# **USC CET Education Research Bibliography**

This annotated bibliography of selected educational literature was developed to support USC faculty, administrators, and schools in the development and evaluation of excellence in teaching. The focus, particularly in the section Teaching Best Practices in the USC Definition of Excellence in Teaching Criteria, is on published research that experimentally validates the effectiveness of practices that promote student learning outcomes. Priority is given to meta-analyses that critically analyze the results of multiple studies and provide corresponding references. The bibliography is not intended to include foundational texts for each topic nor provide literature specific to each discipline. For additional literature specific to your discipline, you may wish to review the [USC Libraries Research Guide](https://libguides.usc.edu/teach) indexing educational journals by discipline.

All references are obtainable from USC Libraries through online access, hardcopy, or, in a few cases, interlibrary loan.

These texts evaluate practices. They do not provide guidance on effective implementation. For resources on how to implement best practices in course design and teaching, please see CET resources or contact CET at [usccet@usc.edu](mailto:usccet@usc.edu).

If you have recommendations for additional resources to add to the list, please let us know by sending an email to usccet@usc.edu.

## Teaching Best Practices in the USC Definition of Excellence in Teaching

### Respectful and Professional

#### Students producing self-explanations

**Chi, M., de Leeuw, N., Chiu, M., & LaVancher, C. (1994). Eliciting Self-Explanations Improves Understanding. *Cognitive Science:* *A Multidisciplinary Journal of Artificial Intelligence, Linguistics, Neuroscience, Philosophy, Psych, 18(3), 439-477.***<https://doi.org/10.1016/0364-0213(94)90016-7>

Demonstrates that students who verbalize an explanation of new information had a greater performance when tested on the new information. Includes a review of other research supporting this self-explanation effect.

**Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement* (pp. 203-4). London: Routledge.**

Student learning is improved through reciprocal teaching, wherein students take the role of instructor.

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge.**

“Students generating self-explanations can experience greater comprehension. (see Chapter 16)

**Bisra, K., Liu, Q., Nesbit, J., Salimi, F., & Winne, P. (2018). *Inducing Self-Explanation: a Meta-Analysis*. Educational Psychology Review, 30(3), 703–725.** [**https://doi.org/10.1007/s10648-018-9434-x**](https://doi.org/10.1007/s10648-018-9434-x)

Demonstrates enhanced learning through student self-explanation and explores the impact of variables such as type of learning task and subject area.

### Challenging and Supportive

#### Classroom environment

**Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement* (p. 103). London: Routledge.**

Learning outcomes are positively correlated with a supportive, cohesive classroom environment.

**Steele, C., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology,* 69(5), 797–811.** <https://doi.org/10.1037/0022-3514.69.5.797>

Demonstrates that details of classroom environment disproportionally decreases performance, and increases stress measures, of Black college students relative to White students.

**National Academies of Sciences, Engineering, and Medicine 2018. *How People Learn II: Learners, Contexts, and Cultures*. Washington, DC: The National Academies Press.**<https://doi.org/10.17226/24783>**. Pp. 127-30.**

Neurophysiological evidence supports an understanding of the mechanisms underlying stereotype threat. Under threatening conditions, individuals show lower levels of activation in the brain’s prefrontal cortex, reflecting impaired executive functioning and working memory

**Canning, E., Muenks, K., Green, D., & Murphy, M. (2019). STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes. *Science Advances, 5*(2), eaau4734.**<https://doi.org/10.1126/sciadv.aau4734>

Faculty perspectives on student ability (fixed vs. growth mindset) correlate with student performance and motivation in their courses. In particular, students from under-represented groups in STEM courses, when taught by faculty with fixed-ability mindsets, demonstrate greater underperformance relative to White and Asian students.

#### Defining learning objectives

**Friedman, M., Harwell, D., & Schnepel, K. (2006). Effective instruction: *a handbook of evidence-based strategies* (pp. 35-7). Columbia, S.C.: Institute for Evidence-Based Decision-Making in Education.**

Defining instructional expectations is positively related to student achievement.

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.) (p. 301). New York: Routledge.**

Contains an interesting discussion of how setting goals can impact not just students, but also instructors.

