

FROM SURFACE LEARNING  
TO DEEP LEARNING:

THE CHALLENGE FOR HIGHER EDUCATION  
IN THE 21<sup>ST</sup> CENTURY

Sally Rings, Ph.D.

Sabbatical Final Report

Paradise Valley Community College

## **To the Reader—**

When I began to write this report, I had a revelation: For the first time in my life, I was not writing for someone else—I was writing for me! What liberation! So I have set aside the conventions and constraints imposed on every other paper I have ever written and followed the conventions that seem to make this document usable for me. In several places I have written less formally than I would have if others were judging my work against some external standard.

I have also chosen to emphasize the sources that have been most helpful to me, rather than working to include all possible sources I have read on specific topics. Therefore, there are many sources in the References list that are not cited in the report. Nevertheless, I have included them because my reading of them has influenced my thinking even though I haven't cited them directly.

I am aware that I have used more direct quotes than I would allow my students, but I have wanted to hold onto the authors' wordings because it will enable me to connect better with the concepts at a later date.

I realize that I have actually written a reference manual for myself, and I expect to refer to it often as I resume my teaching and other professional activities.

I am so grateful for this sabbatical year of reading and reflection. It has re-energized me and created in me an eagerness to return to my work in order to improve learning and contribute to the transformations in thinking and acting that are facing us.

## Visitations

During my sabbatical study, I have interwoven my study of the literature about various aspects of deep learning with visiting institutions and people that are leaders in the learning movement. Below is a list of the visitations I made.

- October 3, 2001                    Visited Alverno College  
Had individual and group conferences with administrators, faculty, students. Observed some of their processes for assessment of student learning.
- October 22-23, 2001            Visited the Evergreen State College  
Met with Emily Decker, the Director of the Washington Center for the Improvement of Undergraduate Education. Perused materials in the Center as well as in the library and the bookstore. Met with Jean MacGregor and Barbara Smith, leaders in the Learning Communities movement. Observed in three Learning Communities.
- January 25, 2002                Visited Palomar College.  
Met with Associate Dean Patrick Swerdtfeger. Toured the campus.
- February 7, 2002                Visited Robert Barr, Director of Institutional Research for Foothill-DeAnza Community College District  
  
Visited Pat Hutchings, Vice President of the Carnegie Foundation for the Advancement of Teaching
- February 22, 2002               Visited Paul Elsner, Former Chancellor of the Maricopa Community Colleges
- February 28-  
March 1, 2002                    Participated in the Southwest Regional Learning Communities Conference, Tempe, Arizona
- March 15—18, 2002            Participated in the Annual Conference of the American Association for Higher Education, Chicago, IL
- April 4, 2002                    Visited the San Jose/Evergreen Community College District  
Met with Louis Albert, Vice Chancellor. Also met with other administrators and faculty.

## INTRODUCTION

This sabbatical project is predicated on the assumption that change—fundamental, from-the-ground-up change—is essential in higher education for the 21<sup>st</sup> century.

Why change? Because many of the purposes that higher education is serving are no longer valid. Most institutions are currently serving industrial-era needs: college graduates enter the work force as employees in enterprises that in various ways exploit the earth for human gain. In fact, the dominant assumption is that colleges and universities exist for the purpose of enhancing the economy as it is currently construed. However, the Earth cannot sustain this kind of economy. Degradation of the resources of the planet is everywhere evident. We must move to a new kind of economy based in a new worldview.

Thomas Berry, in *The Great Work* (1999), states that the great work for the 21<sup>st</sup> century is for humankind to move from being “a disruptive force on the Earth to a benign presence,” existing in harmony with the structures and functions of the planet rather than destroying them. (p. ix) To do so requires redefining our basic assumptions about humanity, moving from the perception that everything nonhuman exists for the purpose of human use to the idea that all things exist in intricately interconnected relationships, everything affecting every other thing.

Berry sees higher education as the most promising catalyst to bring about this transformation, first in thinking and then in action, for higher education provides training in all the professions that control human behavior. For the last few centuries, educational institutions have been training people in professions that exploit the earth; now, in order to create a “viable future,” these institutions need to redefine their purpose as “guiding students toward an intimate relationship with the Earth.” (p. x) The professions need to reinvent themselves within the framework of this purpose.

