A newsletter for those who teach at Brigham Young University

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FOCUS ON FACULTY

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Memorization: "Regurgitation" or "Learning by Heart"?

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Two metaphors—one ugly and negative, the other beautiful and positive—dominate our talk about memorization. Very often memorization is described as "regurgitation," implying, among other things, that stale, undigested bits of information are vomited back to the instructor on tests or in class recitation. The other metaphor, older and more traditional than the former, speaks of memorizing as "learning by heart"—making information, facts, lines of poetry, etc., a part of one's centers of emotions and being. Both terms can be accurate to some degree, but because recent discussion tends so much to emphasize the negative, I would like to try to explain why I believe that "learning by heart" may often be a more accurate way to think about memorization.

Although usually spoken of as mutually exclusive, both memorization and creative synthesis or discovery are matters of degree. Even those who rail most violently against memorizing would concede that learning would be impossible if students did not already have thousands of facts, definitions, and formulae stored in their brains. And rarely do those who demand a good deal of memorization in their classes really expect that their students should learn hundreds of facts without being taught to synthesize them or use them to solve new problems. What I would argue is that current educational practice may have tilted the balance a bit too far away from memorization.

This whole matter was brought to my mind when my three-year-old granddaughter made what to me was an astonishingly deep spiritual comment, stimulated by a term she heard on the LDS general conference broadcast to which we were listening. Upon her comment, the following lines (unconsciously memorized years before) came to mind:

> *Dear child! dear girl! that walkest with me here,*
> *If thou appear untouched by solemn thought,*
> *Thy nature is not therefore less divine;*
> *Thou liest in Abraham's bosom all the year;*
> *And worship'st at the temple's inner shrine,*
> *God being with thee when we know it not.*
> [William Wordsworth, "It Is a Beauteous Evening, Calm and Free," 1802]

This beautiful language evokes two moving Judeo-Christian metaphors about the divine touch—lying in the bosom of Abraham and being admitted into the Holy of Holies. Here the poet touches a truth that resonates in all who have

watched children carefully: that they live in direct contact with God, even when we adults are unaware. Having these lines locked in my mind (heart?) enriched and strengthened the experience I had with my granddaughter. I didn't have to say to myself, "Let's see, I think someone wrote a poem about such an experience somewhere. Maybe I can find it (sometime)."

Such experiences repeat themselves thousands of times every day. Most, of course, are rather pedestrian: we remember some data that helps us solve a problem, we direct someone to a particular location, we discuss a painting without a copy of it in front of us, we order a part for a computer without a catalog at hand. In each case we have memorized something that helps us shorten the process of dealing with daily experience. Without this storehouse of facts and data, we would be helpless. But often that which we have memorized is more profound—a scripture that aids in counseling a sorrowing friend; a hymn whose words and music express our most profound religious feelings when we are struggling with a matter of faith; a melody that evokes remembrance of a wonderful experience; a technical point that helps us defend a position that is important for us, our family, or our community.

What makes memorization appear difficult or at times fruitless is when it occurs without context. Students who tell me that they simply cannot memorize often concede that they not only memorized their own lines in a play or a roadshow but that they probably could have recited the lines of their fellow players as well. Of course, knowing the plot of a play is an important aid to memorizing lines. If one has the line "Come in" and there is a knock at the door, it is pretty difficult not to know when to recite one's line. Likewise, if one knows that Jacques-Louis David was enamored of Roman subject matter and that he hoped to influence French revolutionaries toward some reconciliation, it is fairly easy to identify his painting *The Battle of the Romans and Sabines.* In a like manner, knowing the function of photosynthesis helps us memorize and identify the various parts of a leaf and its cells.

Context can be historical, structural, rhetorical, functional, or of another variety. Context assists students in memorizing facts and keeping them both separated and integrated. But even context can be stressed too much. Sometimes memorization is helpful even though we do not understand context. Many important discoveries—scientific and other—have been made because someone knew seemingly disparate bits of information and then, in a flash of insight, was able to fit them together as a new synthesis. The most unexpected positive consequences can come from memorizing material in a particular field.

Of course, education consists of much more than mastering a large number of memorized facts, but "learning by heart" may well be an important step toward being intellectually enlarged. ■

Hats Off! Many Thanks! Hats Off!