#### Promoting higher-order thinking

**Sternberg, R. (1985). *Beyond IQ: a triarchic theory of human intelligence.* Cambridge [Cambridgeshire]: Cambridge University Press. pp. 283-289.**

A theory of insight, with implications for how to teach it.

### Inclusive and Diverse

#### Groupwork

**Barkley, E., Major, C., & Cross, K. (2014). *Collaborative learning techniques: a handbook for college faculty* (2nd ed.) (pp. 20-2). San Francisco, California: Jossey-Bass.**

Demonstrated that student collaborative activities increased learning outcomes compared to individual activities in online courses.

**Hattie, J. (2009). Visible learning: *a synthesis of over 800 meta-analyses relating to achievement* (pp. 94-5, 212-4). London: Routledge.**

Learning is enhanced by group cooperative/group work, compared to individual work.

**Johnson, D., Johnson, R., & Smith, K. (2014). Cooperative Learning: Improving University Instruction by Basing Practice on Validated Theory. *Journal on Excellence in College Teaching*, 25, 85–4), p.85–118.**

Meta-analysis of collaborative learning studies.

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge**.

“The literature on peer relationships and interactions provides strong and convincing evidence that peer interactions within informal relationships and more structured learning activities are related positively to a wide range of motivational and academic competencies.” (see Chapter 17)

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge.**

“Cooperative learning can be a powerful strategy for increasing student achievement” when it incorporates “group goals and individual accountability.” (see Chapter 18)

**Pascarella, E., & Terenzini, P. (2005). *How college affects students: a third decade of research* (1st ed.) (pp. 102-6, 180-1). San Francisco: Jossey-Bass.**

Collaborative learning approaches can significantly enhance learning, compared to students working individually. Cognitive gains through collaborative/cooperative/group learning reviewed.

**Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, 93(3), 223–231.**

Reviews literature support for groupwork/collaboration, problem-based learning, and active learning (in contrast to lecture)

**Springer, L., Donovan, S., & Stanne, M. (1999). Effects of Small-Group Learning on Undergraduates in Science, Mathematics, Engineering, and Technology: A Meta-Analysis. *Review of Educational Research*, 69(1), 21–51.** <https://doi.org/10.3102/00346543069001021>

Demonstrated that student collaborative activities increased learning outcomes compared to individual activities in classroom settings.

**Snyder, J., Sloane, J., Dunk, R., & Wiles, J. (2016). *Peer-Led Team Learning Helps Minority Students Succeed*. (Community Page)(Report). PLoS Biology, 14(3), e1002398.** <https://doi.org/10.1371/journal.pbio.1002398>

Group work models, such as peer-led team learning, produce positive effects on student performance. The positive effects for underrepresented minority students (URM) was found to be greater than those for non-URM.

#### Reducing student stress

**Fredrickson, B., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition & Emotion*, *19*(3), 313–332.** <https://doi.org/10.1080/02699930441000238>

Negative emotions can hamper cognitive performance.

**Kuhlmann, S., Kirschbaum, C., & Wolf, O. (2005). Effects of oral cortisol treatment in healthy young women on memory retrieval of negative and neutral words. *Neurobiology of Learning and Memory, 83*(2), 158–162.** <https://doi.org/10.1016/j.nlm.2004.09.001>

Stress reduces retrieval of memories for women.

**Tollenaar, M., Elzinga, B., Spinhoven, P., & Everaerd, W. (2009). Immediate and prolonged effects of cortisol, but not propranolol, on memory retrieval in healthy young men. *Neurobiology of Learning and Memory, 91*(1), 23–31.** <https://doi.org/10.1016/j.nlm.2008.08.002>

Stress reduces retrieval of memories for men.

#### Student participation

**Dallimore, E., Hertenstein, J., & Platt, M. (2013). Impact of Cold-Calling on Student Voluntary Participation. *Journal of Management Education*, 37(3), 305–341.** <https://doi.org/10.1177/1052562912446067>

Significantly more students answer questions voluntarily in classes with high cold-calling, and the number of students voluntarily answering questions in high cold-calling classes increases over time.

**National Research Council. (2012). *Improving Adult Literacy Instruction: Options for Practice and Research*. Washington, DC: The National Academies Press. p. 117.**

When learners believe they have control over their learning environment, they are more likely to take on challenges and persist with difficult tasks, compared with those who perceive that they have little control.

