[http://personal.cege.umn.edu/~smith/links.html](http://personal.cege.umn.edu/~smith/links.html" \t "_blank)

**University of Puerto Rico, Mayaguez Campus - Cooperative Problem-Based Learning Workshop - January 28, 2016 - General Education Interdisciplinary grant *The Convergence of Sciences, Technology, and the Humanities sponsored by the National Endowment for the Humanities***

**Session 1 - Design and Implementation of Cooperative Problem-Based Learning**

* Slides - [[Smith-Chavela-CLPBL-UPRM-v4-ho.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Chavela-CLPBL-UPRM-v4-ho.pdf)]
* Worksheet - [[Smith-Chavela-Workshop-Worksheet1.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Chavela-Workshop-Worksheet1.pdf)]
* Key elements of cooperative learning (CL) [[Smith-CL Handout 08.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-CL%20Handout%2008.pdf)]
* Background Reading
  + 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 [[Smith-Pedagogies\_of\_Engagement.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Pedagogies_of_Engagement.pdf)]
  + Freeman, Scott; Eddy, Sarah L.; McDonough, Miles; Smith, Michelle K.; Okoroafor, Nnadozie; Jordt, Hannah; Wenderoth, Mary Pat; [Active learning increases student performance in science, engineering, and mathematics](http://www.pnas.org/content/early/2014/05/08/1319030111.full.pdf) (opens as pdf), 2014, Proc. Natl. Acad. Sci.
  + Smith, Cox & Douglas (2009) Supportive teaching and learning strategies in STEM education New Directions for Teaching and Learning, 117 [[Smith-Douglas-Cox-Supportive\_Strategies\_STEM\_Ed-NDTL117-2009.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Douglas-Cox-Supportive_Strategies_STEM_Ed-NDTL117-2009.pdf)]

**Session 2 - Cooperative Problem-Based Learning - Constructive Controversy**

* Slides - [[Smith-Chavela-UPRM-CLPBL-Controversy-v4.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Chavela-UPRM-CLPBL-Controversy-v4.pdf)]
* Worksheet - [[Smith-Chavela-Workshop-Worksheet2.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Chavela-Workshop-Worksheet2.pdf)]
* Controversy - Situation [[Controversy-Penicillin-situation.pdf](http://personal.cege.umn.edu/~smith/docs/Controversy-Penicillin-situation.pdf)]
* Background Reading
  + Smith, K.A. 1984. Structured Controversy. Journal of Engineering Education, 1984 [[Smith-Structured\_Controversies-Eng\_Ed-1984.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Structured_Controversies-Eng_Ed-1984.pdf)]
  + Smith, KA.., Matusovich, H. & Zho, T.X.P. 2013.Constructive Controversy in Engineering Undergraduate, Masters, Doctorate, and Professional Settings. Prepared for A. Vollmer, M. Dick and T. Wehner (Eds.), Innovation as a social process: Constructive controversy - a method for conflict management. [[Smith-Matusovich-Zho-Constructive\_Controversy\_Engineering\_Education-2013.pdf](http://personal.cege.umn.edu/~smith/docs/Smith-Matusovich-Zho-Constructive_Controversy_Engineering_Education-2013.pdf)]
  + [Johnson, D.W., Johnson, R.T., and Smith, K.A.  2000.  Constructive controversy: The power of intellectual conflict.  Change, 32 (1), 28-37](http://personal.cege.umn.edu/~smith/docs/ConstructiveControversy.pdf). [[Johnson-Johnson-Smith-Constructive\_Controversy-The\_educative\_power\_of\_intellectual\_conflict-Change-32-1-2000.pdf](http://personal.cege.umn.edu/~smith/docs/Johnson-Johnson-Smith-Constructive_Controversy-The_educative_power_of_intellectual_conflict-Change-32-1-2000.pdf)]

**Design and Implementation of Cooperative Learning** - Resources

* Cooperative Learning Notes [[CL-College-814.doc](http://personal.cege.umn.edu/~smith/docs/CL-College-814.doc)]
* [Many additional resources included on the website]

Karl A. Smith, Ph.D., F.ASEE I Morse-Alumni Distinguished Teaching Professor I Professor of Civil Engineering, Emeritus I Co-Executive Director STEM Education Center - <http://www.cehd.umn.edu/stem/> I University of Minnesota (Part Time) II Cooperative Learning Professor of Engineering Education I School of Engineering Education -<https://engineering.purdue.edu/ENE/> I Purdue University (Part Time) II E-mail: [ksmith@umn.edu](mailto:ksmith@umn.edu) I Web: <http://www.cege.umn.edu/directory/faculty-directory/smith.html> I Skype: kasmithtc I Mobile: [612-210-7915](tel:612-210-7915)