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Featuring:

Dr. Ken Bain, the author of the ground-breaking *What the Best College Teachers Do*, and the brand new companion book *What the Best College Students Do*.

Dr. Bain, Provost of District of Columbia University in Washington, DC. has written a treasure trove of insight and inspiration for first-year teachers and seasoned educators alike.

Resource Packet

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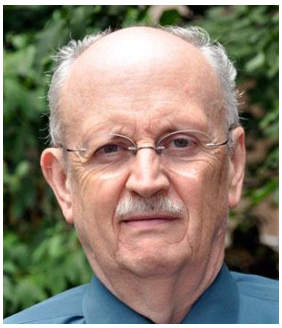

Ken Bain, Ph.D.
Provost
University of the District of Columbia

Dr. Bain is the author of two highly acclaimed books on higher education and teaching effectiveness. "What the Best College Teachers Do" provides profound answers to the question "what makes a teacher great?" The book is the result of a 15-year study of nearly one hundred college teachers and shares their methods and motivations. His new book in this field, "What the Best College Students Do," is another ground-breaking contribution to great teaching.

Dr. Bain is an active speaker at workshops, seminars and other events focused on improving instruction in higher education in the U. S., Europe, and Asia. He and his writings are contributing to making a profound, positive changes in how people teach and learn.

Jennifer Baggett, Ph.D.
Biology Instructor
Richland College

Dr. Baggett earned a doctorate in cell biology from The Johns Hopkins University; she completed her bachelor's degree at Rice University. She has done research on basic cellular processes at the University of Texas Southwestern Medical Center and at Southern Methodist University, both in Dallas. She has taught biology at Eastfield College and is a faculty member at Richland College, both in the Dallas County Community College District. She served as the academic content specialist for a distance learning biology course for the LeCroy Center of the DCCCD.

Ken Alfers, Ph.D.
History Instructor
Mountainview College

Dr. Alfers earned M.Ph and a doctorate in history from George Washington University in Washington, D.C. He received his B.A. and M.A. degrees from Creighton University. He has served as the academic content specialist for the award-winning distance learning courses "America: The Second Century" and "America in Perspective." As a teacher, writer and historian, he has been active in faculty leadership in the Dallas County Community College District. He received the DCCCD Outstanding Teacher award in 1983.

Michael Sandel
Political Philosopher and Professor
Harvard University

Michael Sandel has taught the famous “Justice” course for more than 20 years. More than 15,000 students have taken the course, making it one of the most highly attended in Harvard's history. The “Justice” course has been recorded on video and an abridged form of this recording is now a 12-episode TV series, “Justice: What's the Right Thing to Do?”, in a co-production of WGBH and Harvard University.

Andy Kaufman
Professor at the University of Virginia

Andy Kaufman invites his students into something that is larger than the class itself. He takes his Russian literature students to help teach in a juvenile detention facility. The students and residents study the themes of the literature and apply them to their separate and common personal situations.

What the Best College Teachers Do

A Higher Education Teaching and Learning interview with Dr. Ken Bain

HETL: Dr. Bain, in your book, What the Best College Teachers Do, you start out by asking the question: What do any of the best college and university teachers do to help and encourage students to achieve remarkable learning results? Then perhaps we should start this interview with the question: How do you define what it means to be a great teacher and how do you define "remarkable learning"?

Ken Bain [KB]: Both excellent questions, but not easy to answer. Let us start with learning and learners. I am heavily influenced by the research and theoretical literature on deep learning. As you probably know, a considerable body of research has found that university students will predominantly take one of three broad approaches to their learning and that these approaches, or intentions, direct what they do.

Surface learners intend primarily to survive, to get out of the course alive. You can hear it in the language they use. They often resort to what they think will be the easiest approach, namely to memorize stuff to be able to simply repeat it on the examination.

Strategic learners are driven by a desire for recognition, usually in the form of higher grades. They will do what they think is necessary to get those grades, but that is not the same as the deep learner who intends to understand, to think about implications of that comprehension, to think about applications and possibilities, to identify arguments and to distinguish in those arguments between evidence and conclusions. Strategic learners tend not to take risks (for fear it will jeopardize their grade point average) or to learn conceptually. They learn procedurally, how to plug the right number in a formula, or the right words in a particular form of essay.

Deep learners, by contrast, grapple with ideas, concepts, and the implications and applications of those ideas and concepts. John Biggs's Solo taxonomy [1] helps us conceptualize what that deep learning might entail. The students at his highest (or deepest level) will learn to theorize and hypothesize. They will build new conceptual models and use those models to understand, analyze, synthesize, and evaluate. The Kirchener and King reflective judgment model [2] also captures a lot of what deep learners can do, and so does the concept of the adaptive expert. In short, deep learners undergo transformations in the concepts they hold. Their learning has a sustained and substantial influence on the way they will subsequently think, act, and feel.

HETL: Could you elaborate more on the concept of deep learning – how would characterize deep learning and its impact on the learner?

KB: I think learning can be defined in terms of the intellectual, artistic, and personal development of the students. One of the great teachers of the twentieth century, Paul Baker, talked about helping students develop the dynamic power of their own minds. In Baker's terms that meant helping students realize their own unique perspectives and what it meant to create valuable work of the mind. Baker worked in the performing arts, but his ideas have important implications for all of our fields, from engineering/science to medicine to the arts/humanities to the social sciences.

Baker tried to help students see their own uniqueness and their capacity to develop perspectives that no one else can originate. But if each of us comes from a unique perspective that means that you can develop insights and perspectives that I would never originate on my own, and so can Einstein and Shakespeare. Thus, an important part of the creative process and learning derives from the ability to recognize good ideas that other people have developed and to make our own contributions to them.

I wrote that outstanding teachers will have "remarkable success" in fostering predominantly deep learning approaches and achievements in learning and that kind of unique personal development of which Baker

spoke. I used the term “remarkable success” to indicate that such teachers will reach students and influence their learning intentions and successes in ways that go far beyond what anyone might normally expect with a given group of students.

In other words, some people might have “remarkable success” in moving difficult (and even unprepared or ill-prepared) students to a slightly higher level. The conception is not just based on how deeply students learn, but also on the influence that the teacher has had on their learning. Thus, some people working with students who are already learning deeply might not have as much “remarkable success” as someone who takes a group of disengaged students and turns them into very deep learners, with deep intentions.