### Relevant and Engaging

#### Limited use of lecture

**Ruhl, K., & And Others. (1987). Using the Pause Procedure to Enhance Lecture Recall. *Teacher Education and Special Education*, 10(1), 14–18.**

Demonstrates learning is enhanced by breaking up lectures into short segments separated by pauses during which student groups discussed the lecture content.

**Thomas, E. J. (1972) The Variation of Memory with Time for Information Appearing During a Lecture. *Studies in Adult Education*,4:1, 57-62.** <https://doi.org/10.1080/02660830.1972.11771885>

Demonstrates student learning dropping as lecture progresses. Measures student learning effective only during start and end of lecture.

**Akçayır, Gökçe, Akçayır, Murat. *The flipped classroom: A review of its advantages and challenges*. Computers & Education. 2018;126:334-345. doi:10.1016/j.compedu.2018.07.021**

The most frequently reported advantage of the flipped classroom is the improvement of student learning performance. Also discusses challenges to the flipped-classroom model.

**Hew, Khe Foon, Lo, Chung Kwan. *Flipped classroom improves student learning in health professions education: a meta-analysis*.(Report). BMC Medical Education. 2018;18(1):1-12. doi:10.1186/s12909-018-1144-z**

A meta-analysis showed an overall significant effect in favor of flipped classrooms over traditional classrooms for health professions education. The flipped classroom approach was more effective when instructors used quizzes at the start of each in-class session.

#### Active learning

**Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class. (REPORTS)(Author abstract)(Report). *Science*, 332(6031), 862–864.** <https://doi.org/10.1126/science.1201783>

Demonstrates increased student attendance, higher engagement, and more than twice the learning in Physics section taught using research-based instruction by an inexperienced instructor, compared to traditional lecture by an experienced instructor. The instructional approach used in the experimental section included pre-class reading assignments and pre-class reading quizzes (flipped class), in-class clicker questions with student-student discussion, small-group active-learning tasks, and targeted in-class instructor feedback.

**Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2014). Active learning increases student performance in science, engineering, and mathematics. (PSYCHOLOGICAL AND COGNITIVE SCIENCES) (Report)(Author abstract). Proceedings of the National Academy of Sciences of the United States, 111(23), 8410–8845.** <https://doi.org/10.1073/pnas.1319030111>

Meta-analysis. The studies analyzed here document that active learning leads to increases in examination performance that would raise average grades by a half a letter, and that failure rates under traditional lecturing increase by 55% over the rates observed under active learning.

**Hake, R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics,66*(1), 64–74.** <https://doi.org/10.1119/1.18809>

Statistically analyzes student pre- and post- course data to prove that student engagement and interaction methods are approximately 2x as effective as traditional lecture.

**Pascarella, E., & Terenzini, P. (2005). How college affects students: *a third decade of research* (1st ed.) (pp. 101-2). San Francisco: Jossey-Bass.**

Cognitive gains through active learning reviewed.

**Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education, 93*(3), 223–231.** <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>

Reviews literature support for groupwork/collaboration, problem-based learning, and active learning (in contrast to lecture).

**Deslauriers, Louis, Mccarty, Logan S, Miller, Kelly, Callaghan, Kristina, Kestin, Greg. Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences of the United States of America*. September 2019. doi:10.1073/pnas.1821936116**

Comparing passive lectures with active learning using a randomized experimental approach and identical course materials, students in the active classroom learn more, but feel like they learn less. This negative correlation is caused in part by the increased cognitive effort required during active learning.

#### Classroom discussion

**Dudley-Marling, C. (2013). Discussion in Postsecondary Classrooms: *A Review of the Literature. SAGE Open,* *3*(4).** <https://doi.org/10.1177/2158244013515688>

Discussion of the limited and mixed evidence that college classroom discussions promote learning.

#### Problem solving

**Hattie, J. (2009). Visible learning: *a synthesis of over 800 meta-analyses relating to achievement (p. 210*). London: Routledge.**

Learning focused on solving problems is an effective pedagogical approach.

#### Use of real-world/concrete examples

**Ainley, M., Hidi, S., & Berndorff, D. (2002). Interest, learning, and the psychological processes that mediate their relationship. *Journal of Educational Psychology, 94,* 545–561.**

Research demonstrating that student learning gains improved when the topic being learned was of interest to the student. Includes a literature review of student interest’s impact on learning.

