

Memo to the Faculty

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TAKING LEARNING SERIOUSLY

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What do we mean by "taking learning seriously?" Five interesting questions reflect what's involved in taking up that challenge. I shall ask and answer these briefly to begin this article. I shall then elaborate on those answers.

First, What does it mean to take anything seriously? I answer that when we take something quite seriously, we *profess* it.

Second, What do we mean by learning? I argue that learning is far more than bringing knowledge from outside the person to inside. Indeed, learning is basically an interplay of two challenging processes---getting knowledge that is inside to move out, and getting knowledge that is outside to move in.

Third, What does learning look like when it's not going well? I ask this question because I've spent much of my career in medical education, so I'm concerned not only with health, but with pathology as well. I propose that the major pathologies of learning involve malfunctions of memory, understanding, and application and can be called *amnesia*, *fantasia*, and *inertia*.

Fourth, What do you need to create in order to take learning so seriously that you take active responsibility for understanding and treating its pathologies as well as enhancing its successes? I claim that you must create a *scholarship of teaching* to pursue those goals.

And fifth, What is the new partnership between The Carnegie Foundation for the Advancement of Teaching (CFAT) and the American Association for Higher Education (AAHE), designed to help us deal with the challenges of taking learning seriously? The Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) has been created to respond to these challenges.

Let us now examine each of those core questions and elaborate on their answers.

PROFESSING INTRODUCED

When we take something seriously, we often talk about *professing* it. The deepest, oldest meaning of the word "profess" is to take religious orders in a public and visible way. When one professes faith, it means taking on a set of obligations that will serve as the first principles for controlling one's life, no questions asked. Professing one's faith, behaviorally and emotionally, is an impressive example of taking something seriously.

Another sense of the word is that we *profess* our love—for our spouses and partners, our parents, our children, our dearest friends. We profess a kind of commitment that has within it a willingness to sacrifice on behalf of the other. Also in a public manner, we declare our devotion to another. Here is yet another example of taking something quite seriously.

A more contemporary meaning of the word, a meaning more closely associated with the work of those who read this magazine, is to profess one's understanding, one's expertise: to be professional, or to be a "professor." Members of professions take on the burden of their understanding by making public commitments to serve their fellow beings in a skilled and responsible manner. "Professors" take on a special set of roles and obligations. They profess their understanding in the interests of nurturing the knowledge, understanding, and development of others. They take learning so seriously that they profess it. This brings us to the topic of *learning*.

PROFESSING LEARNING

What is learning? Thirty-five years ago, I taught my first course as a college teacher at Michigan State University. It was a course on the psychology of learning. I can almost trace my career by saying that before I studied psychology, I

had only the sketchiest understanding of what learning was. After I finished graduate school and first began teaching the psychology of learning, I was confident that I really understood what the process of learning entailed. However, over the past 35 years, I have systematically studied learning and understanding in many contexts, and I have taught many courses on the subject. Alas, my understanding has now become more complex, vague, and somewhat ambiguous.

When I began teaching learning theory, our conception of learning was fairly simple. For any given learning situation, the "inside" of the learner was treated as more or less empty; learning was understood as a process of getting the knowledge that was outside the learner—in books, theories, the mind of the teacher—to move inside. We tested for the success of learning by giving tests to look inside the heads of our students to see if what had previously been outside was now there. I exaggerate, but there was a comforting simplicity to our psychological behaviorism in those days.

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. It is not that prior knowledge must be expelled to make room for its successors. Instead, these two processes—the inside-out and the outside-in movements of knowledge—alternate almost endlessly. 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.

David Ausubel was one of the pioneering cognitive educational psychologists. He wrote a lovely epigraph at the beginning of his 1968 textbook, *Educational Psychology: A Cognitive View*: "If I had to reduce all of educational psychology to just one principle, I would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly."

We've come to understand more clearly the extent to which learners construct meaning out of their prior understanding. Any new learning must, in some fashion, connect with what learners already know. Of course, that is an oversimplification, but it is what I mean by "getting the inside out." As teachers, unless we can discover ways of getting the inside out and looking jointly at their prior knowledge with our students, taking seriously what they already know and believe, instruction becomes very difficult. Our first principle, therefore, begins with the assertion that we must take seriously what the students have already learned. To take learning seriously, we need to take learners seriously.

