Abstract
Paul Corrigan has ably reviewed the contentious debate over lecturing. In the present article I borrow from and supplement Corrigan’s *Atlantic* article “To Lecture or Not to Lecture?” and his blog entry “Beyond the Lecturing Debate” so as to include discussion of the following:

1. Lecturing is prevalent but “active learning” is advised by researchers.
2. Nevertheless, some academics defend “lectures.”
3. But such academics often advocate lecturing *along with* “active learning.”
4. Corrigan distinguishes “lecturing” from “Lecturing.”
5. Physics education research emphasizes higher-level learning and distinguishes “lecture” from “passive-student-lecture.”
6. Positive and negative depictions of the lecture.
7. Depictions of “active learning.”
8. Literary and YouTube criticism of the passive-student-lecture.
10. Twelve pro-lecture articles or books.
11. Should One Lecture or Not Lecture?

† The reference is: Hake, R.R. 2014. “Curmudgeonly Comments Concomitant to Corrigan’s “To Lecture or Not to Lecture?”,” online as ref. 71 at <http://bit.ly/a6M5y0>.

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§ As Corrigan discusses, “Lecturing” means different things to different people. Bligh (2000a, Table 1.1, p. 5) states “I regard a lecture as a period of more or less continuous exposition by the teacher. I admit that the ‘more or less’ introduces some vagueness, but that corresponds to the way lecture is used. Although necessarily defined in terms of what the teacher does [my italics], in practice it sets psychologically what the students are expected to do.” For a general discussion of language problems in education see, e.g., “Language Ambiguities in Education Research” [Hake (2008b)], and “Education Research Employing Operational Definitions Can Enhance the Teaching Art” [Hake (2010d)].

* Corrigan quotes Prince (2004) on “active learning.” Prince wrote: “It is found that there is broad but uneven support for the core elements of active, collaborative, cooperative, and problem-based learning.” Some specific examples from physics are given in Hake (1998b, p. 13, see there for the references): Collaborative Peer Instruction, Microcomputer-Based Laboratories, Concept Tests, Modeling Instruction, Active Learning Problem Sets, Overview Case Studies, and Socratic Dialogue Inducing Labs.

¶ What’s “higher-level learning”? I take this to mean all but the two lowest levels: (a) “Factual Knowledge” and (b) “Remember” in, respectively, Table 2 “Structure of the Knowledge Dimension” and Table 3 “Structure of the Cognitive Process” of Krathwohl’s (2002) “A Revision of Bloom’s Taxonomy: An Overview.” Thus “higher-level learning” includes “Conceptual Knowledge” of Table 2 and “Understanding” of Table 3. In my opinion the best current assessment of the latter two is through pre/post testing using Concept Inventories <http://bit.ly/dARkDY> developed by disciplinary experts through arduous qualitative and quantitative research as discussed in e.g., “The Physics Education Reform Effort: A Possible Model for Higher Education” [Hake (2005) and “The Impact of Concept Inventories on Physics Education and Its Relevance for Engineering Education” [Hake (2011c)]. Here the disciplinary emphasis is consistent with Shavelson & Huang’s (2003) point in “Responding Responsibly to the Frenzy to Assess Learning in Higher Education” that “learning and knowledge are highly domain specific – as, indeed, is most reasoning. Consequently the direct impact of college is most likely to be seen [in] domain specific knowledge and reasoning.”
I. Lecturing Is Prevalent But “Active Learning” Is Advised by Researchers

Paul T. Corrigan (2013) (<http://paulcorrigan.in/>) in his Atlantic review of the contentious debate over lecturing first points out that while lecturing is the prevalent mode of current university instruction, “active learning” is generally advocated by education researchers. He writes (slightly edited; URLs converted from journalistic covert to academic overt, the latter with a standard academic Reference list):

Detractors see lecturing as an outdated and outmoded approach to teaching, one that does not work and that, in fact, hinders many students’ ability and motivation to learn, except in shallow ways. These people advocate more active and interactive approaches. But supporters of lecturing don’t buy it. They see lecturing as a traditional and honorable method for passing on knowledge, communicating one’s passion for one’s subject, and modeling how to think.