The Faculty Center recently celebrated its fifth anniversary. Since its inception, The Faculty Center has provided hundreds of faculty with services in instructional, faculty, and organizational development. One secret to the Faculty Center's success has been the countless faculty members willing to share their ideas, experience, and expertise with their colleagues. Faculty members have served as advisory committee members, discussion leaders, panelists, presenters, lecturers, facilitators, not to mention contributors to this newsletter. The Faculty Center wishes to say thank-you to all who have given their time to their colleagues through Center-sponsored activities. Listed below are only *some* who have contributed during the last year. Many thanks and many happy returns! Hats off!

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Scott Zimmerman
. . . and more!

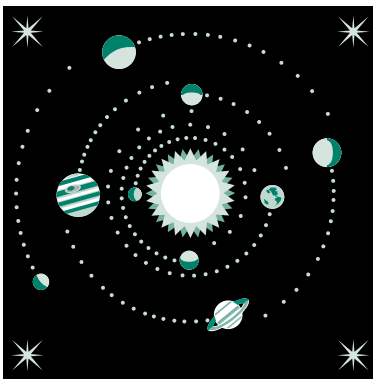
War of the Worlds: When Students' Conceptual Understanding Clashes with Reality

DIANE F. HALPERN, PHD
Chair, Psychology Department, California State University at San Bernadino

If you like horror stories, this one should terrify you: In a recent telephone survey of more than 2,000 adults conducted by the Public Opinion Laboratory at Northern Illinois University, 21 percent of the respondents said they believe the sun revolves around the earth.

I have no doubt that virtually all these adults were taught in school that the earth revolves around the sun. But in fact, they never altered their incorrect mental models of planetary motion because their everyday observations didn't support what their teachers told them: People see the sun "moving" across the sky, and the earth *seems* stationary while that is happening.

Students can learn right answers—even recite them in class—and yet never incorporate them in their working models of the world. The correct answer (that the professor supplies) and the student's personal understanding of the world can exist simultaneously—each unaffected by the other. Outside of class, students continue to use their personal models because they have always worked well. Unless teachers specifically address errors in their students' naïve models of the world, students are not likely to replace their own models with the more accurate ones.



Cognitive psychology provides models of human learning and knowing—that is, how people acquire, organize, retrieve, and use information. These models can help us teach students to put aside inaccuracies. To educate our students successfully, we must incorporate into our teaching an understanding of the way learners organize knowledge and represent it internally, and the way in which these representations resist change when learners encounter new information.

According to Donald Schön, in *The Reflective Practitioner* (1983), most teachers "have gained relatively little from cognitive psychology." It seems that even cognitive psychologists apply to their teaching very little of what they know about their academic discipline. One of my favorite examples of this is the deadly-dull, three-hour lecture I once endured on the shortness of peoples' attention spans.

Let me suggest some basic principles of human cognition that can inform college-level instruction:

• What and how much students learn in any situation depends heavily on their prior knowledge and experience. We must not think of our students as blank slates but as slates that need to be read and edited to reflect new, more accurate knowledge.

• To change students' incorrect/incomplete mental models, we must understand their implicit and explicit assumptions; then we can design instruction to address their misconceptions and to make clear the benefits of new models. Otherwise, students can produce correct answers on tests, but their understanding may not change.

• Learning and remembering involve multiple, interdependent processes. No single set of learning principles helps *all* students learn in every situation, particularly because what students learn and recall partly depends on what they already know. Therefore, educators must be prepared to use a variety of teaching methods, especially when their students are having trouble understanding and applying new concepts.

• Experience often "teaches" us things that are, in fact, incorrect, but our daily lives do not always provide immediate feedback that demonstrates the errors. To promote critical thinking about everyday assumptions, educators need to provide systematic and corrective feedback. For example, research indicates that most jurors believe they can tell from a person's demeanor whether she or he is telling the truth. Yet Paul Ekman, a psychologist at the University of California at San Francisco who studies lying, has found that people generally *can't* tell when someone is lying. To dispel students' assumptions about their supposed ability, Ekman has convincing liars "testify" to law students during a class, then later confess their deceit.