An interesting surprise is that once what is inside gets out, it seldom just sits there; in a setting where serious activity and/or discussion is possible, that knowledge is enriched and

elaborated by social interactions with people who have also experienced their own processes of getting what's inside out. Thus, learners construct their sense of the world by applying their old understandings to new experiences and ideas. That new learning is enriched enormously by the ways in which people wrestle with such ideas on the "outside," before they bring those ideas back inside and make them their own. This explains why one of the most important remedies for combating the illusion of understanding and the persistence of misconceptions is to support learners in the active, collaborative, reflective reexamination of ideas in a social context.

Learning is least useful when it is private and hidden; it is most powerful when it becomes public and communal. Learning flourishes when we take what we think we know and offer it as community property among fellow learners so that it can be tested, examined, challenged, and improved before we internalize it.

WHAT DOES IT LOOK LIKE WHEN LEARNING DOESN'T GO WELL?

I call this topic the "epidemiology of mislearning," or the "taxonomy of pedago-pathology." As I indicated earlier, there are three such pathologies: we forget, we don't understand that we misunderstand, and we are unable to use what we learned. I have dubbed these conditions *amnesia*, *fantasia*, and *inertia*.

Amnesia is one of the most frequent pathologies of learning—perhaps the most frequent. Students ordinarily and regularly forget what they have learned in their classes. Indeed, at times they forget that they even attended some classes.

More than 30 years ago, medical educators conducted a study on what first-year medical students remembered of the thousands of new terms that they'd memorized in their first year gross anatomy course. They were tested and retested over time. The curve that matched most closely to their forgetting of gross anatomy was the same shape as discovered in Hermann Ebbinghaus's classic study of memory for nonsense syllables a century ago. The publication of data like these made a mark in the world of medical education. The teaching of anatomy has since changed radically in schools of medicine.

My colleagues and I at Stanford conducted a study in which we asked graduate students who were preparing to become high school teachers to bring their undergraduate college transcripts to an interview. We were trying to understand the connections between what and how they had learned in college, and the ways they themselves would teach in high school. We asked them to walk us through their college transcript course by course, and tell us what they

remembered about each course. Certainly, they remembered the contents, teachers, and the activities of many courses vividly. On the other hand, a depressing number of courses had faded from memory. At times, students did not even recollect having taken them. Is that evidence that they learned nothing from those courses? Of course not. Should we be concerned by reports like that? Absolutely.

Are we satisfied with the notion that students forget a significant amount of what we once held them responsible for knowing? If we take learning seriously, we must take responsibility for the ubiquity of amnesia. We need to reexamine much of what we teach, and how we teach it.

Fantasia is the name we have given to what otherwise might be called illusory understanding or persistent misconceptions. Fantasia is potentially far more insidious than amnesia. With amnesia my attitude is to let bygones be bygones. What you have simply forgotten may be harmless. But fantasia can be dangerous. It is that state in which students are absolutely confident that they understand something, but they don't.

You may have seen a short video in which graduating Harvard students were asked to explain why there are changes in the seasons. Nearly every student responded with supreme self-confidence that the orbit of the earth is elliptical and that, therefore, the earth is sometimes closer to the sun, hence summer, and sometimes farther from the sun, hence winter. They exemplified the condition of fantasia, the confident grasp of an idea or explanation that is fundamentally at odds with the most warranted conceptions held by experts. These illusions may have been based on widely accepted folklore that had become a prevailing preconception. They may have developed from a formal lesson that had been assimilated, memorized, but never accurately understood. These misconceptions are important for several reasons. New learning rests on old learning. A strategically held misconception can interfere with significant amounts of later good teaching. In that sense, misconceptions become insidious, a sort of intellectual land mine (or perhaps a "mind mine"?).

There is plenty of research---especially in science education---about the impact of illusory understandings. Many of them may not be a cause for alarm. An entire population can live happy and responsible lives bearing the heavy burden of illusions of understanding about the causes of seasons. But fantasia may also cause serious problems. Medical students who took literally the explanation that the heart functioned just like a pump later displayed frequent misunderstandings of how to deal with serious forms of cardiopathology.

Biology teachers must wrestle with the durability of student misconceptions of evolution and natural selection. Most students in courses that emphasize evolution and natural selection enter these courses as intuitive Lamarckians.

They are convinced that any characteristics acquired by one generation are then transmitted to the next generation. The formal instruction emphasizes the Darwinian refutation of that position. These students may earn A's and B's in the course, demonstrating that they now understand the Darwinian perspective, but quiz them three months later and they're once again dedicated intuitive Lamarckians---as indeed are many of the rest of us. I suspect that forms of fantasia are endemic among students and graduates of higher education, many lying in wait for years before manifesting themselves at critical moments.