**Goldstone, R., & Son, J. (2005). The Transfer of Scientific Principles Using Concrete and Idealized Simulations. *Journal of the Learning Sciences, 14*(1), 69–110.** <https://doi.org/10.1207/s15327809jls1401_4>

Concrete examples (in contrast to abstract) improve learning of theories.

#### Visual support for instruction

**Mayer, R. (2018). Keynote PowerPoint for *CET Teaching With Technology Conference.***<http://cet.usc.edu/cet/wp-content/uploads/2018/05/2018_TWT_keynote_slides.pptx>

Provides a summary of previous and ongoing research into best practices regarding multimedia in education.

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge.**

“People learn better from words and pictures than from words alone.” (see Chapter 22)

**Mayer, R. (n.d.). Multimedia instruction. In *Handbook of Research on Educational Communications and Technology*: Fourth Edition (pp. 385–399). Springer New York.** <https://doi.org/10.1007/978-1-4614-3185-5_31>

Good for multimedia principles with lots of citations

**Vekiri, I. (2002). What Is the Value of Graphical Displays in Learning? *Educational Psychology Review*, 14(3), 261–312.** <https://doi.org/10.1023/A:1016064429161>

Improvement in learning from use of visuals and verbal instruction over just verbal instruction.

### Prepared and Purposeful

#### Activating prior student knowledge

**Bransford, J., & Johnson, M. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior, 11*(6), 717–726.** <https://doi.org/10.1016/S0022-5371(72)80006-9>

Prior knowledge and context provided before a learning experience impact a student’s ability to later recall learned information.

**Kole, J., & Healy, A. (2007). Using prior knowledge to minimize interference when learning large amounts of information. *Memory and Cognition, 35*(1), 124–137.** <https://doi.org/10.3758/BF03195949>

Associating new information to be learned with pre-existing knowledge can strongly improve learning in situations requiring the acquisition of large amounts of information.

#### Instructor demonstrating worked examples

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge.**

Teaching with worked examples is an established practice that promotes learning. (see Chapter 15)

#### Student reflection

**Zimmerman, B. J., Moylan, A., Hudesman, J., White, N., & Flugman, B. (2011). Enhancing self-reflection and mathematics achievement of at-risk urban technical college students. *Psychological Test and Assessment Modeling*, 53(1), 141-160.**

Students receiving self-reflection training outperformed students in the control group on instructor-developed examinations. Self-reflection training also increased students’ pass rate on a national gateway examination in mathematics by 25% in comparison to that of control students.

### Fair and Equitable

#### Establishing learning goals with students

**Rothkopf, E., & Billington, M. (1979). Goal-Guided Learning from Text: Inferring a Descriptive Processing Model from Inspection Times and Eye Movements. *Journal of Educational Psychology, 71(*3), 310–327.** <https://doi.org/10.1037/0022-0663.71.3.310>

Students who are made aware of learning goals engage learning experiences differently and more effectively than students not provided such information.

**University of Nevada, Las Vegas (n.d.). *Transparency in Learning and Teaching in Higher Education.*** <https://www.unlv.edu/provost/teachingandlearning>

Site with references to literature. Increased transparency in assignment descriptions improves student outcomes.

#### Instructor feedback

**Goodwin, B., & Miller, K. (2012). Good feedback is targeted, specific, timely.(Research Says)(Column). *Educational Leadership*, 70(1), 82–83.**

Review of research on the use of feedback to promote learning. Easy reading, with citations.

**Hattie, J. (2009). Visible learning: *a synthesis of over 800 meta-analyses relating to achievement* (pp. 173-8). London: Routledge.**

Effective feedback from the instructor significantly and positively impacts student learning outcomes.

**Hattie, J. (2012). *Visible learning for teachers: maximizing impact on learning.* London: Routledge.**

A discussion of effective feedback practices, including a very helpful guide to feedback prompts on page 133. (Chapter 7)

**Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research*, 77(1), 81–112.** <https://doi.org/10.3102/003465430298487>

A review of the research into feedback as a pedagogical technique, including the relative impacts of various forms of feedback demonstrating the promotion of learning goals by instructor feedback (mostly written).

