The Difference that Inquiry Makes:

A Collaborative Case Study of Technology and Learning, from the Visible Knowledge Project.

Edited By Randy Bass & Bret Eynon

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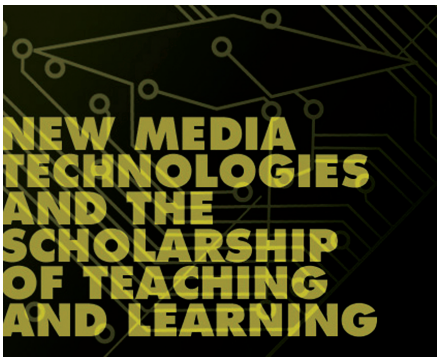

"The Difference that Inquiry Makes: A Collaborative Case Study of Technology and Learning, from the Visible Knowledge Project," *edited by Randy Bass and Bret Eynon*

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Trace Evidence: How New Media Can Change What We Know About Student Learning

Lynne Adrian, University of Alabama

From The Difference that Inquiry Makes: A Collaborative Case Study on Technology and Learning, from the Visible Knowledge Project[1], *edited by Randy Bass and Bret Eynon*

Introduction

The idea that learning is social is built into discussion classes. If individuals contribute their thoughts, shared insights will produce more knowledge. The problem is that this assumption is largely unexamined. In 2002 I tested the Classroom Performance System (clickers)[2] as a tool to increase student participation in discussions. What I actually discovered was the larger patterns of open-ended questions. Making these patterns visible has changed my teaching, because it allows me to show the patterns to students and increase their understanding of the kinds of questions that can be asked and answered in American Studies.

My course American Studies 205, American Lives, uses late twentieth-century American autobiographies to explore how individuals construct a sense of self and to reflect the diversity of different lives in America. Since many issues regarding construction of self within a particular cultural context call for student reflection on similar processes in their own lives, the class has always been conducted primarily through discussion. Students are generally willing to discuss a wide range of topics. Discussions are often free-wheeling, with the number of students who speak varying from term to term. Responses on surveys at the end of the term are overwhelmingly favorable. I chose to use clickers in this course because of its established nature and historically positive outcome.

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1 About VKP: In all, more than seventy faculty from twenty-two institutions participated in the Visible Knowledge Project over five years. Participating campuses included five research universities (Vanderbilt University, the University of Alabama, Georgetown University, the University of Southern California, Washington State University, and the Massachusetts Institute of Technology), four comprehensive public universities (Pennsylvania's Millersville University, California State University (CSU)--Monterey Bay, CSU Sacramento, Ohio's Youngstown State University, and participants from several four-year colleges in the City University of New York system, including City College, Lehman, and Baruch), and three community colleges (two from CUNY--Borough of Manhattan Community College and LaGuardia Community College, and California's Cerritos College). In addition to campus-based teams, a number of independent scholars participated from a half dozen other institutions, such as Arizona State and Lehigh University. The project began in June 2000 and concluded in October 2005. We engaged in several methods for online collaboration to supplement our annual institutes, including an adaptation of the digital poster-tool created by Knowledge Media Lab (Carnegie Foundation), asynchronous discussion, and web-conferencing. The VKP galleries and archives (https://digitalcommons.georgetown.edu/blogs/vkp/) provide a wealth of background information, including lists of participants, regular newsletters, and reports and essays by participants, as well as a number of related resources and meta-analyses. For this article, the author gratefully acknowledges the students whose work is cited here. All students whose work is included have granted the author permission to use the material.

2 Hereinafter referred to as "clickers." Clicker devices are designed like television remote controls to register and project students' responses to questions in real time. There are at least thirteen different systems currently on the market, used in over six hundred educational systems.