Matthew Fox, in *The Reinvention of Work* (1994), also understands Berry’s vision of the great work to move toward a sustainable existence for all. Fox states that work needs to be redefined as we move from the industrial paradigm to the paradigm being ushered in by the new science, science that understands the interconnectivity of all things. Authentic human work, rather than being just jobs, needs to be part of the Great Work of the universe, That is, it should provide necessary and useful services, it should “enable everyone to use their gifts like good stewards” (p. 31), and it should contribute to the growth of justice and compassion for all species on the Earth. (p. 68) Therefore, the role of education is to prepare learners for this *work*, not *jobs*.

The history of higher education in this country can be seen as an evolution from studying the classics to preparing for a vocation, or *job*. Students today tend to see the primary purpose of higher education as the means of “getting a good job”—quite different from the visions of Fox and Berry.

The old educational system worked for the industrial age. Yet the industrial age, with its goals of exploiting and controlling everything for the use of humans, is now “producing ecological and social crises in our outer world and psychological and spiritual crises in our inner world. Both of these crises grow out of our success in separating ourselves from the larger fabric of life.” (Kofman and Senge, 1993, p. 10) As Thomas Berry points out, the age of industrialism could occur only once on this planet, for it presumed many situations—such as cheap raw materials—that simply will not repeat themselves. (1999, pp. 138-39)

As the industrial age draws to a close—and it must—the new science is driving a paradigm shift that can enable us to create a new world based on a new system of beliefs. (Some of these “new” beliefs are actually based on some ancient understandings, such as the unity and interconnectivity of all things.) Education can re-form itself and play an essential role in re-forming the human enterprise, and ultimately the regeneration of the Earth.

Such fundamental change will require profound commitments. Yet many phenomena are converging to facilitate the needed changes. First is the new science, which calls for new understandings of the way the world works. Second is the brain research of the last 30 years, which demonstrates the holistic and interconnected functions of the brain, the same principles that the new science has observed in all living systems. Third is systems thinking, also based in the new science, which can be a useful tool in helping us to re-examine and re-configure the very purpose of education. All of these both call for and promote deep learning at both individual and institutional levels. In education, deep learning is essential for students as well as for the institution and the employees that comprise it.

What is deep learning? When I am asked this question by people who inquire about my sabbatical study, I first answer by explaining its opposite, surface learning. Everyone understands it because it is a common experience in America’s schools: learning unrelated bits of information that are relatively meaningless, only to forget them soon after the test.

Deep learning occurs when the knowledge is needed, but we teach knowledge in the hopes that it will be there when it is needed later. Most of it is forgotten. (Handy, 1998) Deep learning derives from what motivates us and carries a sense of purpose for us; it springs from intrinsic motivation. In this sense it is a form of self-organization, a

principle of both the new science and how the brain learns. (Caine & Caine, 1997, pp. 111-12) “Values are at the heart of all expertise, mastery, and genuine understanding.” (Caine & Caine, 1997, p. 112) Deep learning extends beyond the merely cognitive; it encompasses many intelligences. It is knowledge that has been incorporated into one’s perception of the world. In short, deep learning changes people—and their institutions.

The relationships among the concepts of change, systems thinking, and deep learning do not constitute a tidy, linear organization; rather they are interconnected, like a web. Therefore, the structure for this work is somewhat artificial but necessary in order to focus on one aspect at a time. I have decided to begin this work at the level of the individual, with a summary of the important findings from the brain research about how people learn. From there I have moved to some general points about learning synthesized by some of the leaders in higher education who seek deeper learning for students. The third chapter explicates some of the structures and pedagogies that foster deep learning: learning communities, cooperative and collaborative learning, and assessment. This work then moves to the institutional level, with a summary of some basics of systems thinking, a powerful tool for organizational learning. The fifth chapter is devoted to strategies for change and is intertwined with the preceding chapter. Finally, I have included some ideas for staff development activities that I can use when I return to PVCC from my sabbatical year.

## HOW THE BRAIN LEARNS

“We have learned more about learning in the last 30 years than in the rest of human history combined, due to the efforts of cognitive scientists.” (Spence, 2001, p. 15) From this research it is clear that the mind is not like a tape recorder or camera, it “*represents* rather than records reality.” (Spence, 2001, p. 16) However, the pedagogies used in most institutions do not reflect this research; therefore, it is essential that educational institutions first come to understand what we now know and then restructure their institutions to support that knowledge.