In terms of how most teachers teach, those who support lecturing have the upper hand by far, especially in higher education. Lecturing remains, as Wilbert McKeachie – a professor emeritus at the University of Michigan, notes: “the method most widely used in universities throughout the world” [quoted in Cashin (2010)].

But in terms of what theorists and researchers of education have to say, supporters of alternative methods pretty much have things in the bag. “Active learning” and its cousins serve as the paradigm for most who study teaching and learning, as the following reviews of the research literature attest: (a) What's the Use of Lectures [Bligh (2000a)] on lecturing; (b) “Does Active Learning Work? A Review of the Research” [Prince (2004)] on active learning; and (c) Taking Stock: Research on Teaching and Learning in Higher Education [Hughes & Mighty (2011)] on teaching and learning in higher education.

Considering the three references in the last paragraph above [my italics]:

a. Bligh (2000a)) on Lecturing - Bligh wrote on page 4 of What's the Use of Lectures:

I shall argue, with reservations that, on the available evidence: (1) The lecture is as effective an any other method of transmitting information, but not more effective. Programmed learning and PSI - personalized system of instruction – may be an exception. (2) Most lectures are not as effective as discussion methods to promote thought. (3) Changing student attitudes should not normally be the major objective of a lecture. (4) Lectures are ineffective to teach behavior skills.

Furthermore, as indicated in “Should Education Research Be Like Medical Research?” [Hake (2003b)] I quoted Bligh (2002) as follows [slightly edited; my italics]:

In all the first five editions of What's the Use of Lectures? that I published in UK over the past 30 years or so, I have included tables of large numbers of experiments, mostly comparing the effectiveness of lectures with other teaching methods. The tables include the name of the researcher(s), date, the comparison made and most crucially the test(s) used. Over the past 80 years there have been literally thousands of these classroom-based experiments.

[Allan Collins (1999)] is hopelessly wrong to suggest that they are all laboratory based. Where on earth he has got that idea I cannot imagine, unless his definition of a laboratory is different from mine.) In the fifth edition in UK [Bligh 1998] I also included a whole chapter on reservations and difficulties in conducting such experiments and drawing the conclusions you summarize. These include the breadth of criterial categories, the problems of mixed criteria used by many investigators, imprecise definitions of teaching methods, the problems of uncontrolled variables, the lack of reported data for using meta analyses, and the enthusiasm of experimenters for their pet comparative method. . . . . . . . . . . . . .
Jossey Bass's view was reinforced by two or three of their reviewers and I was left with a very poor opinion of them and regretted that a publisher seemed to think American faculty don't value evidence and criticism. *It was as if my book was being turned into cold dogma rather than a reasoned case.* (but) . . . if you get the 5th Edition . . . [Bligh 1998] . . . you can get 700 or so references to research articles.

For commentary on Bligh's exemplary work see “Fortieth Anniversary of Donald Bligh’s *What’s the use of Lectures?* ” [Hake (2011a)].

b. Prince (2004) on Active Learning* wrote:

This study examines the evidence for the effectiveness of active learning. It defines the common forms of active learning most relevant for engineering faculty and critically examines the core element of each method. It is found that there is broad but uneven support for the core elements of active, collaborative, cooperative, and problem-based learning.

Hake [1998a] examined pre- and post-test data for over 6,000 students in introductory physics courses and found significantly improved performance for students in classes with substantial use of interactive-engagement methods. Test scores . . . [[more accurately average normalized gains <g>]]. . . . measuring conceptual understanding were roughly twice as high in classes promoting engagement than in traditional courses. Statistically, this was an improvement of two standard deviations above that of traditional courses. Other results supporting the effectiveness of active-engagement methods are reported by Redish, Saul, & Stienberg (1997); and Laws, Sokoloff, & Thornton (1999).

c. Hughes & Mighty (2011) on Teaching and Learning in Higher Education

Corrigan (2013b) in his essay “Research On Teaching Offers No Blueprints, Only Maps” described the map presented by Hughes & Mighty (2011), based on decades of studies, as follows:

When faculty adopt active-learning pedagogies, students are more likely to engage in deep-learning approaches, leading to improved mastery and retention of knowledge and skills, and more sophisticated learning approaches. When faculty adopt traditional transmission-oriented pedagogies, students are more likely to engage in surface learning approaches, leading to learning and skill-based deficits and more novice-like understandings of their disciplines, to the detriment of themselves and society.