Clickers are one of the fastest growing educational technologies in the United States. A number of studies analyze the use of clickers in college settings,[3] focusing on using active and collaborative learning to assure understanding of factual information, usually in large lecture classes.[4] Almost all are modeled on science education, such as Eric Mazur's pioneering work in Harvard's physics program. In those models, the incorrect answers to multiple choice questions are constructed to reflect particular common misunderstandings of the principles being discussed. There the purpose of social action is to get convergence around an agreed-upon right answer with the incorrect responses providing the lecturer the opportunity to identify common misunderstandings. Because only one previous study focused more on the discussion process itself rather than on the conclusion reached,[5] my class's use of the system was significantly different. In my American Studies course I used the clickers to get students to experience a multiplicity of possible answers and connections between topics. The recognition, persistence and validation of multiplicity was the goal. Using clickers with open-ended multiple-choice questions allowed students to literally *see* on a screen several possible answers, some of which might not have occurred to them. When choices were registered on the screen students could also see how divided their peers were in the answers to a given question. I hoped the conclusion "Joe thinks that" would become "Twenty percent of my classmates think that." Thus, various answers might be perceived as possible solutions rather than individual quirks of opinion. I wanted to see if using technology could increase student participation in discussion compared to a class taught without clickers. My rather naïve assumption was that more students talking would lead to more exploration of ideas, a wider range of suggestions, and deeper student learning.

Clicker Use and the Problems of Inquiry in American Studies

Of course, it should not be hard to predict that the obvious did not happen. Technology was no magic bullet to make my students suddenly very talkative. A few painfully shy students still never said a word. A few loquacious students still talked as often and as long as I would allow, said very little of substance, and made no deeper observations at the end of the semester than at the beginning. It was hard not to think that the experiment was a dismal failure–or at best a proof that technology was not the answer. Even at the end of the semester a significant number of students seemed to miss the point of class discussion. When asked about their willingness to discuss, one student replied "I sometimes participate. I usually don't know what response she is looking for, and the answers can be very broad," and another replied "when we go into in-depth detail about a book, I don't participate because it's too detailed and not on the exam." Both students indicated their belief that the purpose of class discussion was to help students find specific right answers to questions on which they would later be tested.

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3 Institutions include the University of Wyoming, North Central Technical College, U.S. Military Academy at West Point, Harvard, University of New Hampshire, University of Alabama, University of Texas at Austin, Penn State, University of North Carolina, Wilmington, Illinois Institute of Technology, and the University of Texas, El Paso.

4 Merrill S. Blackman, Patricia Dooley, Bill Kuchinski, and David Chapman, "It Worked a Different Way," *College Teaching* 50 (Winter 2002): 27-28. See also the Mazur group at http://physics1.harvard.edu/research/detailspage.php?ed=1&rowid=52 and A. Louis Abrahamson, "An Overview of Teaching and Learning Research with Classroom Communications Systems (CCSs)" at http://www.bedu.com/Publications/Samos.html.

5 Charles R. Ward, James H. Reeves, and Barbara P. Heath, "Encouraging Active Student Participation in Chemistry Classes with a Web-based, Instant Feedback, Student Response System," http://www.chem.vt.edu/confchem/2003/a/ward/ConfChem_SRS.htm and Merrill S. Blackman, Patricia Dooley, Bill Kuchinski, and David Chapman. "It Worked a Different Way." *College Teaching* 50 (Winter 2002): 27-28. See also the Mazur group at http://physics1.harvard.edu/research/detailspage.php?ed=1&rowid=52 .

While clickers didn't make my students talk more, there was an important question the data *did* address. The key query turned out to be whether the clickers could be used in an area like American Studies where the pedagogical project focuses more on opening up thought patterns, linking diverse materials, and developing higher-order critical thinking skills rather than on conveying a specific body of information. Clickers permitted me to study whether visually presenting students with open-ended questions helped them to formulate multiple responses and perspectives on the issues.

Answering that question required me to focus on responses students made in their written work rather than on how much they talked in class. How did their thinking about the books change over the course of the semester as a result of the questions I presented? If I repeatedly posed questions whose answers showed multiple causations, were they better able to identify multiple causations at the end of the semester than at the beginning? If I asked repeatedly about both the literal meaning and the larger implications of metaphor, were students better able to see them as interrelated? These are key questions, because for American Studies the persistence and validation of multiplicity is the goal, and expertise is often marked by an ability to see both a multiplicity of answers and connections between events or texts and their contexts. A field like American Studies can rarely use a model like Mazur's ConcepTest because the overwhelming majority of the field involves working in areas with *no* right answers. Only questions of chronology have a definite "right" answer, and those are rather limited in application; as Peter Felten demonstrated in the opening exercise for a seminar on the 1960s in which students were asked to put ten photographs in chronological order, the heuristic value lies in student's explications of how they chose a particular order. The exercise brought to the surface hidden assumptions and myths (what Felten called "the Forrest Gump syndrome") that can interfere with student learning.[6]