For my purposes in exploring the brain research, I have focused, not on the structures and functions of the brain, but instead on the understandings derived from them and their implications for teaching. These understandings have emerged from the cognitive sciences, neuroscience, and other fields about how the brain learns that have application in teaching for deep learning. This body of knowledge has come to be called “brain-based learning” (Caine & Caine, 1997) or “brain-compatible learning.” (Bransford, et al., 2000) Below are 12 brain/mind learning principles explained by Caine and Caine. (1997, p. 104-108) These principles are also explicated in other sources.

**Principle 1: “The brain is a complex, adaptive system” that functions in a holistic, integrated manner. (p. 104)**

*“Western culture has taught us to ‘think apart’ the world—to divorce fact from feeling, spirit from matter, self from community.... But these great opposites co-create reality. When we think them apart we destroy the wholeness that they can bring to our lives.”*

-- Source unknown (p. 129)

The new paradigm, which emphasizes the importance of wholeness and interconnectedness, rather than isolated parts, is finding application in every field of inquiry (Capra, 1982), including brain research. (p. 78) Although much recent brain research is still based in the materialism of the Newtonian paradigm, which assumes that all reality is grounded in matter, the systems thinking that emerges from the new science, when applied to the human brain, sees that “...body, mind, and brain form a dynamic unity” (p. 79) that cannot be fully understood by describing the constituent parts. In other words, the whole is greater than the sum of its parts. And the whole is “...complex, emergent, and organizing at ever higher levels of complexity.” (p. 84) Thus, “human beings are not machines. Human beings are complex, adaptive systems living on the edge of the continuous ability to self-actualize.” (p. 86)

Further, the regions of the brain are both separate and connected to the whole.

Researchers have come to understand that examining only a part of something cannot yield a full explanation of it, for it exists in relationship to everything else. Theories of right- and left-brain functions and the triune brain are now outdated because functions that were previously ascribed to one part of the brain are now known to take place in many parts of the brain. The human brain is highly interconnected and interdependent; all elements affect all other elements. (pp. 26-7) Thus, a whole-systems understanding of the brain has emerged. (Jensen, 1998, p. 4)

**Principle 2: “The brain is a social brain.”** (p. 104)

Throughout our lives, beginning at birth, our brains/minds change as they interact with other people. In fact, this phenomenon is so fundamental that individuals must be seen as “integral parts of larger social systems.” (p. 104) Therefore, learning is deeply affected by the personal relationships that are a part of the learning situation.

**Principle 3: “The search for meaning is innate.”** (p. 105)

From birth, we seek to make sense of our experiences. Our search for meaning is driven by our values and sense of purpose. (p. 105) As we search for meaning, we look for feedback that tells us whether something makes sense. (Kagan, 2001)

**Principle 4: “The search for meaning occurs through ‘patterning.’”** (p. 105)

This tendency for all humans to create patterns seems innate. It involves attaching new information to already-understood “mental hooks” (Jensen, 1998, pp. 95-96) as well as creating new patterns. These patterns can be schematic maps and categories. The brain/mind seems determined to store isolated bits of information within a category rather than allowing them to remain detached from related concepts. (p. 105)

**Principle 5: “Emotions are critical to patterning.”** (p. 105)

Learning is influenced by emotions. In fact, thoughts and emotions cannot be separated; they “literally shape each other.” (p. 105) Therefore, learning can no longer be thought of in terms of cognitive, affective, and physical domains, for all of these aspects are interrelated and continually influence one another. (p. 18) Nor are reason and emotions opposites. “Emotion helps reason to focus the mind and set priorities.” (Jensen, 1998, p. 72) In addition, “our brains are structured so that which makes us feel is remembered.” (Kagan, 2001)

**Principle 6: “Every brain simultaneously perceives and creates parts and wholes.”** (p. 106)

The earlier theory that the left brain processed parts while the right brain processed wholes is oversimplified. Recent research has demonstrated that these two kinds of processing occur at the same time and in both hemispheres. Thus, the brain functions more synergistically and holistically than previously thought.



**Principle 7: “Learning involves both focused attention and peripheral perception.”** (p. 106)

The brain absorbs both information that it is focused on as well as information that is in the background or even beyond conscious awareness. Thus, elements in the total environment are taken in and processed by the brain.

**Principle 8: “Learning always involves conscious and unconscious processes.”**  
(p. 106)

“Much of our learning is unconscious—experience and sensory input are processed below the level of awareness.” (p. 106) Therefore, understanding may occur long after the input occurs.