One of the studies supporting the above map is “Why Not Try a Scientific Approach to Science Education?” a chapter in Hughes & Mighty (2011) by physics Nobelist Carl Wieman. This is evidently similar to his Change Magazine article of the same title [Wieman (2007)] at <http://bit.ly/anTMfF>. In that article Wieman wrote [my italics]:

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* In my opinion the term “active learning” (commonly applied to “reform” methods of instruction) might well be avoided because it’s ambiguous and misleading: (a) If “learning” includes rote memorization and if “active” includes mental activity, then all “learning” is “active,” since without some brain activity there can't be any “learning” (even of rote-memorized material). (b) If “learning” means “understanding,” then no “learning” whatsoever may occur in so-called “active learning” programs. Therefore the term “active learning” can be misleading. Corrigan (2013a), in his blog entry “Active Learning Has an Ancient History” takes a more inclusive view of “active learning” than Prince. Corrigan displays a print of ancient apprenticeship training in bread baking – see page 9 - and writes: “Active learning names an innate process through which humans come to know things, whether how to use fire, care for children, bake bread, do algebra, scan for iambic pentameter, or list the principal events of the French Revolution. Lecturing names an invention of medieval universities, originally used for duplicating textbooks. . . . .[[more accurately “relaying information from scrolls”]]. . . . (before printing presses) [Friesen (2011)] and later adapted for other purposes.
The purpose of science education is no longer simply to train that tiny fraction of the population who will become the next generation of scientists. We need a more scientifically literate populace to address the global challenges that humanity now faces and that only science can explain and possibly mitigate, such as global warming, as well as to make wise decisions, informed by scientific understanding, about issues such as genetic modification. Moreover, the modern economy is largely based on science and technology, and for that economy to thrive and for individuals within it to be successful, we need technically literate citizens with complex problem-solving skills.

In a traditional science class, the teacher stands at the front of the class lecturing to a largely passive group of students. Those students then go off and do back-of-the-chapter homework problems from the textbook and take exams that are similar to those exercises.

We physicists believe that one of the great strengths of physics is that it has a few fundamental concepts that can be applied very widely. This has inspired physics-education researchers to study how well students are actually learning the basic concepts in their physics courses, particularly at the introductory level.

These researchers have created some good assessment tools for measuring conceptual understanding. Probably the oldest and most widely used of these is the Force Concepts Inventory (FCI) [Hestenes et al. (1992)]. This instrument tests students’ mastery of the basic concepts of force and motion, which are covered in every first-semester postsecondary physics course. The FCI is composed of carefully developed and tested questions that usually require students to apply the concepts of force and motion in a real-world context, such as explaining what happens when a car runs into a truck. The FCI - now administered in hundreds of courses annually - normally is given at the beginning and end of the semester to see how much students have learned during the course.

Richard Hake (1998a,b) compiled the FCI results from 14 different traditional courses and found that in the traditional lecture course, students master no more than 30 percent of the key concepts that they didn’t already know at the start of the course. Similar sub-30-percent gains are seen in many other unpublished studies and are largely independent of lecturer quality, class size, and institution. The consistency of those results clearly demonstrates that the problem is in the basic pedagogical approach: The traditional lecture is simply not successful in helping most students achieve mastery of fundamental concepts. Pedagogical approaches involving more interactive engagement* of students show consistently higher gains on the FCI and similar tests.

