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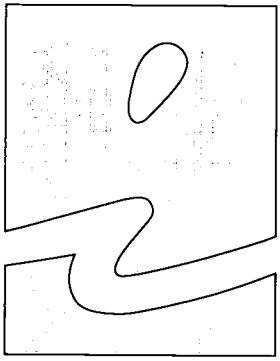
ABSTRACT

This monograph is part of the League for Innovation's learning initiative aimed at assisting community colleges in developing practices, programs, and policies that place learning at the heart of the educational enterprise. It highlights key innovations in the community colleges, distilling key elements from research on learning outcomes, the cognitive process, intellectual development, and the social construction of knowledge. It begins by discussing learning and outcomes, describing various research results, and providing a list of the most widespread principles deemed useful for practice, derived from 50 years of research on improving student learning. The author underscores the importance of student involvement with the people and activities of the college for greater academic success. The author then offers suggestions for creating effective learning communities, citing a learning community at Seattle Central Community College that involves students and faculty in an integrated curriculum. Approaches on learning and process are explored, with a focus on cognitive and developmental process. The monograph concludes with a discussion on learning and social constructivism, one of the most prominent learning theories today. (Contains 31 references.) (YKH)

Opening Windows on Learning

K. Patricia Cross



ALLIANCE FOR COMMUNITY COLLEGE INNOVATION

The Cross Papers
Number 2

League for Innovation in the Community College
Educational Testing Service

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Acknowledgment

The Educational Testing Service (ETS) has been a key partner in League projects and activities for over a decade. We are indebted to ETS for its generous contributions to the preparation and publication of this second paper in an annual series the League will produce as "The Cross Papers." With support from ETS, this paper will be distributed to thousands of community college leaders around the world.

Foreword

At the League for Innovation we have been encouraging community college and technical institute leaders to initiate and support a series of "conversations on learning" within and across their institutions. Through our Learning Initiative, we are raising some of the issues and sharing our own experiences about learning through our projects, conferences, Technology and Learning Community (www.leaguetlc.org), and publications.

Through our League Senior Fellows Program, we are especially pleased to work with K. Patricia Cross who helps us focus our conversations on learning on the key issues. As a League Senior Fellow, Cross prepares an annual paper published by the League for Innovation on issues related to learning. The Cross Paper Number 1, *Developing Professional Fitness Through Classroom Assessment and Classroom Research*, has been widely distributed, and copies are available from the League.

The second Cross Paper, *Opening Windows on Learning*, will greatly stimulate community college faculty and staff who are interested in their institutions becoming more learning centered–and who is not?–to broaden and deepen their conversations on learning. The paper is a refreshing introduction to the basics of learning, and its style is illustrative of the special gifts Cross brings to her work. First, Pat Cross is not timid about taking on the tough and substantive education issues that continue to challenge and perplex our attempts to improve the educational enterprise. Second, she has a knack for synthesizing and explaining key concepts that elude most practitioners, assisting our understanding by peppering her manuscripts with concrete examples. Third, she often frames her reviews in poetic form and uses sparingly the wry comment to bring us down to earth.

These gifts of communication are amply illustrated in this second Cross Paper which encourages us to add our own voices to the continuing conversation on learning. We urge our colleagues in community colleges and technical institutes to use this paper to find their own conversations and to reconstruct their

understanding of our primary role which is to place learning at the center of everything we do.

Terry O'Banion
President and CEO
League for Innovation in the Community College

OPENING WINDOWS ON LEARNING

As I sat at my desk on a glorious spring day, with flowers in full bloom and soft breezes coming through the open window, I thought about the seasons of our profession. We are emerging, I think, from our winter of discontent. The cold winds of criticism and the icy demands for accountability have dominated the closing decades of this century. But the new century holds the promise of a fresh new spring for educators, and I see creativity and innovation blooming everywhere, but especially in the nation's community colleges.

It was a relatively short time ago, in the 1960s, that community colleges experienced the growth spurt of their first real spring. Dedicated to the mission of expanding access to new segments of the population, community colleges grew at a fantastic rate–350 new community colleges sprang to life between 1965 and 1975. By the mid-1970s, however, the signs of a slow down were evident, and the 1980s opened with the publication of a national report on education, which found "A Nation at Risk" because of the "rising tide of mediocrity" in the nation's schools (National Commission on Excellence in Education, 1983). Higher education was not the major target of that highly influential report, but the chill of the 1980s and 1990s soon spread to community colleges as the public and legislators demanded evidence of what students were learning in college. And, as community college educators, we weren't really sure that we knew what to do with so many students, many unprepared and seemingly unmotivated for serious learning.