**Hunt, G., Wiseman, D., & Touzel, T. (2009). *Effective teaching: preparation and implementation* (4th ed.). Springfield, Ill.: C.C. Thomas. pp. 26-8**

Includes a summary of effective and ineffective uses of praise as feedback. (pp. 26-8)

**Mathan, S., & Koedinger, K. (2005). Fostering the Intelligent Novice: Learning From Errors With Metacognitive Tutoring. *Educational Psychologist*, 40(4), 257–265.** <https://doi.org/10.1207/s15326985ep4004_7>

Students receiving immediate “intelligent novice” feedback acquire a deeper conceptual understanding of principles and demonstrate better transfer and retention of skills over time. Intelligent novice feedback models error detection and correction, and supports students in the exercise of these skills (rather than pointing out errors and recommending specific corrections).

**Mayer, R. E., & Alexander, P. A. (2016). *Handbook of research on learning and instruction* (2nd ed.). New York: Routledge.**

Includes an excellent literature review of the use of feedback by instructors to promote learning gains. (see Chapter 14)

**Mckendree, J. (1990). *Effective Feedback Content for Tutoring Complex Skills. Human–Computer Interaction, 5*(4), 381–413.** <https://doi.org/10.1207/s15327051hci0504_2>

Goal-oriented feedback is effective at guiding students through skill development.

**Pashler, H., Cepeda, N., Wixted, J., & Rohrer, D. (2005). When Does Feedback Facilitate Learning of Words? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 31*(1), 3–8.** <https://doi.org/10.1037/0278-7393.31.1.3>

Demonstrates evidence that corrective feedback after incorrect answers significantly improves later performance. Also includes a review of other relevant research.

### Evidence-Based

#### Formative assessment

**Dunlosky, J., Rawson, K., Marsh, E., Nathan, M., & Willingham, D. (2013). Improving Students’ Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. *Psychological Science in the Public Interest : a Journal of the American Psychological Society, 14*(1), 4–58.** <https://doi.org/10.1177/1529100612453266>

See section titled “Practice testing” for literature review.

**Hattie, J. (2009). Visible learning: *a synthesis of over 800 meta-analyses relating to achievement* (pp. 185-6). London: Routledge.**

Planned, frequent deliberate practice by students improves learning.

**Roediger, H., & Karpicke, J. (2006). The Power of Testing Memory: Basic Research and Implications for Educational Practice. *Perspectives on Psychological Science*, 1(3), 181–210.** <https://doi.org/10.1111/j.1745-6916.2006.00012.x>

A review of research literature on the learning benefits from testing (formative evaluation)

#### Grading based on student mastery

**Covington, M., Von Hoene, L., & Voge, D. (2017). *Life beyond grades: designing college courses to promote intrinsic motivation*. Cambridge, United Kingdom: Cambridge University Press.**

Grade curving, see pp. 22-24, 237-243. Extra credit, see pp. 234-6.

**Dubey, P., & Geanakoplos, J. (2010). Grading exams: 100, 99, 98, … or A, B, C? *Games and Economic Behavior*, 69(1), 72–94.** <https://doi.org/10.1016/j.geb.2010.02.001>

Demonstrates that grading on a curve is inferior to absolute grading (grading in which an individual student’s grade is independent of those of other students). Note: the content of this article is well beyond the understanding of this bibliography’s author; it is included for the benefit of those who have the necessary mathematical competency.

#### Rubrics

**Jonsson, A., & Svingby, G. (2007). The Use of Scoring Rubrics: *Reliability, Validity and Educational Consequences. Educational Research Review*, 2(2), 130–144.** <https://doi.org/10.1016/j.edurev.2007.05.002>

Literature review on use of rubrics. The reliable scoring of performance assessments can be enhanced by the use of rubrics.

**Panadero, E., & Jonsson, A. (2013). The Use of Scoring Rubrics for Formative Assessment Purposes Revisited: A Review. *Educational Research Review, 9*(1), 129–144.** <https://doi.org/10.1016/j.edurev.2013.01.002>

Literature review demonstrates that rubrics can influence student learning positively as a formative tool; also there are several different ways for the use of rubrics to mediate improved performance and self-regulation.