• Because students frequently fail to apply what we have taught them in class to the real world, we must focus part of our teaching on "transferability." For instance, virtually all students who take courses in the social sciences or statistics can tell you that a correlation between two variables doesn't necessarily mean a change in one causes a change in the other. Most students who have course work on this topic can compute a correlation coefficient for a set of data and provide examples of positively and negatively correlated variables. But when, for example, they read about a study finding that children who eat breakfast are better readers by the end of first grade, many of these same students don't recognize that eating breakfast did not necessarily *cause* the first graders to be

better readers. Frequent use of real-life examples in class helps students recognize the principles we are teaching when they encounter them operating *outside* of school.

Applying these principles of cognitive psychology in our classrooms can begin at the start of each semester. The teacher can start by having students give their own explanations of the subject to be studied—for example, state how they believe selected topics in psychology are linked; describe what would happen if a certain chemical were heated; or explain how they would determine the value of a variable. Students often are surprised to discover they already have beliefs about such topics. Then the teacher can present the facts, stressing the ways in which reality is similar to, or different from, the students' presuppositions. A few real-world examples that require the students to apply underlying principles help insure the replacement of old understanding with correct information.

Later in the semester the teacher can again ask the students for their own explanations of important principles and how their understanding differs from their preconceptions. Having students reflect on their prior knowledge, subsequent learning, and their current understanding increases the likelihood that they will internalize what they are taught in class.

In this rapidly changing world, we must ensure that our students can apply to the real world what we are trying to teach them in class. As specific situations change, the importance of underlying principles—and students' ability to recognize and apply them to new settings—becomes especially critical.

Too many students are leaving our classrooms unable to transfer principles and understanding to new domains of knowledge. We are in danger of producing a citizenship for tomorrow that is superbly prepared only for yesterday's problems. ■

Edited from an article in the March 14, 1997, *Chronicle of Higher Education*. Used by permission.

Lessons from Exemplary Faculty

Patricia Kalivoda (Instructional Development Office, University of Georgia) interviewed ten senior faculty at "a large, Southern, research university" (presumably Georgia) in 1993. From in-depth interviews with these faculty who excelled in both teaching and research, she identified "ten guiding principles" that shaped their worldviews and influenced their behavior (p. 100). We highlight them here.

A life centered on concerns. The academic life should focus not only on ideas, described by one faculty participant as "too thin" (p. 100). Often this means linking one's teaching and/or research to the betterment of society and the sense of working within a broad framework or larger purpose. One's work must have "significance to your field and to humanity" (p. 102).

A commitment to teaching. In addition to a high level of scholarly productivity characteristic of these faculty, "respondents reported a love of teaching, an acute sense of responsibility toward students, and an obligation to disseminate new knowledge generated from research" (p. 102).

A sense that teaching and research are interdependent. Whether their prime focus was on research or teaching, the ten senior faculty felt the two roles were interdependent, not exclusive.

Self-improvement as a way of life. Most in this cohort were "advocates for lifelong learning and practiced it regularly" (p. 105). They believed the idea of continual self-improvement and interest in things—broader than their own field—distinguished the average from the exemplary faculty member (p. 105). Several reported having read books on teaching.

The seizing of opportunities. This means both *acting* on "chance" circumstances that arise and working hard to make the most of opportunities to develop courses, programs, or projects to meet individual needs.

A long-term view and persistence. Some respondents perceived themselves as less talented than some of their colleagues, but they reported a willingness to work harder and longer. They set goals and were not seriously set back by the rejection of an article or grant proposal.

The avoidance of politics and gossip. The respondents regarded campus politics and gossiping as simply a waste of time, detrimental to their personal well-being and effectiveness. One stated that they "poison the kind of community that encourages scholarship" (p. 109).

Generosity of ideas. All valued the open sharing of ideas. According to one professor: "Another lesson that I knew from the start was to not be suspicious of others, to be as open as possible" (p. 110).

Respect, sincerity, and caring for others. Faculty spoke of extending respect, sincerity, and care to colleagues and to students, both undergraduates and graduates.

A view of the vocation as an avocation. Those interviewed considered their work much more than a job; it was more like a way of life. ■

Patricia Kalivoda, "Exemplary Senior Faculty at Research Universities: Their Guiding Principles for Balancing Teaching and Research." *Innovative Higher Education* 20:2 (Winter 1995), 95–116. Summarized in *The Academic Leader* (January 1996) and *The Teaching Professor* (March 1996), Magna Publications, Inc., (800) 433–0499. Used by permission.