The problem, from my point of view, in using this exercise as a model in American Studies is twofold. Events, texts, and advertisements have definite dates; concepts or individuals are much less specific. In addition, much of the exercise is dependent on, and driven by, students' preexisting mythic frame of reference from which they operate. Those shared contexts exist in only a small part of what American Studies covers. Often what American Studies teaches is interpretation of and connection between seemingly unrelated elements. Arguments are judged on how effectively connections are reasoned as much as by the specific conclusions that are reached. This approach has great value for students, but it requires that classroom use of both discussion and clickers must function differently than ConcepTests do in science classes.

Teaching difficulties often illuminate problems in student learning, making a problem in teaching an excellent thing–much like a problem in research.[7] The problem that focused my immediate attention was the unexpected difficulty I, my teaching assistant Zeb Baker, and my students had constructing open-ended questions for the clickers that did not have an implied correct answer.

When I had a permanent record of the open-ended questions presented to students, close examination revealed seven different types of questions in a hierarchical order of complexity. These questions are no different from ones I have used to discuss these books throughout my teaching career. The clickers merely enabled me to see these categories by recording them in a recoverable

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6 Peter Felten, "Image, Inquiry and Emotion in the History Classroom." Academic Commons (Dec. 2008), http://www.academiccommons.org/commons/essay/inquiry-image-and-emotion-history-classroom .

7 Randy Bass, "The Scholarship of Teaching: What's the Problem?" *Inventio* 1, no. 1 (Feb. 1999), http://www.doiiit.gmu.edu/Archives/feb98/rbass.htm .

form. That discovery raised new sets of questions, and the interesting questions are not inherently based in technology itself. Perhaps Zeb Baker was right to ask "Is anyone really learning in this class based on technology? At the moment, particularly after the class today, I would have to say that no one is learning except Dr. Adrian and [me], and we are only learning about how people essentially do not want to embrace the technology."[8] I disagree that the students disliked the clickers. Instead, I believe we were seeing student reluctance to, or discomfort with, adopting a multivalent approach to causation, to the multiple explanations and connections that represent the heart of interdisciplinary study. However, Baker is absolutely correct that as teachers *we* were the real beneficiaries of the clickers, because technology allowed us to preserve traces of the ongoing process of discussion to refer back to and analyze it in a less ephemeral state. The technology itself is not the crucial component being measured; rather, its role is analogous to vacuum tube cloud chambers that allow physicists to trace the path of an electron as it is split from an atom. The technology enables the study, but is not the focus of the research. Now the conversation has become less ephemeral and can more easily be analyzed.

Seven Types of Discussion Questions

In analyzing student responses to questions, it became apparent that there were seven basic kinds of questions that I used to open up discussion. The "simplest," but vital, type of question involved asking what students already knew about a particular author or text. Previous work in the scholarship of teaching and learning has established this practice as critical. As Lee S. Shulman observes, "We now understand that learning is a *dual* process in which, initially, the inside beliefs and understandings must come out, and only then can something outside get in….To prompt learning, you've got to begin with the process of going from inside out. The first influence on new learning is not what teachers do pedagogically but the learning that's already inside the learner."[9] Key examples of this type of question were used to open discussion on *The Autobiography of Malcolm X.* Students were asked if they had heard of Malcolm X or read the book previously. In the discussion that followed, they were able to express what they had heard or thought they "knew."

In the case of Malcolm X it is particularly vital to examine "common knowledge" to enable students to actually encounter what the text says and not just repeat generalities, similar to the use of clickers in Political Sciences classes at the University of Texas at El Paso.[10] Students in my course were then asked "Have you had any responses from others who have seen you buy, carry, or read the book?" and given choices of "No responses, Yes--positive responses, or Yes--negative responses." Through this question students were able to acknowledge and confront the intense emotional response that Malcolm X can still invoke which opens up the possibility of directly discussing *why* he still arouses such strong feelings and facilitates open and respectful discussions on difficult topics.