HETL: Dr. Bain, why is being a great teacher important? Relative to other factors such as course design, subject matter expertise, and research, how important is the quality of teaching in influencing learning outcomes?

KB: I see teaching as anything someone might do to foster someone else’s approach to and achievements in learning, including the learning that the professor does to prepare for the experience, or the design of the course and the curriculum. I am not thinking of teaching as just what one does in the classroom in front of students. In the book, I noted that all of the people I identified were accomplished learners in their fields, and that such learning seemed to be a pre-requisite to their ability to foster deep learning.

I do not think you can separate the two (research and teaching). I think, instead, that we have to recognize that they are both concerned with learning. One is focused primarily on the learning of faculty and the other primarily on the learning of students, but there is a connection between the two. As it turns out, one of the primary abilities in both is the ability to ask important questions. That is absolutely essential in doing important research and it is fundamental to provoking deep learning.

Sometimes people teach most effectively through their writing, through the courses they design, and so forth. But I see all of these activities as teaching. Is it teaching if I publish an article in an obscure journal that no one reads? Well, if no one reads it, then obviously not. But if a few people read it and they learn from it, then I have taught them something. The problem arises in terms of scale and in terms of levels of teaching and learning. I may teach those few people who read my obscure article written for very advanced learners, but that will not help me foster learning among my undergraduates, or even some graduate students. We have to think about teaching at different levels and to different groups.

Someone (a chemist, I think), once asked me why so many historians like myself are interested in the “quality of teaching.” That question made me stop and think, and I think it is because in a field like mine, what I learn becomes significant only if lots of other people also learn. But if five people in the entire world can “know” something in a field like chemistry then their understanding can have significance. My chemist friends are probably going to disagree, but my point is that I am not just interested in so-called “great teaching”; I’m interested in great teaching that reaches a large number of human beings, that helps significant numbers of people develop the dynamic power of their own minds and that helps them flourish as critically thinking, curious, creative, and, yes, compassionate individuals.

Achieving that goal requires well-designed courses, knowledge born out of research, sophisticated understanding of intellectual, physical, and social abilities, and what goes on between teacher and student in the classroom. I think we need to stop dividing research and teaching into separate and

competing categories. They cannot exist without one another. And, as I say, I am trying to re-conceptualize them to see them as different parts of a common enterprise.

HETL: Dr. Bain, if the reward system for college faculty offers greater rewards for research than teaching then what incentive do teachers have to want to do great teaching and create great learning environments?

KB: I think part of the secret is in re-thinking the traditional divisions that we see between the two. What we have traditionally called teaching and research have something in common: learning. Rather than dwelling on the perceived conflicts between them, we need to explore ways that the learning of teacher and student can complement each other rather than stand in conflict. I think the most fruitful way of doing that may be in understanding the power and importance of good question-making in the success of each. The ability to ask good questions has long been recognized as central to research and publication success, but we also need to see its importance in cultivating someone else's learning, and how, in turn, the ability to ask good questions to spark someone else's learning can help drive a research agenda. Great teacher/scholars recognize that already.

The connection is this: people are most likely to take a deep approach to their learning when they are trying to answer questions or solve problems that they, the learners, have come to regard as important, intriguing, or just beautiful. Yet in a formal educational environment, the learner is usually not in charge of the questions. We could solve that problem by putting the learners always in charge of all the questions, and some people have attempted to do just that. But while that has some benefits, it also has limitations. Novice learners cannot imagine some of questions that advanced learners have begun to consider. Thus, we need to have advanced learners (teacher/scholars) raising questions for novice learners (students) to think about.

However, that often creates a gap between the conditions that prevail in a formal educational environment and the conditions that may stimulate deep learning. The great teachers have learned to fill that gap by asking questions that students will find important, intriguing, or just beautiful, and they manage to do so because of their own deep understanding born out of their own learning. Their own struggle to frame the questions that will provoke students often leads to new insights that will influence their research. Cultivating someone else's learning entails more than asking great questions, but it is the necessary ingredient that underpins everything else.

But because it does involve more than asking great questions, great teachers have to be motivated by a lot more than by "will it help my research". In my conversations with these people, I have discovered a wide variety of motivations including a sense of responsibility to the intellectual community and to its vitality. I think some people realize that the intellectual community that undergirds all of our research and learning benefits from having lots of people who are highly educated. Indeed, some people tell me that they are driven in part by a realization that every aspect of a good society depends on having an educated population. Thus, they are not content to concentrate rather selfishly on just their own learning, or even just the learning of their generation. Rather, they are driven in part by the sense of responsibility to the learning of all generations.

"What the Best College Teachers Do" published in Korean (2005)

I think some people also find great personal satisfaction in helping other people develop their minds, their knowledge, and their intellectual and personal abilities. These are intrinsic motivations. I have heard some people say that they find great joy in the creative accomplishment of producing a wonderful learning experience for their students, and I have heard people say that they feel a moral responsibility to foster the learning of their students. In short, I think there are a variety of

possible motivations that go beyond the typical extrinsic motivations like salary and advancement.

HETL: Dr. Bain, how does the funding of higher education impact teaching and research? Can you provide some insight on that phenomenon?

KB: None of this, however, is designed to excuse or dismiss the enormous pressures that many people place on professors simply to turn out more publications and accumulate research dollars. Part of the problem is the way and the reasons higher education is funded in many countries.

The United States is an excellent example. In this country, we have never had a strong public policy of providing support for higher education. The closest we came to any kind of national policy occurred in the Lincoln administration (1860s) with the creation of land-grant institutions. I believe the last of the land-grant universities that congress created may have been the University of the District of Columbia in the 1960s and 1970s. Following World War II, there was a great push to increase research in the United States, and lots of public money came in the form of research grants from agencies such as the National Institutes of Health, the National Science Foundation, the National Endowment for the Humanities, and others.

Meanwhile, presidents of public universities faced declining public support, which came largely through state monies, especially after about 1980. That meant that many public universities that had traditionally devoted themselves to student learning suddenly felt like they had to get more dollars from grants. But grants, so the perception goes among many university leaders, are most likely to go to people who have the most publications. Thus, presidents and provosts and deans started pushing people simply to publish. The amazing part of that whole history—in which we are still engaged—is that the emphasis on publications did not correspond to any emphasis on anyone's learning, students or faculty. Thus, deans, provosts, and presidents would often simply count the number of publications someone would generate to decide if they deserved promotion and a higher salary.