* “Interactive Engagement” (IE) methods were defined operationally by Hake (1998a) as those designed at least in part to promote conceptual understanding through the active engagement of students in hands-on (always) and hands-on (usually) activities that yield immediate feedback through discussion with peers and/or instructors. Thus a hallmark of IE courses is their use of “formative assessment” in the sense used by Black & Wiliam (1998) and Shavelson (2008) as: “All those activities undertaken by teachers -- and by their students in assessing themselves -- that provide information to be used as feedback to modify teaching and learning activities.” See “Two Different Meanings of ‘Formative Evaluation #2” [Hake (2014)].
II. Nevertheless, Some Academics Defend “Lectures”

Despite the above negative assessments of lectures by education researchers, some academics have recently come to their defense. Corrigan (2013b) wrote: [. . . . . . [insert]]:

This situation makes the recent wave of defenses of lecturing all the more noteworthy. Examples include (a) Mary Burgan’s (2006a) “In Defense of Lecturing”. . . . . ([for counters see Hake (2007a,b,c)]). . . .; (b) Moselio Schaechter’s (2008) “In Defense of the Lecture”; (c) Barry Strauss’s (2009) “Big Is Beautiful”; (d) Adam Kotso’s (2009) “A Defense of the Lecture”; and (e) Abigail Walthausen’s (2013) “Don't Give Up on the Lecture.” In some ways these apologia accentuate the dividing line in the lecturing debate. They praise various aspects of lecturing, while criticizing alternative methods. These rhetorical moves reinforce the idea of a two-sided debate, lecturing vs. not lecturing. Their skirting of the research on the subject puts them on the less convincing side, in my view. But, more importantly, these writers also often point productively beyond the debate altogether, particularly when they qualify their arguments.

III. But Such Academics Often Advocate Lecturing Along With “Active Learning” - Corrigan (2013b) wrote:

It turns out that these defenders of lecturing do not favor always, only, or just any kind of lecturing. Instead, they advocate skillful lecturing on purposeful occasions, as part of a repertoire that includes other teaching practices.


To avoid talking at cross purposes, as often happens in debates about lecturing, I propose we distinguish between “lecturing” (with a lower case “l”) and “Lecturing” (with a capital “L”). The first “lecturing” represents a method, a brick. The second “Lecturing” represents an entire approach, an entire building made only of bricks. Some who lecture do so on occasion and on purpose. Others Lecture as if Lecturing were synonymous with teaching - they Lecture: unreflectively, regularly, and at length.

V. Physics Education Emphasizes Higher-Level Learning and Distinguishes “Lecture” from “Passive Student Lecture”

Judging from the “Lessons from the Physics Education Reform Effort” [Hake (2002a)], it's also useful to distinguish between:

(a) the “lecture,” which can advance or block students' higher-level learning depending on the circumstances; and

(b) the traditional “passive-student-lecture” which is almost always inimical to higher-level learning.
VI. Positive and Negative Depictions of the Lecture
In a blog entry “Beyond the Lecturing Debate”:

A. Corrigan (2014) illustrates the “lecture” with about half of Cesare Maccari’s <http://bit.ly/1ebQKL> famous painting *Cicero Denounces Catiline*, showing Cicero, the master orator, and only the rapt audience to Cicero’s left. The complete painting (which includes the denounced Catiline to Cicero’s far right) is at <http://bit.ly/LBsWeI>:

For less flattering depictions of the lecture see:

(a) A typical less-than-rapt college-student audience:
(b) Less-than-rapt attendees at a medieval sermon (thanks to Copley Systems <http://bit.ly/MvmCG3>):

![Image](http://bit.ly/MvmCG3)


![Image](http://bit.ly/18sWPdm)
VII. Depictions of “Active Learning”

1. Socratic Dialogue*

2. Bread Baking Apprenticeship†

VIII. Literary and YouTube Criticism of the Passive-Student-Lecture

For literary and YouTube counterparts to Hogarth's artistic skewering of the passive-student-lecture see, respectively:


* See, e.g., (a)“Promoting Student Crossover to the Newtonian World”[Hake (1987); (b) “Socratic Pedagogy in the Introductory Physics Lab” [Hake (1992)]; (c)“The Socratic Method of the Historical Socrates, Plato's Socrates, and the Law School Socrates” [Hake 2007f]]; and (d) “Helping Students to Think Like Scientists in Socratic Dialogue Inducing Labs” [Hake (2012b)].