But a new spring has arrived for community colleges. The seeds have been planted for a new kind of college that Terry O'Banion, president and CEO of the League for Innovation in the Community College, calls *A Learning College for the 21st Century* (O'Banion, 1997). The learning college places learning first, putting it at the heart of everything that the college does. Other community college leaders share this vision. Robert Barr and John Tagg of Palomar College call for a change in the community college mission dramatic enough to be called a paradigm shift. The

new learning paradigm, they say, will change the very definition and perception of a college from "an institution that exists to provide instruction" to one that "exists to produce learning." Although they recognize that some educators may feel uncomfortable with the verb "produce," "We use it," they say, "because it so strongly connotes that the college takes responsibility for learning . . . " (Barr and Tagg, 1995, p. 15).

No one assumes, of course, that colleges are solely responsible for learning. Productive learning is a shared responsibility, collectively engaged by students, faculty, administrators, employers, legislators, the general public, and anyone else who is concerned about the future of our society. But educators must necessarily take the lead in establishing the environment for learning, and to do that we need a good, workable understanding of what learning is and how we can cultivate it.

Fortunately, the time is right for thinking in new ways about learning. Emerging into the bright light of this spring's planting season are seeds of thought from three major sources of scholarship on learning. First, is a vast amount of empirical research on what happens to students as they proceed through college. This is broadly known as research on learning outcomes and explores strategies and practices that lead to positive learning results for students. Second, is a rich and fast-growing body of research on cognition, which might be called research on learning processes. And intermingled with these two streams of research is an emerging epistemology with stimulating thought about the nature of knowledge, which puts learning within the context of social constructivism.

Learning and Outcomes

Research on the impact of college on students is extensive. Every decade or so, an ambitious effort is made to synthesize existing studies into a volume of research findings. In 1969, Kenneth Feldman and Ted Newcomb synthesized 40 years of research on learning outcomes and published a book of some 500 pages, reviewing nearly 1,500 studies (Feldman and Newcomb, 1969).

Roughly a decade later, Howard Bowen, an economist and national leader in education, attempted to answer the question of whether higher education is worth what it costs (yes, it was an issue 20 years ago) by reviewing the existing research on what students get out of their college education. He entitled his book *Investment in Learning* (1977) to make the point that both society and individuals have huge investments in education, and we need to know whether such investments pay off.

The most recent effort to say what we know about learning outcomes was compiled in 1991 by researchers Ernest Pascarella and Patrick Terenzini, who reviewed nearly 2,600 research studies and set forth their findings in a 1,000-page treatise entitled, *The Impact of College on Students* (Pascarella and Terenzini, 1991). The research on student learning outcomes is widely quoted and probably better known by nonresearchers than any other type of learning scholarship, mostly because considerable effort has gone into drawing from this scholarship a set of "principles" deemed useful for practice.[1]

The best known, certainly the most widely distributed list, is the *Seven Principles for Good Practice in Undergraduate Education*. A specially convened group of higher education scholars derived the *Seven Principles* from the past 50 years of research on improving student learning. Chickering and Gamson (1987; 1991) synthesized the conclusions of this group into seven principles, making them widely available to educators. In briefest form, the *Seven Principles* are stated as follows:

1. Good practice encourages student-faculty contact.

2. Good practice encourages cooperation among students.

3. Good practice encourages active learning.

4. Good practice gives prompt feedback.

[1] See for example, Oxford Centre for Staff Development, 1992; McCombs, 1992; Education mmission of the States, 1996; Chickering and Gamson, 1987.

5. Good practice emphasizes time on task.

6. Good practice communicates high expectations.

7. Good practice respects diverse talents and ways of knowing.

There is nothing especially surprising about these seven statements. Some seem self-evident. Taken as a group, however, they serve to remind us of the importance of the learning environment. They convey the desirability of a "community" of learners–people working interactively, respectful of one another, and sharing the common goal of learning.