They did not seem to care whether or not students or faculty members had learned anything, and when pressed, often could not discuss the intellectual contributions that a professor had supposedly made with all those publications. That process was, somewhat ironically, most likely to happen within the "teaching universities" that decided that they had to become research-intensive institutions rather than within the leading research universities. As a result, there is often a much friendlier atmosphere for people interested in student learning within some—but certainly not all—of the major research universities than there is within the "teaching university" turned "research intensive" university.

The pressures from this process have been slightly off-set in the United States by the other major means of getting funding to institutions of higher learning, financial aid to students. Because a substantial amounts of money flowed through students into the university—even for "private" institutions—there has been some pressure from those students to improve the learning environment. That has helped offset the pressures in the other direction.

I guess my fundamental point, however, is that I believe that there is no inherent conflict between faculty and student learning and that if we understand that research and teaching are really two important parts of a larger process of learning, we can avoid systems that simply blindly encourage publications, publications, publications with no emphasis on anyone's learning.

HETL: Dr. Bain, you make the statement "that teaching is one of those human endeavors that seldom benefits from its past." What do you mean by that?

KB: In general I meant that because traditionally people have not recorded and shared the insights they have developed from teaching, those insights and practices are not passed on to subsequent generations. A great teacher emerges, learns a great deal about how people learn and how best to

cultivate that learning. They create wonderful learning environments for their students, but they do not necessarily share what they have learned with their colleagues.

We do not have a substantial body of literature that captures the insights and practices of the great courses that have been created in the past. Perhaps colleagues within a particular department spend thirty or forty years with a colleague who has developed great insight and practices and others learn from that experience, but it does not go beyond that point—except that some of the students in those classes may be influenced if they become educators.

HETL: Dr. Bain, then to what degree does personality type play a role in being a great teacher? For instance, are extroverts inherently more likely to be great teachers than say introverts?

KB: I do not know that they are. You can have extroverts and introverts who do not care about anyone else and their learning and you have others of both types who do. I think much depends on how much you care about the development of other people. It is true that in many traditional learning environments, it helps if you can get up in front of people and communicate with them. But I do not think that depends much on personality.

For instance, I am an inherently shy person, and I have had to struggle to learn to stand in front of a class and communicate. People tell me that I do a pretty good job with engaging a group of people now, but I had to learn to do that. It was part of my own personal development, and I pursued it for my own satisfaction, but had I not done so, I might have become better at creating good learning environments in other ways, with games I invented, or online environments I might produce.

I have no idea what kind of personality, for example, the people have who developed the Web site Starfall.com. But it is a wonderful learning environment for children learning to read the English language. It might even work for adults from other language backgrounds. I do not know. My oldest grandson—who is now seven—discovered Starfall.com on his own when he was about two, and by the time he was four, he had learned how to read. My youngest grandson—who is now four—is doing the same thing. The people who created that Web site are wonderful teachers, but they may all be introverts (or extroverts) for all I know.

HETL: Dr. Bain, can a teacher who uses primarily lectures still be able to be a great teacher? In other words, how important is method in being a great teacher?

KB: As I noted in the book, the great teachers I encountered employed a rich array of approaches to teaching. Someone like Derrick Bell—a great teacher who died in 2011 at the age of 80—never lectured as far as I know. Jeanette Norden creates equally powerful learning environments within lectures. As I wrote in chapter five, whether one lectures or not is not the key factor. Rather, much of the success depends on what we call the creation of a ”natural critical learning environment”. It was the kind of learning environment that we saw in both Bell’s class and Norden’s class.

HETL: Dr. Bain, it seems that you are saying that great teachers are not only experts in their subject matter but they are also experts in how to create great learning environments. If so, how does one become an expert in creating a great learning environment?

KB: Two factors that I have not stressed thus far are important. You must have great insight into what it means to learn in your field, and you must have an equally deep insight into how people learn and all the personal and social forces that can both interfere with and support that learning. That is easier to say than it is to do, but it does require attention to the research and theoretical literature on human learning. I sometimes tell audiences that I taught for twenty years before it ever occurred to me to look at much of the literature on human learning despite the fact that such a body of literature existed and I was trying to cultivate other people’s learning. Fortunately, I have been at this long enough (because I started teaching

when I was five years old) that I have had another twenty-five years to read that literature. I think people should do it earlier in their careers.

Another major factor is the development of the ability to ask important and intriguing questions that will engage our students. We spend too much time pinning our hopes on our machines, hoping that computers or iPads or something magical will help engage our students. They won't. Students will become engaged only when they see the questions and problems as important, intriguing, or just beautiful. We can learn to use the arts—from poetry to film to music—to help raise the question, but we have to understand those questions and their connection with the questions that may already be on the minds of our students.

HETL: Dr. Bain, apart from any specific personality traits, do great teachers have a common set of practices (that is, behaviors) that make them great in your opinion? In addition to practices, do great teachers have a common philosophy (that is, a way of thinking), that make them great in your opinion?

KB: Great teachers will ask great questions in the process of creating that natural critical learning environment. I discuss that environment in the book, but the concept of the natural critical learning environment has continued to grow in our minds; some of our latest thinking can be found in a very simple form at http://www.bestteachersinstitute.org/id30.html and in the surrounding pages on that Web site.

As for whether or not great teachers have a common philosophy, it depends on what you mean by a "common philosophy." I do think that all of the people I have studied had a strong devotion to fostering deep approaches and achievements in learning, and they conceived of teaching as anything they might do to help other people learn. But everything I have said might be a part of that "common philosophy."

HETL: Dr. Bain, if you could give one piece of advice to a new faculty member wanting to become a great teacher, what would it be?

KB: I guess it would be to think carefully about what kind of paradigms their students are likely to bring to class and to think about the kinds of questions that might engage students deeply and challenge those paradigms, and how they can let the research on university teaching and learning inform their practices.

I think it is also important that we pay attention to the research on human learning. It never stops amazing me that some people who say they value research never consider to use any of the research findings when it comes to designing their own classes and learning environments.

I think that both new and established faculty members would be well served to look at the research finding on human learning when designing their courses.

Twelve Pivotal Practices to Promote Brain, Health, and Strategic Learning

Sandra Bond Chapman, Ph.D.