A second type of question involved helping students see that a central metaphor or term in a literary context has both a literal meaning and a larger resonance, providing insight into a work and its relationship to larger American cultural questions. Examples of this type of question occurred throughout the semester, and involved Jade Snow Wong's *Fifth Chinese Daughter,* Kim Chernin's *In My Mother's House*, and Maya Angelou's *I Know Why the Caged Bird Sings*. For example:

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8 Zeb Baker tape transcript (Sept. 19, 2002), 17-18.

9 Lee S. Schulman, "Taking Learning Seriously," *Change* 31, no. 4 (July/August 1999): 10-17, http://www.carnegiefoundation.org/pub/sub.asp?key=452&subkey=618.

10 A. Louis Abrahamson, "An Overview of Teaching and Learning Research with Classroom Communications Systems (CCSs)" at http://www.bedu.com/Publications/Samos.html .

What does 'discipline' mean to Jade Snow Wong?

A. To be punished

B. Mastery of a skill necessary to move to the next level of accomplishment

C. Total awareness of mind and body

Of students registering an answer on the clickers, twenty percent chose A, forty percent chose B, and forty percent chose C. These three answers are arranged in a continuum from novice to expert readers. All three are demonstrated in the text, with the most detailed and concrete examples focused on discipline as physical punishment. Discipline as mastery is mentioned, but not emphasized, and the larger use of discipline as total awareness is increasingly implied in the later portions of the text, but not directly addressed. The percentages already indicate that by the middle of the semester most students were beginning to move into intermediate and expert readings of the text, rather than remaining on the literal level of discipline as the severe physical punishment Jade Snow's parents use. Class discussion on why students chose B and C was lively and fruitful.

The third type of open-ended question the clickers revealed asked students to acknowledge multiple causation of events or multiple motives–some conscious, some unconscious–in an individual's actions. Notable examples of these kinds of questions come from Maya Angelou's *I Know Why the Caged Bird Sings.* A simple example of multiple causation is embedded in this question on the revival Angelou describes:[11]

Why does the revival minister choose 'charity' as his topic?

A. Because the audience is poor (6%)

B. Because it is a fundamental value in the faith (29%)

C. Because it lets the different churches work together (12%)

D. Because it allows him to criticize whites (6%)

E. All of the above (47%)

The largest group of students chose answer E, perhaps partially due to the format of the question, though the ensuing discussion on why all answers were valid was useful.

A fourth, slightly more abstract, type of open-ended questions asks for the multiple influences on an individual which help determine their views or cultural positioning. A related category of questions call for determining which factor is *most* important out of a list of correct possibilities.

The fifth category of open-ended question is distinguished not by content but by the method of construction, which also makes it a higher order of intellectual challenge. In this instance, I ask students to generate a list of possible responses to a question such as "What are some adjectives describing personal characteristics of Perle Chernin?" or "What traits turn Malcolm the eighth-grade honors student into a petty criminal?" Students then used clickers to select which of the suggested responses were most important or accurate. By having students generate the responses and select

11 The percentage of students giving each answer in CPS discussion is placed parenthetically on this and all subsequent questions.

an overriding factor, two levels of active learning are added to the class. Generating a list of possible explanations provides a rehearsal for what students are required on to do in an essay examination.

One of the most abstract levels of questions asks students to examine the narrative strategies an author chooses to tell her/his life story. Because this requires students to look at the content of the narrative and its construction, it is often a difficult exercise for beginning general education students. These questions can either request analysis of one text or comparison between two texts. A simple yes or no example of this type of question is "The way Mary Crow Dog tells her story resembles how Esther Greenwood narrates her story." Eighty-seven percent of the students recognized their similarities, though *The Bell Jar* is a fictionalized autobiography using a modified stream of consciousness narrative to echo Greenwood's research on James Joyce, and *Lakota Woman* is a co-authored book based largely in non-Western narrative traditions in which linear separation of past and present generations is often ignored. Students identified and discussed similarities more easily because the question only asks students what they perceive but does not require them to name the phenomena. The instructor then can name and explain the genesis of what students already perceive.