One of the strongest and most consistent findings from outcomes research is the evidence that shows that students who get involved with the people and activities of the college demonstrate higher retention rates; greater personal growth, achievement, and satisfaction; and increased participation in further learning opportunities than those who participate only in classroom learning experiences (Astin, 1985). Indeed, one of the reasons that residential colleges have higher retention rates than community colleges is that residential colleges have many more ways of involving students with the people and organizations of the college. Students are a captive audience on a residential campus, spending study time as well as leisure time on campus; socializing with fellow students in the dorms; joining organizations that involve them with others sharing their interests; and talking and working with faculty. The research shows that, when it comes to retention, even working at a part-time job on campus has a significant advantage over working off campus (Astin, 1985).

While community colleges can never claim the same kinds of on-campus involvement as residential colleges, community colleges are realizing the advantages of involvement by creating small interactive learning communities. Learning communities come in a wide variety of forms and structures (Matthews, Smith, cGregor, and Gabelnick, 1997), but the goal of all learning

communities is to get students involved with their peers and teachers and to give them a feeling of belonging to a community of learners. Some learning communities, such as those offering peer support for entering freshmen, are fairly simple mechanisms for helping students make friends; they require relatively little structural change. Other models require substantial change, involving team teaching, an integrated curriculum, and cohorts of students who travel the road to learning together. Some learning communities base their rationales largely in research findings that cite the pedagogical advantages of small group learning. Others have their origins in a philosophy of knowledge that contends that social interaction is not only desirable for meaningful learning, but necessary.

The Coordinated Studies Program (CSP) at Seattle Central Community College offers an example of a learning community with carefully articulated pedagogical and philosophical rationales (Tinto and Russo, 1994). Each CSP is organized around a central theme that involves students and faculty in an integrated curriculum. One CSP, for example, takes as its theme, "Our Ways of Knowing: The African-American Experience and Social Change."[2] The 18 units of credit offered for the CSP links courses (and therefore faculty and students) in sociology, political science, art, and English. Students attend class Monday through Thursday from 9:00 a.m. to 1:30 p.m., participating in a variety of group learning activities that emphasize the pedagogy of active learning and the philosophy of collaborative learning. The research evaluators of the Seattle Central program observed that, "The faculty of the Coordinated Studies Program worked together as a collaborative team in the classroom. They consciously sought to model learning for the students and to include students as active participants in the construction of classroom knowledge. In that way, they sought to have students take ownership of the learning process" (p. 22).

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2 Learning college themes can range across a wide variety of disciplines. Evergreen State College, for example, offers a year-long program in "Matter and Motion," consisting of study in calculus, chemistry, physics, and computer applications. Another CSP entitled, "Science Shakes the Foundations: Dickens, Darwin, Marx, and You," offers credit in glish, anthropology, history of science, and economics (Gabelnick, MacGregor, ıtthews, and Smith, 1990).

A carefully conducted evaluation of the Seattle Central CSP showed that the program was highly successful in involving students in the activities and purposes of the college. Evaluators compared the learning outcomes of 121 students in the CSP program with 166 students in the regular program (Tinto and Russo, 1994). Not only was the persistence into the following spring and fall quarters significantly higher for CSP students, but they reported greater involvement than the comparison group in outside courses and activities with other students. They also reported more positive views of the college. Interviews with students revealed that the CSP experience helped them form friendships, but it also served as a bridge between the academic and social worlds of the college. Students spoke not only of learning more, but enjoying it more, and they actually reported studying more than similar students in traditional classrooms.

Evaluations of other learning communities have shown equally positive findings. Tinto and his colleagues (Tinto, Love, and Russo, 1994) evaluated the outcomes of several different types of learning communities, offering these general conclusions about the effectiveness of learning communities in improving both student learning and persistence:

1. Participation in a learning community enables students to develop a supportive community of peers that helps bond students to the broader social life of the college, while also engaging them more fully in the academic experience.

2. Students were influenced by participating in a setting in which sources of learning came from a variety of perspectives beyond that of one faculty member.

3. Students in learning communities were more socially and academically involved in college life and more positive in their views of the institution and their own involvement in the college.

4. The positive outcomes of learning communities were as prevalent among developmental students as among their better-prepared peers.