Study laser focused: Minimize multitasking as it
- Diminishes mental productivity
- Elevates brain fatigue
- Increases stress

Avoid isolated fact learning: Learning and teaching content such as science, literature or history as accumulated facts is quickly forgotten and fails to promote integrated or deeper-level brain thoughts. Teach/learn the **process** of how facts were discovered – rather than the **product** – facts.

Reduce information overload: When studying for tests, mark or block out information that is relatively unimportant to learn – at least 50% or more. Inhibiting information is a key brain function associated with better learning.

Abstract meanings instead of rote memorization: When taking notes, practice writing synthesized meanings from readings/ lectures rather than writing verbatim what is being conveyed. Abstracting meaning from what one reads/ hears builds a brain that has enhanced long term memory for global ideas and more reliably able to retrieve fundamental facts.

Customize meanings: Constructs novel meanings from what you are learning; apply ideas to your own life contexts as this personalization makes information more deeply encoded in the brain.

Build an entrepreneur mind: Generate as many interpretations from what you are reading or application to new contexts and as many different perspectives as possible – enhances innovative brain connections.

Seek/train curiosity: Curiosity is more important to develop futuristic brains than training students to be performance oriented (grades, standardized test scores, etc.).

Repetition deepens learning: The more times you read to learn information; the more likely you are to remember long term as the synapses are strengthened.

Beware of mindless reading: Often we read without encoding meaning because we are only word scanning rather than interpreting what we are reading – typically due to mind wandering. That is why you often cannot relate what you have just finished reading. Read for meaning if you are going to set aside the time to read; be in the moment.

Sleep strengthens new learning: Rather than pulling a late- or all-nighter, get a good night's sleep after studying. Information is consolidated in the brain at a deeper level of understanding during sleep.

Exercise reinforces memory: Try exercising just prior to studying, especially outdoors, to get light. Exercising increases blood flow to the memory region of the brain and increases attention and concentration. Sunlight elevates mood.

Tutor a peer: Teaching someone what you have learned, strengthens brain efficiency.

Rubric for Assessing the Quality of Your Student Learning Objectives

Provided by Janet Fulks

	Back to the Drawing Board Revisit and rewrite.	**Try it Out - Useful Outcomes Application Good for a first go round, but may require tweaking after it is assessed.**	**Expert Outcomes Application Excellent SLO and assessment; you should mentor others.**
Language	Written in jargon that a student won't understand Does not include active verbs and does not describe what a student will be able to **do** at the end of the course	Written in mostly student-friendly language with some jargon and discipline code words Includes some active verbs that mostly describe what a student will be able to **do** at the end of the course	Written in student-friendly language that is easily understood but true to the discipline Includes active verbs that describe what a student will be able to **do** at the end of the course
Content	Asks student to use lower level thinking skills that reflect discrete course objectives Addresses content coverage rather than student competency	Asks students to use some higher-level thinking skills and to sometimes synthesize several discrete course objectives Mostly addresses student competency, but does include some content coverage	Asks students to use higher-level thinking skills and synthesizes several discrete course objectives Addresses student competency rather than content coverage
Measurability	SLO cannot be measured	SLO is measurable, but the method may prove difficult	SLO is clearly measurable
	Back to the Drawing Board Revisit and rewrite.	**Try it Out - Useful Outcomes Application Good for a first go round, but may require tweaking after it is assessed.**	**Expert Outcomes Application Excellent SLO and assessment; you should mentor others.**
Appropriateness	Is not consistent with the curriculum document of record Does not represents a fundamental result of the course Does not aligns with other courses in a sequence, if applicable Does not represents collegiate level work	Is mostly consistent with the curriculum document of record Mostly represents a fundamental result of the course Mostly aligns with other courses in a sequence, if applicable	Consistent with the curriculum document of record Represents a fundamental and valued result of the course Aligns with other courses in a sequence, if applicable

		Mostly represents collegiate level work	Represents collegiate level work
Assessment Method (may or may not be clear from the language of the SLO but if not, is recorded elsewhere)	Assessment method is unclear and is not written elsewhere Assessment method does not include a venue for dialogue Assessment method is not sustainable	Assessment method may be clear, but if not may be written elsewhere Assessment method may include a venue for dialogue Assessment method is mostly sustainable	Assessment method is clear; may also include where data will be housed Assessment method includes a venue for dialogue Assessment method is easily repeatable and sustainable
External Outcomes or Standards	If appropriate, does not address external outcomes relevant to this course of study If appropriate, does not consider other colleges or external standards important to this course or program	If appropriate, mostly addresses addressed external outcomes relevant to this course of study If appropriate, mostly considers other colleges or external standards important to this course or program	If appropriate, addresses addressed external outcomes relevant to this course of study If appropriate, considers other colleges or external standards important to this course or program

Mind, Brain, and Education: Building a Scientific Groundwork for Learning and Teaching

By: Kurt Fischer

ABSTRACT — The primary goal of the emerging field of Mind, Brain, and Education is to join biology, cognitive science, development, and education in order to create a sound grounding of education in research. The growing, worldwide movement needs to avoid the myths and distortions of popular conceptions of brain and genetics and build on the best integration of research with practice, creating a strong infrastructure that joins scientists with educators to study effective learning and teaching in educational settings. Science and practice together provide many potentially powerful tools to improve education. Neuroscience and genetics make possible analysis of the " black box " of biological processes that underpin learning. Understanding the biology of abilities and disabilities helps educators and parents to facilitate individual students' learning and development. Cognitive science provides analyses of the mental models/metaphors that pervade meaning making in human cultures, creating tools for avoiding unconscious distortions and crafting effective educational tools. Developmental and learning science produce tools to analyze learning pathways, including both shared patterns and learning differences. To reach the potential of grounding education effectively in research requires improving the infrastructure by creating (a) research schools where practice and science jointly shape educational research, (b) shared databases on learning and development, and (c) a new profession of educational engineers or translators to facilitate connecting research with practice and policy.

The emerging field of Mind, Brain, and Education (MBE) aims to bring together biology, cognitive science, development, and education to create a strong research foundation for education. This foundation requires a new approach to connecting research and education, with a two-way collaboration in which practitioners and researchers work together to formulate research questions and methods so that they can be connected to practice and policy. The traditional model will not work. It is not enough for researchers to collect data in schools and make those data and the resulting research papers available to educators. That is not a way for research to create knowledge that is useful for shaping education. The traditional way leaves out teachers and learners as vital contributors to formulating research methods and questions. Contributions from teachers and learners can create more useful research evidence that can feed back productively to shape schools and other learning situations.