What about *inertia*? I take the word "inertia" from Alfred North Whitehead's lovely pun about "inert ideas" that occupy much of the space in our well-educated minds. A play on Plato's concept of "innate ideas," inert ideas are those that simply lie there, doing nothing. They are not forgotten; nor are they in some intrinsic sense wrong. They are simply not in a form that lends them to any useful purpose beyond being remembered.

For me, the best example of inertia is documented in research conducted in the 1950s by one of my mentors at the University of Chicago, Benjamin Bloom, on problem-solving processes in college students. Bloom was serving as the University Examiner, a role that led to his well-known contributions to the *Taxonomy of Educational Objectives*. Using the taxonomy, he identified a number of students who had acquired substantial amounts of "knowledge" of a subject, but could not apply that knowledge, or use it to analyze or synthesize new understandings.

Bloom identified two groups of students who had completed an American History course. Both groups had performed equivalently on the test items that measured knowledge of the facts of history, but one of the groups had excelled in measures of higher-order understanding while the other had floundered on problem-solving questions that required them to apply that knowledge to new situations. Bloom wanted to understand how two groups of people, who apparently knew roughly the same things, could be so very different in what they could *do* with their knowledge.

Bloom invited the students to think aloud when confronted with a question like this: "What do you think would have been the attitudes of Virginia tobacco farmers toward the new Constitution of 1789?" That particular "fact" was nowhere to be found in the students' reading or lecture materials. The students who had performed well on the problem-solving questions would say things like, "Well, I don't remember anything in particular about that, but let me work my way through it. The Virginia tobacco farmers, well, what would they have had a stake in? Let's see, they would have been very dependent on both inter-state and international trade because they'd want to be able to sell their crop. A strong federal government might well be in their interest."

As students reasoned their way through reviewing what they knew about the differences between the Articles of Confederation and the new Constitution, the consequences for the relationships among the states, and so on, they would weave together conjectures about the attitudes of tobacco farmers that were well grounded in evidence.

The students who “knew” the information but had not performed well in application would say things that would sum up to: “You want to know about the *attitudes* of these farmers? Hey, I’m sorry. We didn’t study that.” Those students are probably the ones likely to complain about how unfair it was for teachers to test them on things they had never been taught.

I emphatically am not saying that the “facts” don’t matter. Absent the facts, any of these students would simply be fabricating. They wouldn’t have a clue. You *need* facts to make sense; they are the basis for understanding, but they are never enough. Inertia as pathology describes those states of mind where people come to know something but simply can’t go beyond the facts, can’t synthesize them, think with them, or apply them in another situation. Since the ultimate purpose of any education is to help students to go well beyond the limitations of any formal instruction, the epidemiology of inertia should comprise a serious domain of institutional inquiry for higher education. Any institution that claims to take learning seriously must systematically monitor the circumstances of amnesia, fantasia, and inertia associated with its programs. Alas, most of our institutions are similar to hospitals that proceed blithely along well-traveled paths oblivious to the mortality and morbidity rates experienced by their patients.

In our attempts to understand the conditions that foster amnesia, fantasia, and inertia, and in trying to understand how to combat those problems, we unexpectedly stumbled over *nostalgia*. We found nostalgia not so much among students as among teachers, administrators, critics of education, and political leaders. This condition is marked by a common symptom—the firm belief that whatever the educational problem, the best way to combat it is by reinstating the ways through which the observers had been taught when they were the same age as their students. To teachers, the problem with modern education was that it was somehow riddled with new fads like group work, project-based learning, and—oh my!—service learning. Why can’t we just get back to lectures, with an occasional discussion session? Why can’t we just emphasize important facts, basic skills, fundamental principles, and the universal moral values? To the lay critics and policy-makers, the solution involved returning to the rigor of yesteryear: tougher standards, punitive grading systems, and less tolerance for the mushy, politically correct additions to the bedrock of the traditional curriculum.

One of the problems is that those who are trying to remedy the aforementioned afflictions usually believe that the reason people forget, misunderstand, or go inert is that they haven’t been taught *enough*, and that the answer is to teach them *more*. You can often see aspects of this “solution” in the one piece of pedagogy that is a true partnership between higher education and K-12: advanced placement. “AP” is exemplary in many ways. It is a lovely example of standards-based teaching and learning in which the teacher truly serves as a coach who supports all the students in their quest for the highest levels of performance. The test is external to the classroom and does not interfere with that cooperation between teacher and students. However, many AP exams such as Biology and U.S. History seem driven by the principle that, not less is more,” but “much more is more.” The content coverage of those courses is astounding in its magnitude.