**Principle 9: “We have at least two ways of organizing memory.”** (p. 106)

Taxon memory is a set of systems that recalls relatively unrelated information. Committing information to memory in these systems does not rely on meaning; it is not necessary for the learner to understand the information. The taxon systems are motivated by external rewards and punishments. Locale memory, on the other hand, is spatial and autobiographical and can recall instantly such information as where you went yesterday. It is motivated by novelty. “Meaningful learning occurs through a combination of both approaches to memory. Thus, meaningful and meaningless information are organized and stored differently.” (p. 107)

**Principle 10: “Learning is developmental.”** (p. 107)

The term “neural plasticity” is frequently used to describe the brain, meaning that it is malleable and continues to develop and change throughout life. This plasticity operates not only over long periods of time but also during each experience, so that the physical structure of the brain literally changes continually. (p. 27) During learning the brain changes; it rewires itself “with each new stimulant, experience, and behavior.” (Jensen, 1998, p. 13) As stated above, this capacity of neurons to make new connections continues throughout life.

**Principle 11: “Complex learning is enhanced by challenge and inhibited by threat.”**  
(p. 107)

The brain learns best, that is, it makes the most connections, when it is challenged in a safe environment, one where the learner is encouraged to take risks. However, when learners perceive threats, their brains “downshift” into survival mode and away from the ability to grapple with complex problems. (Jensen, 1998, p. 57) Physiologically, high stress causes brain cells to die; it impairs the ability to distinguish important from unimportant, it inhibits memory, and it depresses the immune system. (Jensen, 1998, p. 53)

**Principle 12: “Every brain is uniquely organized.”** (p. 108)

Although each person has the same set of systems in the brain, the structure and function of each person's brain is unique. Therefore, each individual learns differently. Some of these differences are expressed as different learning styles, different talents, and strengths in different intelligences. Howard Gardner (1993) has expanded our understanding of intelligence by identifying eight different kinds of intelligence: linguistic, logical, musical, spatial, bodily kinesthetic, interpersonal, intrapersonal, and naturalistic.

### Implementing Brain-Based Learning:

These 12 principles regarding how the brain learns lead to implications for teaching and learning. Below are several primary implications, separated into "points" for clarity but also overlapping. They cannot be entirely discrete elements; rather they are component parts of a complex, interactive whole that is a total learning environment.

**1. Create a learning environment of "relaxed alertness," one in which learners experience low threat and high challenge at the same time.** (Caine & Caine, 1997, p.153)

Since the brain absorbs all aspects of the learning environment, even those of which the learner is unaware, the total environment needs to be attended to. A rich, stimulating learning environment develops complex neural networks. (Nussbaum, 2001; Jensen, 1998, p. 30)

Since learning is deeply influenced by social relationships, creating a supportive social environment is essential. In this learning environment, the teacher "orchestrates the classroom as a healthy, living community of learners." (Caine & Caine, 1997, p. 153) All persons are respected members of the community, all persons, including the teacher, are learners, and all participate in decision making. Teachers understand the social construction of knowledge; therefore, they support social relationships and the integrity of the community.

Jensen (1998) is adamant about the need to remove threats from the classroom. He states that doing so is the most important thing teachers can do, for threats interfere with the learning process. (p. 30) Threats cause learners to "downshift," to revert to more instinctual or preprogrammed behaviors and to often feel helpless or fatigued as a response to perceived threat. In this state of being, learners cannot respond well to a rich, complex learning environment. (Caine & Caine, 1997, p. 103)

Being learner-centered can help to remove threats. If learners' meaning, purposes, and interests are connected to the curriculum, motivation then becomes intrinsic rather than extrinsic. Rewards and punishments (and

the accompanying threat) become irrelevant. Projects with flexible time lines and outcomes that are relatively open-ended take into consideration different learners' needs. (Caine & Caine, 1997, p. 153)

**2. Embed information in “rich, meaningful experiences.”** (Caine & Caine, 1997, p. 18)

According to Jensen (1998), “the single best way to grow a better brain is through challenging problem solving. (p. 35) Curriculum can be embedded into challenging, real-world problems which can then be addressed with a variety of methods and activities. Bransford et al. (2000) states, “To develop competence in an area of inquiry, students must: (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework,, and (c) organize knowledge in ways that facilitate retrieval and application.” (p. 16) Organizing curriculum through problems can provide a meaningful framework as well as provide applications for knowledge. Doing so also integrates the curriculum and relates it to learners' worlds.