There are many cases in the modern world where science and practice together shape research questions, leading to usable knowledge. Consider the field of medicine, where biologists and medical practitioners (physicians, nurses, etc.) work together in teaching hospitals and other locations of practice to connect research to issues of health and illness. In medicine, research and practice are thoroughly intertwined, resulting in huge improvements in treatments and interventions. More generally, research and practice combine routinely in many industries and fields (Hinton & Fischer, 2008). Meteorology combines science and practice to analyze and predict weather patterns (e.g., National Center for Atmospheric Research, www.ncar.ucar.edu/research/meteorology/). Cosmetics companies spend billions doing research on skin care, makeup, and personal hygiene, producing thousands of products grounded strongly in research evidence. Food processing, automobile manufacturing, agriculture, the chemicals industry, construction — almost every major modern business grounds itself solidly in research that is shaped by practical questions about how products function and how they can be used effectively in context.

What happened to education? If research produces useful knowledge for most of the industries and businesses of the world, then shouldn't it be serving the same function for education? Somehow education has been mostly exempt from this grounding in research. Dewey (1896) proposed the establishment of laboratory schools to ground education in research through combining research with practice in schools, ensuring both formative evaluation and democratic feedback. Unfortunately, his vision has never been realized. There is no infrastructure in education that routinely studies learning and

teaching to assess effectiveness. If Revlon and Toyota can spend millions on research to create better products, how can schools continue to use alleged “ best practices ” without collecting evidence about what really works?

This lack of grounding in research is a key reason that governments in many parts of the world have begun to assess learning in schools through standardized testing in projects such as Program for International Student Assessment (Organization for Economic Cooperation and Development [OECD], 2007a) and No Child Left Behind. The narrowness of these assessment tools creates serious problems, however, for determining the effectiveness of learning and teaching; and, it mostly precludes input from teachers and learners into the assessment process. Could Toyota determine how its cars performed by testing them on a racetrack and ignoring what they do in everyday driving situations? Could Revlon or Avon create effective cosmetics by testing effects only for people gathered into large meeting halls once a year? What education needs is assessments of real school performances that are shaped by researchers, teachers, and students working together to examine the effectiveness of many aspects of learning and teaching in the context of schools (curricula, school arrangements, classroom types, etc.) — what Daniel and Poole (2009) call pedagogical ecology.

A "Teacher's Dozen" Fourteen General, Research-Based Principles for Improving Higher Learning in Our Classrooms

By: Thomas Angelo

How much trust would you place in an engineer who admitted to having no knowledge of thermodynamics or other basic principles of physics, and who thought, in fact, that those physical laws didn't apply to his work? How much confidence would you have in a physician with no understanding of how bacteria and viruses cause infection, one who believed that biochemistry was irrelevant to her practice? If by some terrible mistake you were arrested and put on trial, would you hire a lawyer who thought that keeping up with the research on jury selection, effective defense strategies, and sentencing patterns was a waste of time?

These questions are obviously rhetorical, because we all expect or at least hope that professionals will be knowledgeable and keep current in the research that informs their practice. But, as college teachers, do we expect as much of ourselves?

Unless you're in a field such as cognitive science or educational psychology, chances are slim that your graduate education included any survey of the research on how humans learn. And even within cognitive science and educational psychology doctoral programs, future professors rarely study the research on adolescent and adult learning. As faculty, we tend to assume that knowing a great deal about our specific discipline say, British literature, biology, business, or Byzantine church history is sufficient preparation for teaching. Unfortunately, as most I department chairs and all faculty who have children in college soon learn, that is a faulty assumption. Mastery of one's discipline may be *necessary* for effective college teaching, but it surely isn't *sufficient.*

Three Assumptions

Before going any further, let me lay out the three main assumptions that underline this article. The first is that to most effectively and efficiently promote learning, faculty need to know something about how our students learn, indeed how we ourselves learn. The second assumption is that there really are some general, research-based principles that faculty can apply to improve teaching and learning in their classrooms. And the third is that college teaching is so complex and varied that faculty, members themselves will have to figure out whether and how these general principles apply to their particular disciplines, courses, and students. The discussion that follows rests on these three assumptions like a stool on three legs: If they're sturdy, then what follows will hold up.

While there isn't space here to adequately test these three "legs," a few comments on them might be helpful. First, I assume it's important for faculty to know something about how humans learn because teaching that ignores this knowledge runs the risk of being inefficient, ineffective, and sometimes even counterproductive. The time, energy, and aspirations that we and our students invest in coursework are simply too valuable to spend carelessly.

Second, while few savvy faculty would argue that we know nothing useful about learning, many still protest that we don't yet know enough to inform teaching practice. It is true that there's still much to discover, but at the same time we do collectively know a great deal about how people learn, far more than we use Solid research by cognitive scientists, psychologists, ethnographers, and other researchers offers much more direction to college teachers of the 1990s than was available even a decade ago. To argue that we shouldn't use what we know in teaching because our knowledge is incomplete is like arguing that sailors shouldn't use available knowledge about weather and currents in navigation because that knowledge is incomplete. Only by using what we already know can we learn more.

So, what exactly *do* we know about learning that might be useful to college teachers? My response is the "teacher's dozen" referred to in the title. It's my own list of fourteen principles of effective higher learning

that are well supported by research. My "teacher's dozen" isn't meant to be definitive or exhaustive. It's simply one college teacher's current list of solid principles to teach by.

Why fourteen? The best known and most discussed list is Chickering and Garrison's "Seven Principles for Good Practice in Undergraduate Education* Their "Seven Principles" remain the standard, and most of those research-based guidelines can be found in my "teacher's dozen." But in making up my list, I found there were also other, more specific principles I couldn't teach without. Though I tried to limit myself to twelve, the teacher in me just couldn't give up that content so, in the end, I decided that if a "baker's dozen" is thirteen, then surely a "teacher's dozen" could be fourteen.