We were shocked by the results of the publication of the Third International Math and Science Studies, where for the first time we compared our advanced placement students—the *crème de la crème* of American students—against the best students in other countries. We learned that the coverage strategy just doesn’t work. Our kids don’t match up well with their international counterparts. The very best explanation for the differences in performance lies in our very different ways of teaching. We define rigor as teaching our students more, however superficially. Other countries bring a much smaller set of ideas to students, then elaborate and deepen them pedagogically. They don’t cover as much material, but the students understand more robustly what they have studied. If we are to take learning seriously, we will have to find another strategy to replace nostalgia. This leads to the fourth question.

WHAT DO WE DO ABOUT THESE PATHOLOGIES?

We return to the essence of professing. It is certainly not sufficient to cast doubt on nostalgia and regression-to-the-familiar as adequate responses to the problems of learning. We need more vigorous strategies for the future. We have finally begun to recognize that when we confront serious problems in education, we must embark on systematic research to help us cope with them. Educational research is a powerful resource for educational improvement at all levels, from the preschool to the graduate school. One product of educational research is the elucidation of general principles useful to guide and critique current and future practices. I have written elsewhere about how the principles of *activity*, *reflection*, *collaboration*, and *passion* among learners, combined with *generative content* and the creation of powerful learning *communities*, can support general designs

for instruction. The encouraging news is that such research can be conducted and adapted to fundamental variations among disciplines, levels of schooling, backgrounds of students, and educational purposes. The sobering news is that although we can learn a great deal from traditional forms of research at the level of general principles, education is not a science; it is a complex set of practices that is grounded and principled but not rule-governed. As the late Donald Schön wrote eloquently, the principles of technical rationality are necessary for this work to proceed, but these principles must be joined with reflective practice.

Far too many interpreted Schön's writings as advocating a rejection of scholarly research in the professions or applied fields. Far from it. The strategy we must pursue is an approach to scholarship that legitimates more than one kind of research. Research that renders one's own practice as the problem for investigation is at the heart of what we mean by *professing* or *profession*.

At the very core of any field that we call a profession is an inherent and inescapable uncertainty. Professions deal with those parts of the world that are characterized by unpredictability. Teachers can teach in the same manner to three classes in a row and experience different consequences each time. Professions (like teaching) deal with that part of the universe where design and chance collide. One cannot resolve that uncertainty by writing new rules. The way forward is to make that collision, that unpredictability in our fields, itself an object of individual and collective investigation. We will never fully remove the uncertainty from teaching any more than we can from such other professions as clinical medicine, architecture, economic planning, or clinical social work. But as a profession, we can grow much wiser about how to anticipate and deal with uncertainty. We can develop new forms of inquiry that both learn from and support the "wisdom of practice."

TAKING TEACHING SERIOUSLY

My answer to the fourth question—How do we combat these pathologies?—is that we must commit ourselves professionally to a scholarship of teaching.

What do we mean when we call something "scholarship"? Certainly, all acts of intelligence are not scholarship. An act of intelligence or of artistic creation becomes scholarship when it possesses at least three attributes: it becomes public; it becomes an object of critical review and evaluation by members of one's community; and members of one's community begin to use, build upon, and develop those acts of mind and creation.

Think about what happens in the scholarship we create when we're doing traditional forms of cause research. We publish our findings and ideas because we have a responsibil-

ity to make our acts of mind available to our colleagues. Yes, a few of us want to get promoted, too. But the real reason that publication is important is that scholarly acts must be made available for public scrutiny. They have to become community property or they will not contribute to the larger profession, as scholarship must.

We cannot treat all acts of scholarship indiscriminately. We have to ask which of them meet certain standards and genuinely contribute to knowledge. We care about standards of quality because we recognize that scholars are engaged in work that none can accomplish alone. Since we can't do it alone, we depend on the scholarship of others as the building blocks for our own scholarship. Thoughtless critics often ridicule the fact that our acts of scholarship usually end with long lists of references. A list of references is a set of thank-you notes. It is our way of acknowledging that, without the people whom we reference, we could not have done the work we did. We are members of a community of scholars. References permit our readers to trace our research back to its sources.