Not all curriculum lends itself to embedding in problems, but virtually all curriculum can be approached through other real-life activities: field trips, projects and demonstrations, visual imagery, stories, metaphor, and drama. These approaches can actively engage learners in meaningful learning.

**3. Encourage learners to perceive patterns.**

The human brain resists meaninglessness. It seeks to find the relationships among isolated bits of information; it seeks patterns. (Caine & Caine, 1997, p. 105) Teachers need to provide experiences that enable students to perceive patterns and connections, formulating the relationships between pieces of information and larger, encompassing concepts. In doing so, teachers, are fostering the construction of knowledge and understanding by learners.

**4. Honor the emotional aspects in learning.**

Teachers can help learners engage appropriate emotions first by serving as a role model, by sharing what learning is exciting to them. A teacher's enthusiasm can be contagious. (Leamson, 2000) Teachers also need to discover what is intriguing to their students and encourage them to become involved emotionally in their work, perhaps through introducing controversy. (Jenson, 1998, pp. 80-81) Teachers can also provide opportunities for learners to express their feelings about both the content and the process of their learning.

**5. Emphasize learning for understanding, rather than memorizing.** (Bransford, et al., 2000, p. 24)

It is important to capitalize on our locale memory, or map learning, and help learners connect new ideas to what they already know. Locale memory is related to inquiry learning, critical thinking, creativity, and group

processes. (Caine & Caine, 1991, p. 45) It is also important to help learners make connections between concepts and their own lives since an idea must be relevant to learners to have meaning for them. (Jensen, 1998, pp. 92-93)

**6. Use a variety of teaching strategies.**

Since each developing brain is unique, not all will respond equally to any given approach. Teachers can incorporate many kinds of intelligences in order to accommodate differences in learning. Teachers should also offer support for different work modes (group and alone). (Caine & Caine, 1997, p. 165)

Immersing learners in complex learning experiences is important because people function in many different ways at one time, using their whole being. Creating complex experiences can involve the following strategies and approaches:

1. Organizing information around themes and integrating curriculum (Caine & Caine, 1997, p. 170)
2. Encouraging learners to use multiple sources of information (Caine & Caine, 1997, p. 167)
3. Encouraging the “reorganization of information in unique ways” (Caine & Caine, p. 167)
4. Using cooperative learning strategies (Jensen, 1998, p. 93)

**7. “Help learners make visible what is invisible.”** (Caine & Caine, 1997, p. 106)

Teachers can create opportunities for learners to reflect on their learning and to elaborate on their developing knowledge and skills, giving the brain time to process and make meaning. These metacognitive activities also deepen learners’ awareness of both what they are learning and how they are learning.

**8. Use a variety of assessment strategies.**

Because the brain thrives on feedback, especially specific feedback, frequent assessment, both formative and summative, is important. In a brain-based learning environment, traditional tests may be used as one component of assessment, although, according to Jensen (1998), tests that insist on the “right answer” or only one approach to a problem go against our brains’ adaptability and therefore are not healthy for the brain. (p. 16)

Assessment strategies that are more authentic support brain-based learning. (Caine & Caine, 1997, p. 20) Authentic assessment helps learners consolidate and internalize information, contributing to learning that lasts (Bransford et al., 2000, p. 25) Authentic assessment strategies include portfolios, performance evaluations, and students evaluating their own learning. Developing learners’ metacognitive awareness so that they can assess what they do and do not understand increases their transfer of knowledge to new settings. (Bransford et al., 2000, P. 12)

Caine and Caine( 1997) emphasize that learners’ active processing of experience should be “ongoing and... embedded everywhere.” (p. 178)

**9. Use knowledge about how the brain learns as the impetus for transforming education.** (Jensen, 1998, p. 114)

“Force of habit rules the hallways and classrooms. Neither brain science nor education research has been able to free the majority of America’s schools from the 19<sup>th</sup> century roots. If more administrators were tuned into brain research, scientists argue, not only would schedules change, but subjects such as foreign language and geometry would be offered to much younger children. Music and gym would be daily requirements. Lectures, worksheets, and rote memorization would be replaced by hands-on materials, drama, and project work. And teachers would pay greater attention to children’s emotional connections to subjects.” (Begley, 1996, p. 58)