#### Promoting memory retention

**Karpicke, J.D. (2016). *A powerful way to improve learning and memory: Practicing retrieval enhances long-term, meaningful learning*. American Psychological Association Psychological Science Agenda, June. Available:** [http://16/06/learning-memory.aspxwww.apa.org/science/about/psa/20](http://0.0.0.16/06/learning-memory.aspxwww.apa.org/science/about/psa/20) **[March 2020].**

Taking tests of various formats and types is a form of retrieval practice, known today as one of the most robust ways to promote memory for studied information

**National Academies of Sciences, Engineering, and Medicine 2018. *How People Learn II: Learners, Contexts, and Cultures*. Washington, DC: The National Academies Press.**<https://doi.org/10.17226/24783>**. Pp. 100-101**

Varying or interleaving different skills, activities, or problems within a learning session—as opposed to focusing on one skill, activity, or problem throughout (called blocked learning)—may better promote learning. interleaving concepts improved students’ capacity to discriminate among different categories, while blocked practice emphasized similarities within each category.

**vDunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). *Improving students’ learning with effective learning techniques: Promising directions from cognitive and educational psychology*. Psychological Science in the Public Interest, 14(1), 4-58.**

Although re-reading course materials is a favored study strategy among college students, its value as a study activity is limited when compared to other alternative study activities. Rereading sessions, which are typically massed (grouped together close in time), tend not to produce significant improvement in memory in return for the time invested.

## Defining Teaching Excellence

**Devlin, M., & Samarawickrema, G. (2010). The Criteria of Effective Teaching in a Changing Higher Education Context. *Higher Education Research and Development, 29(2),* 111–124.** <https://doi.org/10.1080/07294360903244398>

Discusses attempts at defining excellence in teaching; presents the definition devised by the Australian Learning and Teaching Council, and a discussion of its development with many useful references.

**Hildebrand, M., Wilson, R., & Dienst, E. (1971). Evaluating university teaching. Berkeley: Center for Research and Development in Higher Education, University of California.**

Early attempt to evaluate effective teaching. In this work, a “good teacher” is defined as a teacher who is recognized by students and/or other faculty as a good teacher. Used interviews with students and faculty peers to determine two separate five-component lists of characteristics of a good teacher. They demonstrated that faculty and student evaluations of the quality of individual teachers correlated strongly with each other, although the faculty and students used different criteria to describe what they thought were distinguishing characteristics of a good teacher.

**Hunt, G., Touzel, T., & Wiseman, D. (1999). Effective teaching: *preparation and implementation* (3rd ed.). Springfield, Ill.: Charles C. Thomas Publisher.**

Summary of research on what constitutes effective teaching. (see Chapter 1)

## Faculty Development Programs

**Brownwell, S. & Tanner, K. (2012). *Barriers to Faculty Pedagogical Change: Lack of Training, Time, Incentives, and…Tensions with Professional Identity? CBE—Life Sciences Education, 11(4*),339–346.** <https://www.lifescied.org/doi/10.1187/cbe.12-09-0163>

Proposes that professional identity issues are a key barrier to faculty embracing pedagogical change. Proposes model with four components.

**Hattie, J. (2009). Visible learning: *a synthesis of over 800 meta-analyses relating to achievement* (pp. 119-21). London: Routledge.**

Instructor professional development improves student outcomes.

**Institutional Management in Higher Education (2012). *Fostering Quality Teaching in Higher Education: Policies and Practices.*** https://www.oecd.org/education/imhe/QT%20policies%20and%20practices.pdf

Discusses steps toward promotion of excellence in teaching in the university setting, including development and evaluation. Includes many case studies.

***Study: Student evaluations of teaching are deeply flawed*. (2020). Retrieved from** <https://www.insidehighered.com/news/2020/02/27/study-student-evaluations-teaching-are-deeply-flawed>

Compilation of studies demonstrating improved outcomes for faculty who have been trained in pedagogy (in this case, by the ACUE credentialing program)

## Instructor Evaluation

### Systems for Instructor Evaluation

**Association of American Universities (2018). *AAU Undergraduate STEM Education Initiative*.** <https://www.aau.edu/sites/default/files/AAU-Files/STEM-Education-Initiative/P%26T-Matrix.pdf>

“This matrix is intended to capture strategies campuses are using to incorporate evidence beyond student course evaluation in the summative evaluation of faculty members’ teaching (e.g., promotion and tenure, and annual/merit reviews).”