Crossing Boundaries

ELOUISE BELL
Professor Emeritus of English

Elouise Bell was named 1997 Utah Woman of Achievement by the Governor's Commission on Women and Families; at BYU she received the Alcuin (1986) and Maeser (1988) awards. Currently she writes a monthly column for The Salt Lake Tribune; *she also performs a one-woman show (based on the life of Mormon pioneer midwife, Patty Sessions),* Aunt Patty Remembers *sponsored by Utah Humanities Council.*

A teacher's responsibility is to guide students across boundaries and sometimes, if necessary, to *push* them across. This is rarely an easy job, but no real learning happens otherwise.

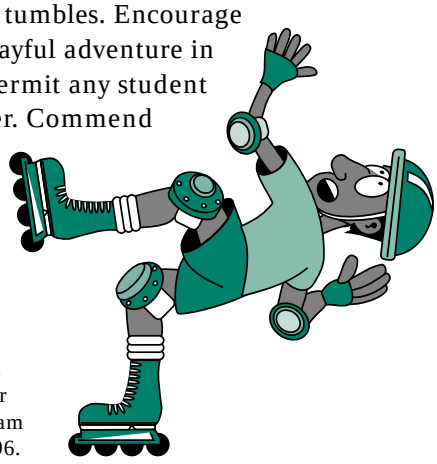
What boundaries? Well, for starters, certainly a teacher wants to transcend the boundaries of the student's present knowledge and understanding. But the good teacher does more than simply advance a student farther down the same road, supplying a given number of new facts or theories. The inspired teacher will reveal an entirely new perspective, or perhaps a handful of perspectives, showing the student new ways to see and understand the old terrain.

More than this, the teacher will insist that the student develop new mental skills and thereby cross personal boundaries. This move is never comfortable. It can be especially hard for very bright students, who much prefer showing a teacher what they can already do and do well. The rigorous teacher is not content with that but prods the student to do something new, something harder, something not tried before. The student often resists, feeling, "If it ain't broke, don't fix it." (Translation: "I am already an A student. This approach works. Why are you pushing me?") My answer, as a teacher, is: "An engine with twelve cylinders that is putt-putting along on two *is* broke, baby!"

Crossing boundaries is a way of learning and a way of life. Learning means going to new and undiscovered places in one's mind. Genuine learning is a soulful activity, enriching but painful at times. Exploring new territory means we often stumble, for there is no well-trodden path. The trick is to teach students not to fear stumbling. One BYU professor tells her classes, "If you are not making mistakes here, you are not learning; you are not being bold enough." Another teacher reminds students, "Everybody wants to see Jesus, but nobody wants to die." Everyone wants to go somewhere interesting, but no one really wants to make painful change or to cross boundaries.

Here are some suggestions for teachers who are committed to leading students across boundaries.

- ☐ Remember that a small shift in perspective can produce dramatic results—especially over time.
- ☐ Do not decide that struggling students should not be forced to cross boundaries. It is not your job to judge who is capable of the quest.
- ☐ Develop a vocabulary that invites students to cross boundaries:
  - "What do you need to do to make this better?"
  - "What did you try in this assignment that you hadn't tried before?"
  - "What would happen if you did this?"
  - "What else might you try?"
  - "Let's take the opposite approach for a moment."
  - "Who might have a totally different view of this issue?"
- ☐ Recognize that no two students stand on quite the same terrain. Each one crosses a slightly different boundary. Be respectful of individual journeys.
- ☐ To know how a student's journey is going, *listen* to that student. If you ask a question, in the name of reason, *listen* to what the student says by way of response. Be silent for a moment and *think* about the answer before you start talking. Teaching is an interactive endeavor, after all.
- ☐ Be full of new places to show your students, new dreams to share with them.
- ☐ Above all, make the classroom a safe place. When we learn to skate, surf, or ski, we fall down a lot, and we laugh at our tumbles. Encourage the same spirit of playful adventure in your class. Do not permit any student to embarrass another. Commend bold effort and brave stumbles—and lead on. ■



Edited from Professor Bell's keynote address at the Third Annual Rocky Mountain Peer Tutoring Conference, Brigham Young University, March 1996.