Finally, at the most expert levels of American Studies practice are questions that ask students to identify hidden similarities between two seemingly different phenomena. Examples of these types of questions include asking of Malcolm X if "there a difference between an illegal hustle like his, and a legal hustle like the one he creates for Reginald?" or, concerning Angelou, "does the music of the revival and the music of the roadhouse have the same underlying message?" In the case of Angelou, direct evidence in the text speaks to this question "All asked the same questions. How long, oh God? How long?"[12] so the fact that sixty-three percent of the students could answer "yes" over thirty-seven percent who answered "no" based on prior understandings of musical form and lyrical content is less remarkable than the fact that discussion forced them to articulate how and why the two are similar.

Student responses on essay examinations also provided plentiful evidence that some of the students in the sample did get better at making connections. For illustrative purposes I will use student responses that reflect the second type of question--where students must read terms both literally and as a larger metaphor in a work.

The most concrete examples comes from the first test, when students had been systematically led through discussion of the central metaphors in the titles of *The Bell Jar* and *I Know Why the Caged Bird Sings*. Carmen's examples from test one is particularly sophisticated.

> *The bell jar's literal meaning is that is something that guards cherished items from the invasions of the outside world, like dust. It is also used in scientific experiments to create vacuums. As for "in my mother's house," it is the physical ownership of the house and everything in it including the inhabitants.*

She continues her non-literal reading of Chernin's metaphor as follows:

> *The house in the sense of being a mother, was not for Rose. For her, her house was the Communist Party, her shelter for helping the rest of the people. She was a mother to them, organizing to get them food, shelter, and better rights. The home where her family was, was just a place to sleep. Her "home" was wherever people needed [to be] organized.*

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12 Maya Angelou, *I Know Why the Caged Bird Sings* (New York: Bantam Books, Random House, 1970), 111.

> *As for Kim, in Rose's house she felt abandoned, especially after Nina's death. When Rose got depressed after Nina's death, she moved houses to California and it was only the Communist Party that could bring her back. Not anyone in her home, which is where all her love is supposed to be. Kim, in her mother's house, told her she wasn't Marxist and argued and debated and grew apart with her. This occurred after Kim went figuratively to her mother's original home, Russia, where the inside of it was a deception from the outsides façade. After leaving her mother's house and returning to tell her story, they finally grew to understand each other. It became the symbol of the rekindling of their relationship which had been lost so long before in another house--Russia.*

At the end of the Chernin section Carmen moves the metaphorical reading from house as a shelter to a reading of house as a larger place--this time including both Kim's and Rose's responses to Russia. She is able to read both mother and house metaphorically in fairly sophisticated ways. Interestingly, she does this in an impersonal voice, without use of "I." Another student, Cindy, is less able at reading metaphorical language symbolically, offering little regarding Plath. However, she does note the following about Chernin:

> *Mother's house represents a struggle against stereotypes and parental agendas. It is the fight to live life by one's own standards. It is the issue of independence.*
>
> *Mother's house is also a symbolism of generationalism--heredity even. No matter how different they seem each generation, Perle to Rose, Rose to Kim, Kim to Larissa, it is easy to see the family traits.*

The connection between the metaphor and the analysis is much less robust than in the previous example. Instead, the metaphor becomes the occasion for making some fairly traditional generalizations about generations and social process.

Student answers on the final examination revealed that, particularly for the A and B students, there had been some carry-over from the ability to read more generalized meanings into the concept of discipline to the understanding of the persona presented in the autobiography. In response to a final examination question asking "Which author has influenced you the most and why?" Carmen's writing produces some powerful examples of understanding both the concept of culture and of human similarities across what could seem like cultural divides.

> *If I had been in [Wong's] shoes, I don't know if I could have made it as far as she had. Several times I would have given up. With her doing American and Chinese schooling, plus trying to learn housework, she should have been mentally and physically exhausted, but she rarely mentioned it.*

I marked this passage when grading as a good use of a specific example. It also reflects an unstated awareness of discipline in the larger senses; though not specified, Carmen is referring to Jade Snow Wong's self-discipline. Later in the essay Carmen continues:

> *I was very disappointed when her parents didn't say anything about her getting into college. I know my parents were thrilled especially when I had a partial scholarship. I can relate with Jade Snow in trying to pay one's way through college. I know she struggled with it and I'm doing the same. I am exhausted trying to keep up with a job and the amount of school work I have.*

Here she moves strongly from an example in the book to relate the example back to her direct personal experiences. She then proceeds to generalize from this identification of experiences:

> *Through reading her story, I found that the Chinese are very strong and dedicated, and intelligent in ways Americans are not. In learning from both cultures one could end up a very wise person in many aspects.*

I believe this last sentence is a great example of learning. Carmen looks as though she is going to fall into the essentialist mistake of generalizing about a whole people based on one book. Then in the second sentence she clarifies that she means different *cultural knowledge* that can produce different strengths, not that all Chinese people are the same. It is an excellent example of a student coming to see culture as both within, and larger than, the individuals showing the culture.