† Shown by Corrigan (2013a) as an example of “active learning.” See also e.g., (a) the Wikipedia entry on “Apprenticeship” at <http://bit.ly/1guZqSG> where this print is identified as “A medieval baker with his apprentice. The Bodleian Library, Oxford”; (b) Situated Learning: Legitimate Peripheral Participation [Lave & Wenger (1991)], and (c) Cognition in the Wild [Hutchins (1995)].
VIX. Nine Anti-Passive-Student-Lecture Articles
For Nine Other Anti-Passive-Student-Lecture Articles (in chronological order of publication date) see:

4. “Lessons from the physics education reform effort” [Hake (2002a)];
6. “Re: The college lecture may be fading” [Hake (2002b)];
7. “At M.I.T., Large Lectures Are Going the Way of the Blackboard” [Rimer (2009)];
9. “Lectures Didn't Work in 1350 - And They Still Don't Work Today” [Reese (2013)].

VX. Twelve Pro-Lecture Articles Or Books
Twelve Pro-Lecture Articles Or Books [not mentioned by Corrigan (2013a,b; 2014); in chronological order of publication date] are:

4. “Innovations in physics teaching—a cautionary tale” [Mottman (1998a)] – countered by Kolitch [1999], Steinberg [1999], and Hilborn [1999], whose counters are commented upon by Mottman (1998b);
5. “A time for telling” Schwartz & Bransford (1998) – countered by Hake (2008a);
7. “How do we know if we are doing a good job in physics teaching?” [Ehrlich (2002)] – countered by Hake (2002c);
8. “Why Minimal Guidance During Instruction Does Not Work” [Kirschner et al. (2006)] – countered by Hake (2007e, 2008b), Hemlo-Silver et al. (2007), Kuhn (2007), and Schmidt et al. (2007);
9. “The Lecture as a Transmedial Pedagogical Form: A Historical Analysis” Friesen (2011);
X. Should One Lecture Or Not Lecture?

Corrigan (2013b) at <http://bit.ly/1cGQaKW> gives his answer (with which I agree) in the sub-lines of his title:

A. “To Lecture or Not to Lecture? *That is not the question.* **Teachers should focus on finding the best way to teach a particular skill,** rather than dismissing or embracing one method outright.”

For example, in my response “Direct Instruction rocks: Or does it?” [Hake (2013)] to psychologist David Klahr's (2012) provocative “Inquiry Science rocks: Or does it?” I concluded:

A. Klahr's (2012) Fig. 1 histogram and the research of Chen & Klahr (1999) and Klahr & Nigam (2004) suggest that if **one's goal is the enhancement of a process skill** such as the “Control of Variables Strategy” (CVS) among elementary-school students then (s)he should probably consider utilizing **Klahr's direct-instruction-like “Type A” pedagogy** rather than discovery-learning-like “Type-C” method with near zero teacher guidance.

B. The present Fig. 1 histogram taken from Hake (1998a), its corroboration by others listed in Hake (2008c), and the high positive correlation of post-test conceptual FCI and problem-solving MB tests. . . . .[[shown in Hake (1998a)]] . . . . , suggest that if **one’s goal is the enhancement of conceptual understanding and problem-solving ability** among high-school or undergraduate students then (s)he should probably consider utilizing discovery-learning-like **“Interactive Engagement” pedagogy** rather than direct-instruction-like “Traditional” pedagogy.

**Epilogue**

“People have nowadays . . . got a strange opinion that everything should be taught by lectures. Now, I cannot see that lectures can do so much good as reading the books from which the lectures are taken. Lectures were once useful; but now, when we can all read, and books are so numerous, lectures are unnecessary.”


Bligh D.A. 2002. Private communication to R.R. Hake of 31 August: Comments on “Re: The college lecture may be fading” [Hake (2002b)] and “Cognitive Science and Physics Education Research: What We’ve Got Here Is Failure to Communicate” [Hake (2007e)]. Excerpts given here are by permission of D.A. Bligh.