Although much of the new experimentation with learning communities is occurring in academic subjects, vocational programs have had learning communities–although not usually called such–for many years. By their very nature, vocational programs usually involve students in collaborative learning. Students frequently work with partners or in teams in which they come to form associations around a common task that eludes students sitting next to each other in a history class. Furthermore, the relationship between faculty and students in vocational programs is often less formal and more personal than in more traditional classrooms. Personal attention can be given to the student having trouble wiring the circuit correctly in a way that is not possible for the history teacher who may not even be aware that a student is having trouble grasping the significance of the Battle of Bunker Hill. We can safely conclude that learning communities, whether academic, vocational, or a combination, provide students with that important feeling of involvement only when they are true to their name in creating a "community" of learners–a true community in which participants are interactive, challenging, respectful, cooperative, and sharing in the common goal of learning.

Research on learning outcomes has delivered an important message that should serve as a foundation for creating learning colleges. Despite the special difficulties for community colleges in connecting with students, they must strive to foster in our diverse, part-time, working, and commuting students and faculty a feeling of belonging to a serious learning community.

Learning and Process

There are two important approaches to research on learning and process. Cognitive psychologists study what goes on in the mind and brain. They are interested in how learners create a cognitive structure to make sense of incoming information. Developmental psychologists study learning as a holistic function of the person. They are interested in the growth and development of intellectual values and attitudes that motivate learning. These rather different ways of looking at learning as a process are interrelated, but each eveloping a rich and important literature. If the community

college of the future is to be a learning college, it is important for educators, whatever their specific role in the functioning of the college, to understand learning as an active cognitive and developmental process.

Learning and Cognitive Process

Perhaps the most comprehensive conclusion about learning and cognitive process comes from the Task Force on Psychology in Education convened by the American Psychological Association (McCombs, 1992). In their first principle of learning, they state that, "Learning is naturally an active, volitional, internally mediated, and individual process of constructing meaning from information and experience, filtered through each individual's unique perceptions, thoughts, and feelings" (p. 291). Granted, this principle sounds like something put together by a committee fighting over each word, and finally agreeing on a very complex sentence. But it does do a good job of bundling the major research conclusions, emphasizing the process of learners actively filtering information through a set of unique perceptions in order to build their own understandings.

The most prominent learning theory today is known as constructivism. It provides the foundation for currently popular forms of learning that are labeled "student-centered," in which the intention is to move the activity of learning away from the provision of authoritative "answers" by the teacher toward student construction of knowledge. Constructivism contends that learning is a process in which learners construct understanding. What a student actually hears in a lecture or reads in a textbook is not a copy of what was said; it is a reconstruction based on the knowledge, experience, interests, and emotions that the listener or reader brings to the experience. As experienced teachers know, sometimes the reconstruction that is created by the student bears little resemblance to the message that was delivered. Students do not simply assimilate knowledge as it is presented; they act on the message to connect it to what they already know.

Too often we speak carelessly about students learning "more"–or about how "much" students know, as though learning were an

additive process in which new learning is simply piled on top of the old. This is the empty vessel metaphor for learning. The teacher opens the lid and pours new information in on top of existing knowledge. Such learning is passive on the part of the student. Students receive information without acting upon it to make it their own. Passive learning is what is involved in the cynical definition of a college lecture hall as a place where information passes from the notes of the professor into the notebooks of the students without passing through the minds of either.

Learning, properly understood, is transformational rather than additive. New learning interacts with what we already know to transform and deepen our understanding. David Ausubel (1977), a pioneer in the study of meaningful learning, made the point more than 20 years ago, but it is receiving renewed attention today. He said, in essence, find out what a student knows and teach accordingly. That bit of wisdom is almost lost in the vocabulary of cognitive psychology as we talk about "schemata" as mental structures that store and organize learned material. One can picture a schema as a complex tinker toy of interrelated ideas, with all sorts of connections among stored material. The excitement of learning comes when new connections are made, sometimes transforming the structure, pulling apart some connections and making new ones. New information results in meaningful learning when it connects with what already exists in the mind of the learner.

Research on the difference between the learning of novices and experts shows clearly that for the expert, new information is quickly grasped in usable form because connections to existing knowledge are numerous. The learning of a novice, in contrast, is labored and slow, not because the novice is less intelligent than the expert or even less motivated, but because connections between new information and existing schemata are sparse. There are no hooks on which to hang incoming information, no way to group related ideas, no way to retrieve information from a jumble of unrelated facts.