Begley’s summary implies that administrators, once they truly internalized the needed changes, would, in typical top-down fashion, enact the changes needed to bring education in line with what we know about how the brain learns. However, effecting such a change requires not only the transformation of administrators but also the transformation of teachers—from traditional, authoritarian disseminators of information to facilitators of learning who focus on the expansion of students’ perceptual knowledge, who foster self-organization, and who use authentic assessment. The transformation of education requires teachers to change their worldview, not just adopt new strategies. Then the transformation agenda must extend beyond professional educators to parents and the community, enabling them to make a fundamental shift in their assumptions about education—from the notions that teachers deliver knowledge and students absorb it to the concept that teachers facilitate students’ learning by encouraging them to make meaning from multiple sources of information. This shift in understanding is radical—and also compelling, given what we know about how the brain learns.

## LEARNING IN HIGHER EDUCATION

“We have learned more about learning in the last 30 years than in the rest of human history combined, due to the efforts of cognitive scientists.” (Spence, 2001, p. 15) From this research it is clear that the mind is not like a tape recorder or camera; it “*represents* rather than records reality.” (Spence, 2001, p. 16)

Many educators in higher education have written about the nature of learning without specifically relating it to the research about how the brain learns, yet their explications demonstrate an understanding of learning that implies their familiarity with this research. And many more than I expected use the term “deep learning” in their writings. Pat Cross (1999) states that in the United Kingdom, researchers often distinguish between “deep” and “surface” learning: “learning that makes the connections that lead to deeper understanding versus information which rests on the surface, inert and unassimilated.” (p. 10) She further explains that if new information isn’t related to a pre-existing schema in the learner’s mind, it can’t be used to build knowledge; it will be quickly forgotten. Deep learning also requires time to be incorporated into learners’ schemata—through active processing, reflection, discussion, writing, etc. The emphasis on “coverage” that is typical, especially in introductory college courses, robs learners of this time to process. (Cross, 1999, p. 11)

Alverno College has devoted nearly 30 years to re-inventing itself as a college that is organized around and operates for the purpose of developing deep learning. In the process, it has produced exemplary work on learning and has mentored many other institutions wishing to increase their understanding of learning, and in particular the kinds of assessment that foster deep learning. Marcia Mentkowski and her colleagues at Alverno have written *Learning That Lasts*, a complex accounting of some of the research and subsequent understandings about learning undertaken at Alverno. Below is a summary of some salient points from that book that are interconnected and overlapping:

### Learning Principles from *Learning That Lasts*:

#### 1. “**Learning that lasts is integrative**” (p. 227)

Learners “continually make connections and create new wholes out of multiple parts.” Educators are aware that emotional aspects are central to learning and integrate them into learning experiences, rather than focusing on the purely cognitive. Learners’ career goals, prior knowledge and experience are also incorporated into the learning process. Educators also understand that “performance is the integration of knowing and doing.” (p. 227) Finally, learners self-assess their strengths and weaknesses, integrating self-reflection and performance.

“If learning is to be integrative so that it lasts, then:” (p. 229)

- Curriculum must be coherent (which means that faculty must collaborate).
- Curriculum must include opportunities for self-reflection.
- “Learning strategies need to emphasize doing what one knows.”  
“Faculty need to encourage a developmental outlook,” considering learners’ curriculum over several semesters and courses.

**2. “Learning that lasts is experiential” (p. 230)**

The learner connects “knowing and doing, theory and practice.  
Experiential learning is both active and situated, as well as integrative.”  
Students use experience to ground the formulation of abstractions.  
Off-campus internships and experiences are helpful. (p. 231)

“If learning is to be integrative so that it lasts, then:” (p. 231)

- “Faculty must help learners construct their learning by moving from a specific, concrete context toward broader principles.”
- Faculty need to create opportunities for students to move into the community.

**3. “Learning that lasts is self-aware and reflective, self-assessed and self-regarding” (p. 232)**

“Being aware is an essential part of learning.” Learners need to self-assess reflectively and get feedback that focuses on improvement.

