Charter
	+ Team Contract (Agreement)
	+ Individual/Peer Reflection and Review
	+ Process Observation

Supplemental Session (lunch conversation) for Early-Career Faculty

Pre Reading: Boice. Quick Starters Summary. Smith, K.A. 2000. Guidance for New Faculty (and Students). *Journal of Engineering Education*, January.

Session Supplemental: Excelling at Teaching as an Early-Career Faculty Member

* Key Concepts
* Integrating Research-Teaching-Service
* Strategies for effectively and efficiently teaching in a research-intensive culture
* Resources

References and Further Resources

Pellegrino, J. W. 2006. Rethinking and redesigning curriculum, instruction and assessment: What contemporary research and theory suggests. A paper commissioned by the National Center on Education and the Economy.

[Note: I’ll add to this after the next iteration on the agenda]