Three Goals

Of course, whether such a list should include four, fourteen, or forty-four principles is open to discussion and debate. The first goal of this 'teacher's dozen" is to encourage just that sort of questioning and dialogue. It's to invite faculty to think, talk, and perhaps even read more about the connections between what we know from research on learning and how we practice teaching, Chickering and Gamson's "Seven Principles," or any other general guidelines based on research, will only stimulate meaningful, long-lasting changes in teaching behavior if faculty make the principles personally meaningful by connecting them to their everyday teaching lives. On your campus, for example, you might begin this connecting process by compiling a list of principles from learning research that guide your own teaching and then comparing it with lists drawn up by your colleagues. At the least, comparing lists could make for stimulating lunchtime discussion or enliven a department meeting.

A second goal is to encourage faculty to use their personal "teacher's dozen" as criteria for assessing their current teaching practices. Once you know what principles you ascribe to, you can better determine how well your teaching embodies them. You can use a simple checklist of learning principles to quickly review your course syllabi, class notes, assignments, tests. Or you might watch a videotape of yourself teaching, checking your actions against your list. The videotape might reveal that, even though you're convinced active engagement is critical to learning, you're still doing most of the work in class, while your students passively observe.

A third related goal is to encourage faculty to identify the implications of their "favorite" guiding principles and then develop practical classroom applications. If my third assumption is correct, each combination of teacher, course, and students is so unique that general principles have to be either "custom fit" or "custom built" to be useful in a particular class. The operating axiom is: Adapt, don't adopt. Therefore, the classroom implications and applications of these principles must be generated and validated by individual faculty if they are to have any value. Applying your own "teacher's dozen" might involve making changes in your teaching techniques, homework assignments, or tests. To return to the videotape example, once you've observed that your students are not actively engaged in class, you can begin to systematically experiment with new techniques and approaches and assess how much difference they make.

A Working Definition of Higher Learning

The broader agenda behind these three goals is to help faculty improve the quality of higher learning in their classrooms. But what does that mean? As an exercise in active reading and learning, I suggest you take out a pencil and a piece of paper now and write a one- or two-sentence definition of higher learning before you read any further. Once you've jotted down your draft definition, we can compare notes to make sure we have similar concepts in mind.

What is higher learning? I define higher learning as an active, interactive process that results in meaningful, long-lasting changes in knowledge, understanding, behavior, dispositions, appreciation, belief, and the like. The key terms in this definition are *meaningful, long-lasting,* and *changes*. Higher learning is *meaningful* if the learner understands and appreciates what is learned; that means that something learned by rote but not understood would not qualify. By *long-lasting*, I mean learning that will endure in accessible memory at least beyond the end of the term. And *changes* here means not simply

the addition of knowledge but also the transformation of ways of understanding and organizing the knowledge learned.

This is a demanding definition of higher learning, and I certainly don't always fulfill it, but having an explicit definition does help me make difficult decisions about what and how to teach. Since there is always more worthy course content than time in the semester, I need criteria for making hard choices about what to leave out. Asking myself whether a given class activity, reading, or homework assignment will contribute to meaningful and lasting learning is a helpful decision rule.

A "TEACHER'S DOZEN"
Before I share my current "teacher's dozen," a final caveat is in order given the range of human variation, there are bound to be exceptions to nearly every generalization about learning. It's up to individual faculty members to determine which principles apply to whom, when, where, and how.

That said, for each of the fourteen principles listed below, I'll offer a very brief explanation and then suggest one or two implications for or applications to teaching and classroom assessment. These general implications and applications are meant merely as "pump-primers," to stimulate you to come up with more specific, appropriate ones.

1. Active learning is more effective than passive learning.

What I hear, I forget; what I see, I remember; what I do, I understand. —Chinese proverb

Let the main object of this, our Didactic, be as follows: To seek and find a method by which teachers may teach less, but learners learn more. —John Amos Comenius

As these quotations suggest, teachers have long known what researchers have only recently confirmed about the value of active learning: Students do learn more and better by becoming actively involved. But activity, in and of itself, doesn't result in higher learning. Active learning occurs when students invest physical and mental energies in activities that help them make what they are learning meaningful, and when they are aware of that meaning-making. As George Stoddard put it, "We learn to do neither by thinking nor by doing; we learn to do by thinking about what we are doing."

Implications/Applications
Having students teach or explain something to others that they have just learned helps them learn it much more effectively, especially if they actively rehearse that "lesson" ahead of time and get feedback. To assess actively, ask students to paraphrase a central concept in a couple of sentences for one specific audience, and then to paraphrase the same explanation for a completely different audience. The two audiences might be parents and children, professionals and laypeople, novices and experts. Assess these directed paraphrases for both accuracy and appropriateness.

2. Learning requires focused attention, and awareness of the importance of what is to be learned.

The true art of memory is the art of attention. —Samuel Johnson

One of the most difficult tasks for novice a learner in a field, whatever their age, is to figure out what to pay attention to and what to ignore. Students in introductory courses often cannot tell what is central from what is peripheral, foreground from back- ground, superordinate from subordinate. Novices find these distinctions elusive, usually not because they lack intelligence but because they lack the experience needed to evaluate the data they encounter. If you've ever found yourself lost and alone in a busy city in a country whose language, culture, and street signs are totally unintelligible (some of you are thinking Boston; others, New York), then you can imagine how many students feel when they encounter a "foreign" discipline for the first time in college.

Implications/Applications
You can help novices by pointing out some of the major landmarks, by writing a list of the five key points in your lecture on the board before class, for example. You also can assess how well they are learning to read the "maps" that lectures or readings provide. Using a "Minute Paper" to find out what students thought were the most important points in a lecture or reading and what questions they still have can provide useful information on where they are getting lost and clues for getting back on track.

3. Learning is more effective and efficient when learners have explicit, reasonable, positive goals, and when their goals fit well with the teacher's goals.

If you don't know where you are going, you will probably end up somewhere else. —Laurence J. Peter and Raymond Hull

When learners know what their educational goals are and figure out how they can best achieve them, they usually become much more efficient and effective. Adult learners often fit this bill. When learners know how and how well their goals fit the instructor's, they tend to learn more and get better grades.

Implications/Applications
Early in the term, ask students to write down a few specific learning goals they hope to achieve through your course. Then involve them in comparing their learning goals with those of other students, and with your teaching goals. Look for and build on areas of congruence, but don't gloss over potential conflicts or disconnects. Refer back to and assess progress toward shared goals throughout the semester.

4. To be remembered, new information must be meaningfully connected to prior knowledge, and it must first be remembered in order to be learned.