TO IMPROVE THE UNIVERSITY

Combining Religious Faith and Academic Excellence

RICHARD ROBISON
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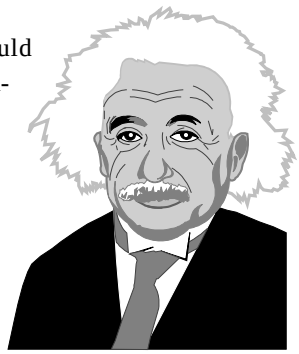
At BYU, faculty are charged with combining religious faith and academic excellence—for some, a formidable challenge. While I have not conquered this seeming paradox, I have given it some thought during my six years here.

Teaching. Too often there is a tendency, especially among some new teachers, to "prove themselves" through excessive rigor. In the classroom they dominate, interrogate, intimidate, and sometimes even humiliate students—all in the name of academic vicissitude. Some faculty believe worthy novices must be "purified" by the full heat of the academic blast furnace; other students who lack the required intellectual capacity must inevitably be reduced to insignificant ashes. For many faculty this is a mirror of their own experience in "sink-or-swim" graduate education. Others lose touch with the student experience or have forgotten what it was like to be a fledgling in a new field.

It seems to me the pursuit of academic excellence does not give us permission to ignore the way we should treat each other: "By long-suffering, by gentleness and meekness, and by love unfeigned; by kindness, and pure knowledge" (D&C 121:41). Paul's admonition to the Corinthians has application in the classroom, too: "And the eye cannot say unto the hand, I have no need of thee. . . . Nay, [all] are necessary" (1 Cor 12:21–22). Every member has value and brings a unique perspective. The challenge is in its discovery.

Managing content. Important to student learning is the effective management of material. We should remember that true education comes "line upon line, precept upon precept" (D&C 98:12). It is a constant temptation to teach everything we know in one-tenth the time it took us to learn it. For some, the temptation may extend to unnecessary obfuscation. Einstein said, "Everything should be made as simple as possible, but not simpler." A constant question to ask ourselves as we prepare for instruction is, "Am I making this more complicated than it is or should be?" Hugh Nibley, professor emeritus of ancient scripture, addresses this matter: "Many years ago this writer learned that if he could not make a thing clear to a five-year-old, it was because he did not really understand it himself " ("Getting Ready to Begin," *BYU Studies*, vol. 8, no. 3, 252–53).



Scholarship. Nibley also points out that professional jargon and mazelike phraseology are the scholar's refuge from the importunities and too-searching questions of the layman, but they do have their purposes. They warn the idle onlooker to keep a respectful distance while the research is going on, and they are constant reminders to researchers that they have not yet formed answers that make it possible to state their cases in clear and simple terms (ibid.).

In research, exercising religious faith promotes (amongst many) one obvious benefit. Joseph Smith taught that as one cultivates spirituality, the spirit of revelation naturally follows: "For instance, when you feel pure intelligence flowing into you, it may give you sudden strokes of ideas" (*Teachings of the Prophet Joseph Smith*, 151). Many of the most significant advances in science have come about this way. Inviting the spirit of revelation and working hard are an unbeatable combination for accomplishing that which God would have us do. Hugh Nibley said, "No [one] can learn enough in a lifetime to count for much, and no one knows that better than [those] who diligently seek knowledge—that is the lesson of *Faust.* How then can *any* honest [person] believe that [a] modicum of knowledge can supersede revelation . . . ?" ("The Way of the 'Intellectuals,'" *Collected Works of Hugh Nibley*, vol. 6 [Salt Lake City: Deseret Book Company, 1988], 376).

If we truly believe that the Holy Spirit can teach the truth of all things, then it behooves us to live so that these benefits can extend to all our professional endeavors. ■

We invite your written responses or any short pieces on other topics of interest that will improve the university. Submissions (up to 500 words) should be sent no later than Friday, September 26, 1997, to:
Lynn Sorenson, *Editor,* FOCUS ON FACULTY, 167 HGB

FOCUS ON FACULTY is an occasional newsletter published by the Faculty Center for the teachers at Brigham Young University (full- and part-time faculty, student instructors, and teaching assistants). Its purpose is to serve as a medium for exchanging ideas about teaching and scholarship and for sharing information about faculty development activities. Editor Lynn Sorenson welcomes your ideas, contributions, and comments.

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