To illustrate at the very simplest level, the association between learning and old, we might note the proliferation of 1-800

numbers. Call 1-800-WINDOWS to get information about new windows for your home, or call 1-800-GO BEARS for tickets to Cal football games. Not only are letters easier to remember than numbers because of the word associations we have already formed, but the advertiser is tying the particular word to the product sold. She is seeking to make maximum connections and therefore to increase the likelihood of recall and use.

All of this suggests one reason for today's emphasis on understanding cultural differences of increasingly diverse student populations. What do students already know, and how can new learning be framed to make meaningful connections? Remember the scene in the movie, *Stand and Deliver*, in which the high school math teacher, Jaime Escalante, is trying to teach the concept of negative numbers to a rather hostile group of students from the barrio of East Los Angeles. Escalante says, "Negative numbers ...very important. You dig a hole in the sand and put the sand next to the hole. The hole, minus two. The sand, plus two. You see that?" he says to a group of students who have spent much of their young lives at the beach. "The hole is minus two. The pile of sand is plus two. What do you get if you add them back together?"

This brief scene shows how the teacher has brought together knowledge of his subject matter and an understanding of his students to make valid connections between what the students already know and what he wants them to understand. It is why metaphor and analogy are so effective in teaching. They connect new information to familiar concepts.

Although constructivism is clearly the dominant learning theory today, bolstered by new research on the brain and its functioning, the understanding of learning as a process of construction is not really new. More than a half a century ago, John Dewey, the greatest educational philosopher of all time, questioned the assumption that knowledge can be transferred from teachers to students. He urged educators to think of education as "development from within" rather than "formation from without" (Dewey, 1938, p. 17). Learners must actively construct their own knowledge; it cannot be given to them, no matter how hard we try.

Learning and Developmental Process

There is another growing body of scholarship on intellectual development and learning process, but it is about the process of becoming a lifelong learner. Knowledge is changing so fast that what students know when they graduate from college is not nearly as important as what they are capable of learning. The half life of knowledge in medicine now–meaning the time it takes for half of the knowledge to become obsolete–is reputed to be about five years. That means that during the time students are in medical school, half of the knowledge of their profession has been replaced by new knowledge. Information is more plentiful, easily available, and rapidly distributed than ever before in the history of the world. We are quite literally awash in information. Between 6,000 and 7,000 scientific articles are written each day. Scientists complain that they are so overwhelmed with data and information that it takes less time to do an experiment than to find out if it has been done (Naisbitt, 1982, p. 24). John Naisbitt claims that for professional and clerical workers–and that includes the majority of all workers today–the creation, processing, and distribution of information is the job (p. 15).

Basic to making community colleges into "learning colleges for the twenty-first century," is the task of providing students with the tools and attitudes for lifelong learning. That means assuring that students develop the skills of writing, numeracy, critical thinking, and problem solving, of course; but it also means developing the attitudes and values of the lifelong learner–cultivating an appreciation of learning and acquiring the habits of a self-directed learner. Developmental psychologists have some valuable insights on the growth of the intellect during the college years. These years typically begin a time of large personal and intellectual change for students–at least for students of traditional age, which is where most of the research on intellectual development has been done.

William Perry, who did his research on Harvard undergraduates, is perhaps the best known developmentalist to those of us in higher education (Perry, 1970; 1981; 1985). He posits nine positions of intellectual development for college students, but a summary of his work can be presented briefly in three major

levels. Perry's scheme starts with a position that he calls "dualism." Dualists are absolutists; they assume that there is a right answer to every question. They see the world in black or white, right and wrong, true or false. They look to an authority for the answer, and they have a low tolerance for ambiguity. The authority is usually the teacher who is paid to teach them. Often dualists are willing to admit that if we don't know the answer yet, research will eventually reveal the correct answer.

Critics claim that traditional education encourages this low level of intellectual development in its reward of "right" answers. To the extent that educators encourage students' dependence on the teacher or textbook for authoritative answers without encouraging students to think critically, they are arresting the student's development at the relatively low level of dualism. But evidence collected by Marcia Magolda (1992) suggests that today's students are growing in intellectual development as they gain further education. She tested the Perry developmental theory on a more representative sample of male and female students and found that 68 percent of the freshmen entering a moderately selective four-year college were absolutists. But the proportion of students at this low level of intellectual development dropped to 11 percent of the juniors and only 2 percent of the seniors. It should be noted that this research is supportive of constructivist theories–and not so incidentally of the effectiveness of education in helping students to construct their own deeper understandings rather than settling for surface learning that involves the passive acceptance of quick but undigested answers.