Thinking means connecting things, and stops if they cannot be connected. —G. K. Chesterton

The more meaningful and appropriate connections students make between what they know and what they are learning, the more permanently they will anchor new information in long-term memory and the easier it will be for them to access that information when it's needed.

Implications/Applications
Provide many and varied examples/illustrations, descriptions/ drawings, images, metaphors, and analogies. But ask students to provide them, as well, then give the students feedback on their usefulness and appropriateness. For instance, two simple ways to help students make connections, and to assess the connections they are making, are to ask them to compose a metaphor ("Learning is ____") or to complete an analogy (Teaching is to learning as ___ is to ____).

5. Unlearning what is already known is often more difficult than learning new information.

It is what we think we know already that often prevents us from learning. —Claude Bernard

Habits, preconceptions, and misconceptions can be formidable barriers to new learning, all the more treacherous because, like icebergs, this prior learning is j usually 90 percent hidden from I view. Before we can help students unlearn or correct prior learning, we need to know something about what is below the surface.

Implications/Applications
Before you present new material, find out what students already believe and know, and what they can do about it a quick diagnostic "probe," containing a few questions, often can help you locate dangerous "icebergs." By asking a few diagnostic questions, you might also find out that the shipping lanes are clear

and that your students are more experienced navigators than you had assumed. Whatever you discover, it will help you and the students find more appropriate starting points for your work.

6. Information organized in personally meaningful ways is more likely to be retained, learned, and used.

Much goes on in the mind of the learner. Students interpret. They over interpret. They actively struggle to impose meaning and structure upon new material being presented. —Donald A. Norman

Humans are extraordinary pattern seekers. We seek regularity and meaning constantly, and we create them when they are not apparent. Witness our penchant for seeing dragons in clouds, for example. To be most useful, the ways learners organize knowledge in a given domain need to become ever more similar to the ways experts in that field organize knowledge. This requires making what is usually implicit, explicit.

Implications/Applications
Show students a number of different, useful, and acceptable ways to organize the same information. Use prose, outlines, graphs, drawings, and models. Assess students* organizing schemas and skills by getting them to show you their "mental models" in a similar variety of ways.

7. Learners need feedback on their learning, early and often, to learn well; to become independent, they need to learn how to give themselves feedback.

Supposing is good, but finding out is better. —Mark Twain

Regular feedback helps learners efficiently direct their attention and energies, helps them avoid major errors and dead ends, and keeps them from learning things they later will have to unlearn at great cost. It also can serve as a motivating form of interaction between teacher and learner, and among learners. When students learn to internalize the voice of the "coach," they can begin to give themselves corrective feedback.

Implications/Applications
Don’t assume that students understand, ask. Try asking them I to jot down what the "muddiest j point" was in a particular reading, lab, or lecture, then respond to the most common "muddy points" in your next class. Find out what students are doing with the feedback you're already giving them. Do they read and use the comments you write on papers and exams? If so, how? If not, why not? Explicitly demonstrate how you get feedback on your work and what you do with it.

8. The ways in which learners are assessed and evaluated powerfully affect the ways they study and learn.

Let the tutor demand an account not only of the words of his lesson, but of their meaning and substance. Let the learner show what he has just learned from a hundred points of view, and adapt it to as many different subjects, to see if he has rightly taken in it and made it his own. —Michel de Montaigne

Whether faculty "teach to the test" or not, most students are going to try to "study to the test." For generations uncounted, students have annoyed their teachers with the question, "Will this be on the final?" One reason they persist is that most' genuinely want to get good grades. But a second reason is that knowing what will be on the final, or on any upcoming test or quiz, helps students figure out , where to focus their attention. In other words, they are looking for a road map. One way to improve learning, then, is to make sure our test questions require the kind of thinking and learning we wish to promote and that students know, at least generally, what those questions will be.

Implications/Applications
Once you're sure your questions are testing what you want students to learn, give them a sample exam or a list of study questions from which the exam questions will be selected. Give students regular opportunities to practice answering similar questions and to get feedback on their answers. If students work in study groups, that corrective feedback often can come from their peers.

9. Mastering a skill or body of knowledge takes great amounts of time and effort.

There are some things that cannot be learned quickly, and time, which is all we have, must be paid heavily for their acquiring.
—Ernest Hemingway

In a study of talented young adults who had achieved high levels of mastery in a variety of fields, Benjamin Bloom and his colleagues found that none had achieved mastery in less than a dozen years, and the average time to mastery was sixteen years at between 25 and 50 hours per week of practice and study. This means that at least 15,000 to 30,000 hours of time and intense practice were required to reach the highest levels of mastery. If we halve those figures to "guesstimate" the time needed to achieve an acceptable mastery level, we're still left with about 15,000 hours of preparation the equivalent of 40-hour weeks, fifty weeks a year, for three-and-a-half to seven years.

Implications/Applications
Unplug all the TVs! Seriously though, students need to know how long it actually takes to attain mastery in their field. Then they need to find out how much time they actually are devoting to that task. Give students a simple form on which they can log all the times they study/practice for a week and indicate how productively they used each block of time. Discussing their findings with other students in a nonjudgmental way can help them become aware of and gain control over their time use.

10. Learning to transfer, to apply previous knowledge and skills to new contexts, requires a great deal of practice.

Research on learning to transfer generally is depressing. Most learning is highly context-bound, and few students become skilled at applying what they've learned in one context to another similar context. In fact, many students cannot recognize things they've already learned if the context is shifted at all. This is one of the reasons why students will point at questions that are only slightly altered versions of homework questions and protest, "We've never done problems like these before!" Those students who are being honest simply cannot see the similarities. They learned to solve problems involving giraffes, motorcycles, and Cincinnati; they never had to solve problems about wildebeest, cars, or Dayton.

Implications/Applications
If you value transfer, teach transfer. Direct students' attention continually between the general and the specific. Give them many different examples of the same concepts or principles, and make sure they see where the similarities and the differences are. Challenge students to identify and then to create similar but different examples or problems.

11. High expectations encourage high achievement.

For some time now, we've known that younger students tend to achieve more by working with teachers who expect more of them. For the so-called "Pygmalion effect" to work well in college, however, the students must share the teacher's high expectations of themselves and perceive them as reasonable.

Implications/Applications
Begin by finding out what your students expect of themselves in your class, letting them know what you expect, and discussing those expectations. Begin the course with assignments that diligent students can

succeed in to build confidence. Have learners interview successful former students, or invite them to class, to illustrate in flesh and blood that high expectations can be realized.