For a scholarship of teaching, we need scholarship that makes our work public and thus susceptible to critique. It then becomes community property, available for others to build upon.

How many professional educators, when engaged in creating a new course or a new curriculum, can turn to a published, peer-reviewed scholarship of teaching in which colleagues at other colleges and universities present their experiments, and its consequences? Where is the scholarly literature through which higher educators study exemplars of teaching and can build upon that work? With precious few exceptions, we don't have such a literature.

In this respect, the scholarship of teaching is dramatically different from the scholarship of investigation. It's one of the reasons why any sort of progress is so hard to come by pedagogically—because blindness and amnesia are the state of the art in pedagogy. We just don't know what our colleagues before or elsewhere have done. We don't even document and analyze our own efforts. Indeed, we often don't know what our colleague in the next office is doing pedagogically, although we are thoroughly familiar with the research of colleagues a continent (and an e-mail click) away.

We are committed at the Carnegie Foundation to infusing into academic culture a profound commitment to the scholarship of teaching. This scholarship is a way of recording, displaying, examining, investigating, and building more powerful pedagogies for dealing with the challenges presented by the pathologies of learning, which are pandemic in our classrooms and institutions. (This brief taxonomy does not begin to exhaust the prevailing pathologies. We need scholarly investigations of such undeniable problems as the disconnection between intellectual learning and moral or

civic learning in higher education. We also need investigations of the troubling absence of intellectual passion and commitment to ideas within our student populations.)

A NEW PARTNERSHIP

I now turn to question five, which is about the AAHE and CFAT collaboration to move the "scholarship of teaching" from rhetoric to action. We have designed a joint project called the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL). It will have three parts that together exemplify what we mean by taking learning and teaching seriously.

Part 1. If you do traditional kinds of scholarship in your field, you can be invited to places that give you a chance to do even more of that scholarship under wonderful conditions. These include the Center for Advanced Study in the Behavioral Sciences at Stanford, the National Humanities Center at the Research Triangle, the legendary Rockefeller think tank at Bellagio on Lake Como, and many more "think tanks" from Aspen to Berlin, from Woods Hole to Waasenaar. For traditional kinds of scholarship, these perquisites can be quite alluring and conducive to further scholarly and artistic excellence. There are few if any rewards for being equally gifted, committed, and effective as a scholar of teaching in one's discipline, interdiscipline, or profession. We have thus initiated an advanced study center for outstanding teachers—a Carnegie Academy for teachers who engage in the scholarship of teaching in ways that make their work public and available for critical evaluation, in a form that others can use, build upon, and transcend.

Outstanding university, college, and community college faculty members designated as "Pew Scholars" come to the Carnegie Academy each summer. They serve for a year as a Fellow, including two successive summers in residence at the Academy. Over a period of five years, more than 100 such Fellows will be selected to participate in the Academy. A parallel program is under way for scholars of teaching from the worlds of precollegiate education and teacher education. Eventually, when appropriate facilities are available, the two groups will interact extensively.

The Academy has a larger purpose than honoring scholars of teaching, enhancing their individual scholarship, and making them more visible. We intend to contribute to building a field of study, in addition to developing the capacities of individual scholars. We have only begun to understand the full range of inquiries entailed in a scholarship of teaching, much less in defining its standards of quality or conditions for aggregation. The Pew Scholars, individually and collectively, will be expected to create ideas and materials for a scholarship of teaching in their respective disci-

plines. Their efforts, and those of similarly engaged colleagues, will become the exemplars of this emerging field. These exemplars will be gathered together in the Carnegie Knowledge Media Laboratory, where we will attempt to understand how best to classify, display, understand, and distribute the kinds of work pursued and the kinds of knowledge created. We will study how to compress such inquiries into more economical forms so that others can readily build upon them. It is a long-term effort, which must involve both scholars and their institutions.

Part 2. A second critical part of the Academy is the Campus Academies Program, coordinated by AAHE. This will be a national network of community colleges, liberal arts colleges, and comprehensive and doctoral institutions that commit themselves to taking learning and teaching seriously by creating conditions on their own campuses that reflect in their own way the values, culture, and principles of the core Academy. We envision these campus teaching academies as support systems and sanctuaries within their institutions to sustain the scholarship of teaching within departments and programs.

In time, we hope to witness a new kind of campus that nurtures the scholarship of teaching, and defines the pursuit of that kind of intellectual work by faculty members as central to its institutional mission. More than 120 institutions have already registered for this program. More are added each month.