At the midlevel stages of the Perry scheme of intellectual development is multiplicity. In this stage, gray areas appear as students begin to discover that this is a relativistic world and that authorities often disagree, and that the views of their fellow students often differ from their own. Certainly those of us who have tried to decide whether to eat salt or drink coffee are aware that authorities often disagree. In an effort to resolve these inevitable discrepancies, students adopt an "everyone has a right to their own opinion" stance. They know that there isn't a single right answer to every question, but they aren't yet ready to take

the next step to critically analyze the situation; it is easier to grant everyone a right to their own opinion. Social constructivists would contend, I think, that learning communities that encourage students to accept and respect one another's views without subjecting those views to critical analysis and argument are arresting development at a stage in which tolerance of differing viewpoints is encouraged, but critical thinking and deeper understanding is circumvented. This can be a problem in classes and programs emphasizing multiculturalism. Simply exposing students to different cultures and ways of knowing is not really learning. It is exposure at the surface level–like piling new information on top of old–but failing to make the connections in the cognitive structures that result in understanding.

Finally, at the more advanced stages of development, students begin to see that some opinions are better than others and that truth is "contextual." There is not a single right answer, nor is one answer as good as any other. Rather, at the highest levels of development, the individual is able to evaluate truth in terms of the context in which it occurs.

The research of the closing decades of this century has opened new windows on learning. The perspectives gained from research on learning outcomes and learning processes are coming together now to form a view of learners working actively to make the connections and build the cognitive structures that will serve them in the twenty-first century. But as useful as research is as one route to knowledge, it is nevertheless based on a conception of knowledge that assumes that there is an "answer" out there in reality and that through objective scientific research, we will eventually discover what it is. Research is not the only route to knowledge, and new scholarship on the nature of knowledge is coming from philosophers who are questioning whether old conceptions of knowledge will serve us well in the century to come.

Learning and Social Constructivism

Social constructivism is an important and emerging epistemology concerned with the nature and origins of

knowledge. Until we have some shared understanding of what knowledge is, say epistemologists, we really can't know how to achieve it.

Social constructivists contend that learning is not so much about discovering an objective "truth" that lies somewhere "out there" in the reality of the world, as it is about a process of making sense of the vast amount of information that surrounds us. Social constructivism is responsible, in part, for the growth of interest in learning communities, peer learning, and group learning projects.

Kenneth Bruffee, a professor of English at Brooklyn College and a foremost advocate of collaborative learning (which is based in social constructivism), contends that at the college level, education is not so much the teaching of agreed-upon "answers" as it is the addressing of questions with dubious or ambiguous answers that require judgment and critical thinking. The way to develop the ability to think critically, says Bruffee, is to teach students to "doubt answers, methods for arriving at answers, even the questions to be asked, and perhaps above all the authority of those who `profess' that knowledge" (1995, p. 15). Bruffee is a strong advocate of learning communities because they encourage students to subject one another's perceptions to question and analysis, and students "learn to depend on one another rather than depending exclusively on the authority of the teacher" (1993, p. 1). "We construct and maintain knowledge," Bruffee says, "not by examining the world but by negotiating with one another in communities of knowledgeable peers" (1993, p. 9). Knowledge is "therefore not universal and absolute. It is local and historically changing. We construct it and reconstruct it, time after time, and build it up in layers" (1993, p. 222).

Although the premises of social constructivism are considered controversial by some, it does not take a whole lot of looking to see how much of the scholarly work on learning today is questioning, in one way or another, the conventional and more authoritarian views of learning in which those who know teach those who do not know. Serious criticisms of the traditional hierarchical approach to knowledge are voiced in the rise of the philosophical

"isms"–modernism, postmodernism, feminism, multiculturalism. These philosophies question the existence of a single "right answer" possessed by the prevailing culture and taught as "truth" to upcoming generations of learners who fail to question the authority of the source of the knowledge.

Belenky and her colleagues (1986) sparked a strong strain of sympathetic recognition among women teachers and students when they demonstrated that many women display different "ways of knowing" from the male model that has dominated academe for so many years. The male model is characterized by "separate knowing"–a way of learning that is impersonal and objective; involving detachment, critical argument, analysis, and other descriptors that we associate with the "scientific method."