12. To be most effective, teachers need to balance levels of intellectual challenge and instructional support.

In discussing the ways in which mothers help children acquire language by constantly adjusting their speech to stay slightly ahead of the child's, Jerome Bruner writes of "scaffolding." Scaffolding is a useful metaphor for college learning, as well. The weaker or smaller the student's foundation (preparation) in the subject, the stronger and larger the instructional scaffolding (structure and support) that is required. This is one of the many reasons that teaching a first-year course requires a different approach than teaching a third-year course in the same discipline. Students in the third year generally require less structure and direction, and benefit from more autonomy and responsibility. This also helps explain why students of lower ability or much weaker preparation often benefit from and appreciate highly structured courses. They need the scaffolding.

Implications/Applications
Even when learner ability or preparation or both are weak, expectations should remain high. To reach those expectations, less-prepared students will need more and more explicit instructional "scaffolding," such as tutoring, highly structured directions, and more personal contact with the instructor. Students who are better prepared or more able can be encouraged to master their learning by serving as tutors, helping to create scaffolding for others, and to take more responsibility for their own learning through independent studies and special projects.

13. Motivation to learn is alter able; it can be positively or negatively affected by the task, the environment, the teacher, and the learner.

Though we tend to talk about students as being either "motivated" or "not motivated," most of our students are very motivated to learn certain things and not at all motivated to learn others. Research suggests that you stand a good chance of increasing motivation to learn if you can positively influence your students' beliefs and expectations about one or more of the following: Students are likely to be more motivated to learn in your class if they see the value of what you're teaching; believe that learning it will help them achieve other important goals; believe that they are capable of learning it; and expect that they will succeed.

Implications/Applications
Give students lots of specific examples of the value and usefulness of what they're learning and help them make connections between short-term course goals and their own long-term goals. Use simple, anonymous surveys to gauge students' expectations, beliefs* and self-confidence levels, then respond to that information with specific examples, suggestions, and, whenever possible, realistic encouragement.

14. Interaction between teachers and learners is one of the most powerful factors in promoting learning; interaction among learners is another.

As with activity, it isn't interaction in and of itself that promotes academic learning, it's structured interaction focused on achieving meaningful, shared learning tasks. As the professional world never tires of pointing out, our students need to learn to work more effectively in teams.

Implications/Applications
Most students have to believe teachers know and care about them before they can benefit from interactions or even interact. Learn students' names as a first step, then try to engage them in working with you to learn. Classroom Assessment and Classroom Research projects can engage students and

teachers in working together to solve meaningful problems, such as finding ways to ensure that everyone in class has a fair chance to master the course content. If you want students to cooperate effectively with other students, first, challenge them with assignments that groups can carry out more effectively than individuals can; second, provide guidelines and guidance for group work, especially for those who haven't had experience and, third, de-emphasize competition among individuals for grades and approval. Meaningful and positive interactions require mutual trust.

Final Notes

Nothing is so useless as a general maxim. —Lord Macaulay

Psychology is a science; teaching is an art, and sciences never generate arts directly out of themselves. An intermediary, inventive mind must make the application, by use of its originality. —William James

I argued at the outset that mastery of an academic discipline is not sufficient for effective college teaching. But even disciplinary mastery complemented by familiarity with research on college learning is not sufficient. Effective teachers know their subjects, know something about the research that informs teaching, and also know how to adapt and apply relevant research findings to their own classrooms. Lord Macaulay was partially correct: Nothing is so useless as a general maxim that isn't properly applied to the particular. With James, I'm convinced that we need inventive, original minds to make the applications of these or any other general principles of teaching. I'm also confident we have such "intermediary, inventive" teachers in abundance among our faculty.

Discussion Questions

1. How would you answer this question: After taking my course, you will be able to do what?

2. What story can you tell to jump start your first day of class?

3. What experiential learning can you include to add more meaning for students?

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2012 - 2013 Programming Schedule

Sept. 17 – Oct. 1, 2012	Ahead of the Class: What to Know and Do on the First Day
Sept. 24 – Oct. 8, 2012	**Module** Ahead of the Class: Motivating Students
Oct. 8 – Oct. 22, 2012	**Module** Ahead of the Class: Active Learning
Oct. 22 – Nov. 5, 2012	**Module** Ahead of the Class: Critical Thinking
Nov. 5 – Nov. 19, 2012	**Module** Ahead of the Class: Assessment
***Oct. 15 – Oct. 29, 2012**	Who Needs a Runway? Take Off From Where You Are! – Vernice "FlyGirl" Armour
***Oct. 29 – Nov. 12, 2012**	A Conversation with Hilary Duff – Hilary Duff
Oct. 30, 2012 – 10:00 AM **Oct. 31, 2012 – 3:00 PM**	Special Topics & Local Needs: A Primer – Webinar Special Topics & Local Needs: A Primer - Webinar
***Nov. 12 – Nov. 26, 2012**	The Wealth Cure: Putting Money In Its Place – Hill Harper
Nov. 26 – Dec. 10, 2012	Keeping 'em Once You've Got 'em: It's Everybody's Job
Jan. 28 – Feb. 11, 2013	How to Develop a Leadership plan
Feb. 11 – Feb. 25, 2013	**Module** TBD
Feb. 25 – Mar. 11, 2013	**Module** TBD
Apr. 1 – Apr. 15, 2013	**Module** TBD
Feb. 5, 2013 – 10:00 AM **Feb. 6, 2013 – 3:00 PM**	WECM Workshops 101 – Webinar WECM Workshops 101 – Webinar
Feb. 18 – Mar. 4, 2013	The Standard of Everyday Greatness – Kevin Bracy
Mar. 11 – Mar. 25, 2013	How to Write Your Own Obituary – Brad Meltzer
Apr. 1 – Apr. 15, 2013	18 Minutes: Find Your Focus, Master Distraction, and Get the Right Things Done – Peter Bregman
Apr. 15 – Apr. 29, 2013	New Technology Trends

Student Completion – Webinar TBA

EVALUATE "Ahead of the Class: What to Know and Do on the First Day"

On a scale of 1-5, with 5 being the highest, rate the video/conference in terms of its value to you.

	Excellent				**Poor**
Timeliness of topic	5	4	3	2	1
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Handouts	5	4	3	2	1
Technical quality	5	4	3	2	1
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