**Institutional Management in Higher Education (2012). *Fostering Quality Teaching in Higher Education: Policies and Practices*.** <https://docs.google.com/viewer?url=http%3A%2F%2Fwww.oktemvardar.com%2Farticles%2FFostering%2520Q.%2520Teching.%2520oecd.imhe%25202012..pdf>

Discusses steps toward promotion of excellence in teaching in the university setting, including development and evaluation. Includes many case studies.

**Magno, C. (2012). Assessing higher education teachers through peer assistance and review. *International Journal of Educational and Psychological Assessment, 9,* 104–120.** <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2287173>

A tool used for peer review of teaching was trialed and tested for statistical reliability and validity.

**Nygaard, C., Courtney, N., & Bartholomew, P. (2013). *Quality enhancement of university teaching and learning.* Faringdon, Oxfordshire: Libri Publishing.**

A set of focus questions to guide peer evaluation, with constituents informed by research.

**Thomas, S., Chie, Q., Abraham, M., Raj, S., & Beh, L. (2014). A Qualitative Review of Literature on Peer Review of Teaching in Higher Education: An Application of the SWOT Framework. *Review of Educational Research, 84(1)*, 112–159.** <https://doi.org/10.3102/0034654313499617>

A review and meta-analysis of studies of peer review of teaching. Conducts a SWOT analysis of PRT.

**Wieman C, Gilbert S, Wieman C. *The teaching practices inventory: a new tool for characterizing college and university teaching in mathematics and science*. CBE life sciences education. 2014;13(3):552-569. doi:10.1187/cbe.14-02-0023**

An inventory to characterize the teaching practices used in science and mathematics courses, which can aid instructors and departments in reflecting on their teaching.

### Student Surveys

**Uttl, B., White, C., & Gonzalez, D. (2017). Meta-analysis of faculty’s teaching effectiveness: Student evaluation of teaching ratings and student learning are not related. *Studies in Educational Evaluation, 54(C*), 22–42.** <https://doi.org/10.1016/j.stueduc.2016.08.007>

This “up-to-date meta-analysis of all multisection studies revealed no significant correlations between the SET ratings and learning.”

***Study: Student evaluations of teaching are deeply flawed*. Retrieved from** <https://www.insidehighered.com/news/2020/02/27/study-student-evaluations-teaching-are-deeply-flawed>

Simulations demonstrate that the use of student surveys to evaluate teaching quality is flawed for reasons beyond bias.

***Statement on Student Evaluations of Teaching,* American Sociological Association, September 2019.** <https://www.asanet.org/sites/default/files/asa_statement_on_student_evaluations_of_teaching_sept52019.pdf>

Statement by numerous academic associations, authored by the American Sociological Association, recommending limited use of student evaluations of teaching

### General Teaching and Learning Resources

**Ambrose, S. (2010). *How learning works seven research-based principles for smart teaching* (1st ed.). San Francisco: Jossey-Bass.**

Discussions of research-based pedagogical practices, with literature citations.

**Anderson, L., Krathwohl, D., & Bloom, B. (2001). A taxonomy for learning, teaching, and assessing: *a revision of Bloom’s taxonomy of educational objectives* (Complete ed.). New York: Longman. Chapter 3: revised Bloom’s Taxonomy**.

Chapter 3: revised Bloom’s Taxonomy. Good as general reference to the taxonomy but not research.

**Nilson, L. (2016). *Teaching at its best: a research-based resource for college instructors* (Fourth edition.). San Francisco, California: Jossey-Bass.**

Available online through USC Libraries. A good general overview of college pedagogy. Not a lot of references to evidence but helpful summaries.

**Sousa, D. A. (2011). *How the brain learns* (4th ed.). Thousand Oaks, CA: Corwin**.

Good description of brain functions and biology, particularly related to learning and memory.

**The Chronicle of Higher Education (2018). *An Engineering Professor Asked His Colleagues to Help Him Analyze His Teaching. Here’s What He Learned.***<https://www.chronicle.com/article/An-Engineering-Professor-Asked/244719>

Story by faculty member of how he experimented with his classes to explore the effects of different pedagogies. May be of interest as a narrative in support of faculty development in teaching.