Carr, J. J. 2000. “The physics tutorial: some cautionary remarks,” *Am. J. Phys.* 68(11): 977-978; online to subscribers at <http://bit.ly/1ngorSt>. Carr wrote: “. . . . the tutorial process should not confound deeper conceptualization and reasoning skills. The tortuous route through the mental tribulations of false starts, dead ends, wrong assumptions, and faulty logic to clearer concepts yields perspective and insight, and is probably the source of true inspiration. Good tutorials, by design, deftly avoid much of the mental drudgery, usually pursuing a far more direct route to learning. There is some risk. The more comprehensive a student’s tutorial, perhaps the less likely the cultivation of his or her own deliberative faculties, analogous to the exerciser’s cliche ‘no pain, no gain.’ A fine line lies between education and inculcation. When mental struggle is preempted, deeper understanding may not develop. The insidious consequences of facile knowledge are complacency, misplaced confidence, and a debilitating absence of practiced contemplation.”
Cashin, W.E. 2010. “Effective Lecturing,” Idea Paper #46, Kansas State Idea Center; online as a 139 kB pdf at <http://bit.ly/1aTUSGp>. Cashin wrote (my italics; slightly edited): “Writers have argued against the effectiveness of lecturing as a teaching technique (e.g., Chickering and Gamson, 1987, 1999). Nevertheless, most teachers will at some time need to lecture. . . . . . . lecturing also has some serious limitations when it becomes the primary means of instruction. The most serious is that lecturing is not suited for higher levels of learning: comprehension, application, analysis, synthesis, evaluation (Bloom et al., 1956), and creativity [Anderson et al. (2001)]. Perhaps equally limiting, in a traditional lecture, the students are mostly passive. This results in learners’ attention waning quickly. If a lecture consists solely of the teacher talking, lack of student feedback can be a big problem.”


Chickering A. W. & S.C. Ehrmann. 1996. “Implementing the Seven Principles: Technology as Lever”; AAHE Bulletin, October, pp. 3-6, 1996; updated (2002) version online at <http://bit.ly/1g7294E>: "This essay, then, describes some of the most cost-effective and appropriate ways to use computers, video, and telecommunications technologies to advance the ‘Seven Principles’.”


Corrigan, P.T. 2013b. “To Lecture or Not to Lecture? That is not the question. Teachers should focus on finding the best way to teach a particular skill, rather than dismissing or embracing one method outright,” *The Atlantic*, 23 Dec.; online at <http://bit.ly/1cGQaKW>. As of 12 Feb 2014 there had been 33 comments, 6 by the literature-aware economist Bill Goffe.


Friesen, N. 2011. “The Lecture as a Transmedial Pedagogical Form: A Historical Analysis.” Educational Researcher 40(3): 95-102; online as a 348 kB pdf at <http://bit.ly/1iPf1NZ>, thanks to Larry Cuban. Friesen’s abstract reads: “The lecture has been much maligned as a pedagogical form, yet it persists and even flourishes today in the form of the podcast, the TED talk, and the ‘smart’ lecture hall. This article examines the lecture as a pedagogical genre, as ‘a site where differences between media are negotiated’ (Franzel) as these media coevolve. This examination shows the lecture as bridging oral communication with writing and newer media technologies, rather than as being superseded by newer electronic and digital forms. The result is a remarkably adaptable and robust genre that combines textual record and ephemeral event, and that is capable of addressing a range of different demands and circum- stances, both practical and epistemological.”


Gibbs, G. 1981. “Twenty terrible reasons for lecturing,” SCED Occasional Paper No. 8, Birmingham; online at <http://bit.ly/1brX1DX>. Gibbs wrote: “A number of reasons commonly given for lecturing and claims commonly made for the efficiency of lecturers are examined for their basis in empirical evidence and common sense. Most of these claims are found to be somewhat weak. It appears that lecturing takes place rather more often than can be reasonably justified. The real reasons for the popularity of lecturing amongst lecturers are then examined. Of the twenty reasons for lecturing examined here, the first nine have little substance and the last eleven are avoidable.”


Griffiths, D.J. 1997. “Millikan Lecture 1997: Is there a text in this class?” Am. J. Phys. 65: 1141-1143; online to subscribers at <http://bit.ly/1izmvnr>. Griffiths wrote: “We have occasionally administered the . . . Force Concept Inventory at Reed, and - as elsewhere - have been dismayed at how poorly our students do, and how slight is the improvement afforded by a year of instruction. . . . The obvious conclusion that our course is a failure seems inescapable. And yet, as I look through the questions and recollect my own confusion at a similar stage, I begin to have second thoughts. . . . The learning process is mysterious and imponderably complicated. I personally learn by what Albert Baez used to call the ‘spiral’ approach, in which the same subject recurs again and again, and one’s comprehension deepens with every pass. I don’t think we should expect perfect understanding on the first encounter, and I do not believe a bad score on the Force Concept Inventory proves that the student has not - at some level – ‘learned’ the material.” For a response see Hestenes (1998).