A less sophisticated related example is Tara's definition of culture in the second final examination essay which asked students to describe, then compare and contrast two authors in relationship to mainstream American culture. She writes:

> *American culture isn't just one set of criteria. Culture in the U.S. is who you are, where you fit in and how you judge your own life in relation to the culture where you find yourself.*

Though the insight is good, she is not able to connect it directly to either material in the texts or to her own experiences. It remains a generalization--almost a cliché.

A higher level of generalization in learning was demonstrated in the final exam by another student, Dale, who answered the question on which author was the greatest influence in part with: "She had to prove herself, not just her grades in school like me, but truly prove herself. She paid her way through college, built her own business, those are two things I don't know if I could ever do. Jade Snow Wong empowered me. After reading her book, I felt that my obstacles were far smaller than hers, but I could still overcome them just like she did." There is an awareness of a larger context of discipline in Jade Snow's need to establish not just a specific goal (such as grades) but a larger, more integrated context for her achievement. This example of student writing also indicates a greater ability to generalize and relate personal experiences to those with different cultural backgrounds.

Over the course of the semester the use of "I" language emerged as a key marker of the difference between novice, intermediate, and expert learners when they were analyzing cultural material rather than recounting factual content in a manner reminiscent of book reports. Novice learners most often write about specifics from the books in neutral language, particularly when they have trouble interpreting the texts. For intermediate learners the presence of analysis in an essay is often signaled by use of "I" language, sometimes as a personal aside addressed directly to the reader, or with an emoticon, such as a smiley face. These students are able to analyze what they read, but they still seem to need to convey the analysis as an expression of personal opinion through their language usage. The one notable exception is Carmen--the very shy, but excellent student, who uses impersonal, neutral language to convey her analysis. I believe that this reflects the characteristic of an expert learner in cultural analysis, where analysis is not only present but is distinguished from personal opinion. The only time Carmen used "I" in the entire semester on the final examination where the form of the question as a direct address to the student elicited "I" language in the answers from every student. In general, direct address in the question itself seemed to enable students to enter into a direct dialogue with the book, often directly relating their lives to that of individuals from the autobiographies.

Conclusion: "Going Meta"

By becoming conscious of what actually happens in the classroom, the instructor can see the patterns of thought utilized and provide scaffolding for students. Identifying recurrent categories of open-ended questions enables me to be more explicit about them in future classes. As Hutchins and Schulman

note, "scholarship of teaching is *not* synonymous with excellent teaching. It requires a kind of 'going meta,' in which faculty frame and systematically investigate questions related to student learning."[13] My reflection on the material permitted it to emerge as a case *of* a particular kind of student learning. In rereading student writing in the context of a scholarship of teaching project, the researcher is reading to see what patterns show *how* students learn. Part of moving from novice, to intermediate, to expert learner is understanding the types of questions can be asked and answered. Teachers also need to know what these categories of questions are if we are to provide the pattern to the field and the scaffolding to enable the students to understand the structure of what they are doing. In many ways my conclusion mirrors Randy Bass's classroom experience when students assumed assigning a book meant it was a great book rather than one important for understanding the field of study.[14] If we do not consciously see the patterns, we cannot make them plain for our students. The fact that technology left traces of the questions I asked enabled me to become conscious of the patterns of inquiry in my field. I can now consciously try and demonstrate these patterns to my students.

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13 Pat Hutchins and Lee S. Shulman "The Scholarship of Teaching: New Elaborations, New Developments," *Change* 31, no. 5 (September/October 1999): 10-15, http://www.carnegiefoundation.org/eLibrary/docs/printable/sotl1999.htm .

14 Bass, "The Scholarship of Teaching," http://www.doiiit.gmu.edu/Archives/feb98/rbass.htm .