Many women, however, are "connected learners." Connected learners regard knowledge as a process of social interaction. Clinchy (1990) describes a connected learner's search for knowledge this way: "She does not ask whether it is right; she asks what it means. When she says, `Why do you think that?' She doesn't mean, `What evidence do you have to back that up?' She means, 'What in your experience led you to that position?'" (Clinchy, 1990, p. 122). This student's search for knowledge, argues Clinchy, is best accomplished through connected conversations, "in which each person serves as midwife to each other person's thoughts, and each builds on the other's ideas" (p. 123). It is interesting to observe that the questions Clinchy, Belenky, and their colleagues chose to investigate in their research reveal their philosophical perspectives about the source of knowledge. Their interview questions consisted of questions like these: "How does the woman conceive of herself as a knower?" "Is knowledge seen as originating outside or inside the self?" "Can it be passed down intact from one person to another, or does it well up from within?" (Clinchy, 1994).

Another strong sign of a radical shift in our view of knowledge is found in some cutting-edge books about the revolution taking place in business. Peter Senge, in his book on the Fifth Discipline [illegible] goes on at some length about the emergence of new

knowledge through dialogue with peers. He calls for "a shift of mind–from seeing ourselves as separate from the world to connected to the world, from seeing problems as caused by someone or something 'out there' to seeing how our own actions create the problems we experience. A learning organization is a place where people are continually discovering how they create their reality. And how they can change it" (pp. 12-13).

Social constructivism–that is the notion that students not only construct knowledge but do so in the context of social interaction–appears as a recurring theme in the research on learning. In a comprehensive review of the research literature in *Teaching and Learning in the College Classroom*, McKeachie and his colleagues wrote, "The best answer to the question, 'What is the most effective method of teaching?' is that it depends on the goal, the student, the content, and the teacher. But the next best answer is, 'Students teaching other students'" (1986, p. 63). The Task Force on Psychology in Education appointed by the American Psychological Association (APA) concluded that, "Learning is facilitated by social interactions and communication with others in a variety of flexible, diverse (cross-age, culture, family background, etc.), and adaptive instructional settings" (McCombs, 1992). When students teach other students, they tend to think of themselves as active participants in the learning process, and they are also somewhat more likely to relate to the background, knowledge, and interests of their fellow students.

Lev S. Vygotsky, the Russian language theorist and a powerful influence on modern social constructivism, invented the awkward term Zone of Proximal Development (ZPD) to suggest that learning is productive when learners are operating in a social situation that exposes them to concepts and ideas just slightly above their current level of development (Vygotsky, 1978). The ZPD is the potential for learning, given the proper instruction and setting; it is replacing the notion of a fixed IQ in social constructivist theory. In learning communities or in small group settings in which students are working on a common problem, the ZPDs of the diverse students making up the group overlap, thus ›posing all students to concepts and understandings within their

ability to grasp but not yet a part of their understanding. An apprenticeship is an example of the operation of the ZPD, since it involves novices working with experts on tasks that are beyond the present capabilities of the apprentice, but within their potential to learn.

Conclusion

It is difficult to draw any firm line between a philosophy about the nature of knowledge and scientific research about human learning. While social constructivism contends that learning is necessarily social, temporary, and continually evolving as people talk with one another and reach consensus, constructivism is the prevailing learning theory derived from research. It contends that knowledge is actively constructed by learners through a process of building, shaping, and modifying the cognitive framework. While social interactions are certainly one viable way–and to many people a very attractive and motivating way–of challenging people to think and to learn, there is probably no single best way to design the learning college for the twenty-first century.

The exhilarating thing about a spring garden is its incredible variety. As I view the freshness of this new spring from my window, I see roses, and iris, and pansies, and lilies. And I see trees, and shrubs, and vines. Each has its preferred location, and each requires my understanding of how it grows. But their common needs have impressed me this spring, as I weed and hoe and water, trying to create an environment in which each can grow and prosper according to its needs.

And so too, it must be in the learning college. Let the innovations bloom, but remember what research and practice tells us about the nature of learning. No one can place an idea or a concept intact into the mind of another. No matter how brilliant the message delivered, it does not result in learning until it is integrated into a unique mental structure. Passive learning is an oxymoron; there is no such thing.

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