Hake, R.R. 2005. “The Physics Education Reform Effort: A Possible Model for Higher Education?” online as a 100 kB pdf at <http://bit.ly/9aicfh>; a slightly edited version of the article that was: (a) published in the National Teaching and Learning Forum (NTLF) 15(1), December 2005, online to subscribers at <http://bit.ly/bvm8Ye> (If your institution doesn't subscribe to NTLF, it should); (b) disseminated in Tomorrow's Professor Msg. #698 on 14 Feb 2006 archived at <http://bit.ly/d09Y8r> - type the message number into the slot at the top of the page.

Hake, R.R. 2006. “Possible Palliatives for the Paralyzing Pre/Post Paranoia that Plagues Some PEP’s,” Journal of MultiDisciplinary Evaluation, Number 6, November, online at <http://bit.ly/NuGIRL>. [PEP’s = Psychologists, Education specialists, & Psychometricians.] This even despite the admirable anti-alliteration advice at psychologist Donald Zimmerman's site <http://bit.ly/oWCSgM> to: “Always assiduously and attentively avoid awful, awkward, atrocious, appalling, artificial, affected alliteration.” This is a truncated version of “Should We Measure Change? Yes!” [Hake (2011b)].
Hake, R.R. 2007a. “Mary Burgan's Defense of Lecturing,” online on the OPEN! AERA-L archives at <http://bit.ly/TGhCOa>. The abstract and link to the complete post were transmitted to several discussion lists. Excerpts from Burgan’s Change article suggest that her essay would have been more appropriately titled “In Defense of the Sage on the Stage,” since she extols lecturing sages rather than lecturers per se. Aside from my own criticisms that I triple bracket [[[. . .]]] within the excerpts, the most incisive criticism of Burgan’s lecturing sage, in my opinion, is that of Russ Hunt, who asks why the lecturing sage doesn’t stop lecturing and simply defer to the sage behind Bound Optimally Organized Knowledge (BOOK). The use of BOOK rather than sages lecturing to intellectually passive students was recommended 44 years ago by chemist Frank Lambert, who called this radical departure from traditional university practice the “Gutenberg Method” because it recognizes the invention of the printing press – see also the signature quote.

Hake, R.R. 2007b. “Re: Mary Burgan's Defense of Lecturing,” on the CLOSED! PhysLrnR archives at <http://bit.ly/1inwjkW>. Post of 20 Feb 2007 15:45:37-0800 to PhysLrnR. To access the archives of PhysLrnR one needs to subscribe :-((, but that takes only a few minutes by clicking on <http://bit.ly/nG318r> and then clicking on “Join or Leave PHYSLRNR-LIST.” If you’re busy, then subscribe using the “NOMAIL” option under “Miscellaneous.” Then, as a subscriber, you may access the archives and/or post messages at any time, while receiving NO MAIL from the list!


Hestenes, D. 1998. “Guest comment: who needs physics education research!? ” Am. J. Phys. 66(6): 465-467; online as a 25 kB pdf at <http://bit.ly/1dvths>. Hestenes wrote: “Having administered the FCI at his own school and seen the dismal results, Griffiths (1997) does not doubt the published data or their importance. Rather, he questions the validity of the FCI and the urgency of the results. His doubts are based on a general skepticism of multiple-choice tests . . . . .[but see Wilson & Bertenthal (2005)]. . . . . . and his own arm-chair analysis of test items. It is precisely to answer such doubts that the FCI has been carefully validated with extensive student interviews. All this has been thoroughly documented in the literature and repeatedly checked by many different people. The FCI is not comparable to the off-the-cuff multiple-choice tests that teachers construct on their own. The carefully constructed distracters for each item are not typical multiple-choice throwaways, but common sense alternatives to Newtonian concepts that amplify the significance of student responses.”