Part 3. Finally, we have begun to develop collaborative relationships with disciplinary and professional societies. Every postsecondary faculty member holds dual citizenship. We are citizens in our local institution; at the same time, we hold citizenship in a discipline or profession, which often gains at least as much allegiance from us as our home institution. If we're going to change academic culture, we need to work with both our visible and invisible colleges. We must expand the processes to give a higher profile to the scholarship of teaching.

We already have begun working with over 20 disciplinary and professional societies, such as the American Historical Association, the Mathematical Association of America, and the American Sociological Association. Many disciplinary groups are interested in such efforts because they recognize that the scholarship of teaching is important to the future of their fields.

PROFESSING REVISITED

I have argued in this article that if we are to take learning seriously, we must profess teaching, and take our profession as teachers seriously. At the heart of the concept of a profession is a public and moral commitment to learning

from pedagogical experience and exchanging that learning in acts of scholarship that contribute to the wisdom of practice across the profession.

A contradiction lies at the very heart of the notion of profession. Once appreciated, the contradiction helps us further understand the educational challenge we face. As I said earlier, when we take something seriously, we profess it --- our faith, our love, our understanding. But notice how fundamentally different those kinds of professing are from one another.

When I profess my understanding, I am urged by my teachers to use critical reasoning, to demand evidence, and to make my arguments clear---to always ask, How do you really know? Skepticism, questioning, the demand for proof are at the heart of professing one's understanding.

But when I profess my love or my faith, at the heart of that professing is the requirement that I suspend disbelief. I do not typically ask for proof or demand evidence. I am asked to take some things on faith. Indeed, some of the great tragedies of our dramatic literature are accounts of protagonists who fail to grasp the differences between a profession of love or faith and a profession of skeptical, reasoned, evidence-based understanding. Othello is a tragic figure because he was incapable of professing his love for Desdemona unconditionally and took Iago's proffered evidence of her infidelity too credulously. Lear's tragedy was self-initiated, when he felt that he had to ask his three daughters for further evidence of their love. Cordelia's candor was misconstrued as absence of devotion.

To be deeply educated, I believe, is to understand both when skepticism and evidence are appropriate, and when faith and suspension of disbelief are appropriate. There are no rules or principles for knowing this distinction. Only through studying the examples in both scientific and humanistic sources---through wrestling with that inherent contradiction between faith and reason---can we and our students come to terms with the essential uncertainties that define our roles as professionals and as human beings.

As professors, we are asked to be rational and empirical, to demand evidence. On the other hand, as teaching professionals, we expect ourselves to believe what much empirical evidence says we shouldn't: that all our students can learn. We express our faith in our students' potential and in our ability to teach them. As professors, we do not choose between the skepticism of reason and the hope grounded in faith. Our students demand both. And we must learn, as professional educators, to do both.

This article was adapted from an address given at the recent AAHE National Conference on Higher Education in Washington, DC.

RELATED READINGS

A number of sources elaborate on the ideas presented in this article.

For further analysis of the commonplaces of the professions and how this analysis of the professions and professional education affects our roles as educators, see

◆ _____ Shulman, Lee S. "Professing the Liberal Arts" in Robert Orrill, ed., *Education and Democracy*, New York: The College Board, 1997.

◆ _____ "Theory, Practice, and the Education of Professionals," *The Elementary School Journal*, Vol. 98, No. 5, 1998, pp. 511-526.

◆ _____ "The Wisdom of Practice: Managing Complexity in Medicine and Teaching," in D.C. Berliner and B.V. Rosenshine, eds., *Talks to Teachers: A Festschrift for N. L. Gage*, New York: Random House, 1987.

◆ _____ "Just in Case: Reflections on Learning From Experience," in J.A. Colbert, P. Desberg, and K. Trimble, eds., *The Case for Education: Contemporary Approaches for Using Case Methods*, Boston: Allyn & Bacon, 1996.

For a contemporary conception of the processes of learning, see

◆ Bransford, John D., Ann L. Brown, and Rodney R. Cocking, eds. *How People Learn: Brain, Mind, Experience, and School*, Committee on Developments in the Science of Learning, National Research Council, 1999.

For a fuller discussion of the scholarship of teaching, see

◆ Shulman, Lee S. "Course Anatomy: The Dissection and Analysis of Knowledge Through Teaching," in Pat Hutchings, ed., *The Course Portfolio*, AAHE, 1998.

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