“If learning is to be self-aware and reflective, self assessed and self-regarding so as to last, then:” (p. 234)

- A curriculum must provide opportunities for reflective self-assessment.
- “Curriculum needs to connect the process of becoming self-aware with future professional roles and goals.” (p. 234)
- “Self assessment needs to be taught and learned developmentally.”
- Faculty need to help students move toward “increasing integrity in self-assessment.” (p. 235)

**4. “Learning that lasts is developmental and individual, transitional and transformative.” (p. 236)**

New learning builds on what was learned before, and the new learning then becomes a starting point for the next level—a process of reconstructing knowledge and ability. “Learning advances in a more spiraling than linear fashion...” Teachers must support students in moving from seeing knowledge and abilities in isolation of one another toward understanding how they apply in varying and increasingly complex situations. “Teaching beginning students can be highly challenging because learners at first do not share the same assumptions about their roles and responsibilities in the learning process.” (p. 237)

“If learning is to be developmental and individual, transitional and transformative so that it lasts, then:” (p. 238)

- Faculty must sequence learning goals, outcomes, and tasks as well as course structure so that they are “meaningfully developmental.” (p. 238)
- Teachers need to facilitate students’ taking responsibility for their learning. .
- Teachers need to provide students with diverse modes of learning.
- Teachers need to meet students where they are, recognizing the developmental variations in students.

5. **“Learning that lasts is active and interactive, independent and collaborative.”**  
(p. 240)

Students must learn that they can't just listen passively; they must think aloud and solve problems in collaboration. At the same time, they must become independent learners able to perform individually.

“If learning is to be active and interactive, independent and collaborative so that it lasts, then:” (p. 241)

- “Students need repeated opportunities to work in significant projects that are defined and executed by the group.” (p. 241)
- “Students need time for collaborative interaction with others” (242)
- Students need to learn to evaluate collaborative processes. (242)

6. **“Learning that lasts is situated and transferable.”** (p. 242)

Learning is most effective when “situated in the context of its ultimate use.” Yet learners can also learn to apply their learning to diverse situations.

“If learning is to be situated and transferable so that it lasts, then:” (p. 244)

- Faculty need to provide opportunities to learn through experience and simulations.
- Students need practice in variety of contexts to see applications.
- Students need to learn to effectively use self-assessment strategies.
- Faculty need to structure courses to purposefully achieve the transfer of ideas.

7. **“Learning that lasts is deep and expansive, purposeful and responsible.”** (p. 246)

For lasting learning, learners develop habits of “deep inquiry” and creative imagining. They learn to explore hidden causes, larger systems, and nuances. They inquire into “different purposes and perspectives.” (p. 246)

Learning that lasts is more likely to be intentional, with learners reflecting on experiences and what was learned from them. Lasting learning also involves unlearning “previously held ideas and assumptions.” (246) Learners develop metacognitive awareness of how they learn and what they need to learn. They become responsive to others and to the implications of what they have learned; they are connected to the larger community.

“If learning is to be deep and expansive, purposeful and responsible so that it lasts, then:” (p. 246)

- Students need to explore the multiple perspectives and dimensions of an issue and use diverse sources in researching it.
- Students need to examine their own purposes for learning and connect with the goals of the curriculum.
- Educators need to communicate to students that learning happens in all settings, not just classrooms.
- Educators need to commit to helping students “unlearn as well as to learn attitudes, values, commitments” (p. 247)

A second explication of the nature of learning that I find especially helpful is from a joint report of the American Association for Higher Education, the American College Personnel Association, and the National Association of Student Personnel Administrators. This report also focuses on higher education, synthesizing the



best practices gleaned from innovations developed since the 80's. These points overlap with the work from Alverno and also mirror what the sciences are telling us about the nature of learning.

Learning Principles from the Joint Task Force on Student Learning (AAHE, ACPA, NASPA):

1. **“Learning is fundamentally about *making and maintaining connections*: biologically through neural networks; mentally among concepts, ideas, and meanings; and experientially through interaction between the mind and the environment, self and other, generality and context, deliberation and action.”** (1998, p. 4)

“To make and maintain connections, design learning experiences that:

- expose students to alternative world views and culturally diverse perspectives;
- give students responsibility for solving problems and resolving conflicts;
- make explicit the relationships among parts of the curriculum and between the curriculum and other aspects of the collegiate experience; and
- deliberately personalize interventions appropriate to individual students' circumstances and needs.” (p. 5)

2. **“Learning is enhanced by *taking place in the context of a compelling situation that balances challenge and opportunity, stimulating and utilizing the brain's ability to conceptualize quickly and its capacity and need for contemplation and reflection upon experiences.*”** (p. 6)

“To create compelling situations:

- “articulate and enforce high standards of student behavior inside and outside the classroom;
- give students increasing responsibility for leadership;
- create environments and schedules that encourage intensive activity as well as opportunities for quiet deliberation; and
- establish internships, externships, service-learning, study abroad, and workplace-based learning experiences.” (p. 6)