Hilborn, R. C. 1999. “On teaching—innovative and traditional.” Phys. Teach. 38: 250-251; online to subscribers at <http://bit.ly/NbhAzj>. Hilborn wrote: “John Mottmann’s (1999a) article raises a number of important issues concerning innovations in introductory physics teaching. The letters [Kolitch (1999), Steinberg (1999), Mottman (1999b)] that appeared in The Physics Teacher in response to the article did not, it seems to me, speak to the heart of the matter. I will not comment on the specific details of the California Polytechnic State University (Cal Poly) ‘studio physics’ situation discussed by Mottmann since the issues go beyond that one case. Rather, I want to focus on the underlying assumptions in Mottmann’s commentary since those assumptions appear quite frequently when dedicated teachers defend what they call ‘the traditional lecture mode’ of teaching [Griffiths (1997), Geilker (1999)]. For anyone concerned about fostering improvements in physics teaching, it is important to uncover those assumptions and to understand what lies behind them. . . . . . . . Two crucial assumptions underlie many of the attacks on physics education innovations. The first can be phrased in the following way: ‘I have no obligation as a teacher and a physicist to share with the broader community what I have learned about what is effective.
and ineffective in helping students learn physics; it is sufficient for me to improve my own teaching based on my own evaluation of that teaching.’ The second assumption is the converse of the first: ‘I can evaluate the effectiveness of someone else’s teaching innovations privately by talking to just a few students, giving one or two problems to students and looking at student performance in a course taken several months after the course in question has ended. I don’t need to know much about the goals and methods of the innovation.’ . . . . . . . The second assumption is exposed in Mottmann's comment ‘Personally, I do not feel that the FCI [the Force Concept Inventory] is very useful.’ Why are personal feelings relevant in evaluating the usefulness of the FCI? The more relevant questions would be: What kinds of evidence would test the usefulness of the FCI? What evidence has been presented by physics education researchers and others about the effectiveness of the FCI? [Hake (1998a)] How would we go about gathering that evidence in a way that gives us confidence in the results? ” . . . . . . .


Mazur, E. 1996. “Are Science Lectures a Relic of the Past: Most students have an attention span of about 15 minutes. So why, asks Eric Mazur, do universities persist with hour-long lectures during which notes taking notes from the blackboard is the main form of activity?” *Physics World* 9: 13-14; online at <http://bit.ly/ppm3Bm> (scroll down to “Magazines or Other Publications”).

Mazur, E. 2009a. “Confessions of a Converted Lecturer” talk at the University of Maryland on 11 November 2009. That talk is now on You Tube at <http://bit.ly/dBYsXh>, and the abstract, slides, and references - sometimes obscured in the You Tube talk - are at <http://bit.ly/yEHVHQ> as a 4 MB pdf. As of 13 Feb 2014 10:46-0800 Mazur's talk had been viewed 107,967 times. In contrast, serious articles in the education literature, often read only by the author and a few cloistered academic specialists, usually create tsunamis in educational practice equivalent to those produced by a pebble dropped into the middle of the Pacific Ocean. See also "Re: Confessions of a Converted Lecturer" [Hake (2010a)].


Rhem, J. 2007. “Burgan Battles: Lecture - Strawman or Villain? Does the lecture deserve disdain, defense, or understanding?” NTLF 16 (3), March, online as a 287 kB pdf at <http://bit.ly/1eNlW5K>. If your institution doesn't have a subscription to NTLF, then, in my opinion, it should.


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Wilson, M.R. & M.W. Bertenthal, eds. 2005. *Systems for State Science Assessment*, Nat. Acad. Press; online at <http://bit.ly/f6WFeg>. They wrote: "Performance assessment is an approach that offers great potential for assessing complex thinking and learning abilities, but multiple choice items also have their strengths. For example, although many people recognize that multiple-choice items are an efficient and effective way of determining how well students have acquired basic content knowledge, many do not recognize that they can also be used to measure complex cognitive processes. For example, the *Force Concept Inventory* . . . [[Hestenes, Wells, & Swackhamer, 1992]] . . . is an assessment that uses multiple-choice items to tap into higher-level cognitive processes."