3. **“Learning is an *active search for meaning by the learner—constructing knowledge rather than passively receiving it, shaping as well as being shaped by experiences.*”** (p. 7)

“To stimulate an active search for meaning:

- expect and demand student participation in activities in and beyond the classroom;
- design projects and endeavors through which students apply their knowledge and skills; and
- build programs that feature extended and increasingly challenging opportunities for growth and development.” (p. 7)

4. **“Learning is *developmental, a cumulative process involving the whole person, relating past and present, integrating the new with the old, starting from but transcending personal concerns and interests.*”** (p. 8)

“To create a developmental process integrating all aspects of students' lives:

- design educational programs to build progressively on each experience;
- track student development through portfolios that document levels of competence achieved and intentional activities leading to personal development;
- establish arenas for student-faculty interaction in social and community settings; and
- present opportunities for discussion and reflection on the meaning of all collegiate experiences.” (p. 8)

5. **“Learning is done by *individuals who are intrinsically tied to others as social beings, interacting as competitors or collaborators, constraining or supporting the learning process, and able to enhance learning through cooperation and sharing.*”** (p. 9)

“To relate individuals to others as social beings:

- strive to develop a campus culture where students learn to help each other;
- establish peer tutoring and student and faculty mentorship programs;
- sponsor residence hall and commuting student programs that cultivate student and faculty interaction for social and educational purposes; and
- support activities that enable students from different cultural backgrounds to experience each other’s traditions.” (p. 9)

6. **“Learning is strongly *affected by the educational climate in which it takes place: the settings and surroundings, the influences of others, and the values accorded to the life of the mind and to learning achievements.*”** (p. 10)

“To construct an effective educational climate:

- build a strong sense of community among all institutional constituencies;
- organize ceremonies to honor and highlight contributions to community life and educational values;
- publicly celebrate institutional values;
- articulate how each administrative and academic unit serves the institution’s mission; and
- share and use information on how units are performing in relation to this mission.” (p. 11)

7. **“Learning requires *frequent feedback if it is to be sustained, practice if it is to be nourished, and opportunities to use what has been learned.*”** (pp. 11-12)

“To provide occasions to use and practice what has been learned:

- recruit students with relevant academic interests as active participants and leaders in related campus life programs and activities;
- organize work opportunities to take advantage of students’ developing skills and knowledge;
- collaborate with businesses and community organizations to match students to internship and externship experiences that fit their evolving educational profiles; and
- develop student research and design projects based on actual problems or cases presented by external organizations to be resolved.” (p. 12)

8. **“Much learning *takes place informally and incidentally beyond explicit teaching or the classroom, in casual contacts with faculty and staff, peers, campus life, active social and community involvements, and unplanned but fertile and complex situations.*”** (p. 13)

“To facilitate informal and incidental learning:

- sponsor programs for students, faculty, and staff that serve both social and educational purposes;
- organize community service and service-learning activities performed by faculty, staff, and students together;
- design campus life programs that relate directly to specific courses;
- link students with peers and with faculty staff, and community mentors; and
- build common gathering places for students, faculty, and staff.” (p. 13)

9. **“Learning is *grounded in particular contexts and individual experiences, requiring effort to transfer specific knowledge and skills to other circumstances or to more general understandings and to unlearn personal views and approaches when confronted by new information.*”** (p. 14)

“To transform learning *grounded in particular contexts and individual experiences* into broader understandings:

- sponsor events that involve students with new people and situations;
- champion occasions for interdisciplinary discourse on salient issues;
- foster dialogues between people with disparate perspectives and backgrounds; and
- expand study abroad and cultural exchange programs.” (p. 14)

10. **“Learning involves *the ability of individuals to monitor their own learning, to understand how knowledge is acquired, to develop strategies for learning based on discerning their capacities and limitations, and to be aware of their own ways of knowing in approaching new bodies of knowledge and disciplinary frameworks.*”** (p. 15)

“To enable students to monitor their own learning:

- help them delineate and articulate their learning interests, strengths, and deficiencies;
- reduce the risk to students of acknowledging their own limitations;
- help students select curricular and other educational experiences covering a broad range of learning approaches and performance evaluations; and
- create faculty and staff development activities to learn about “advances in learning theory and practice.” (p. 16)

It is encouraging to see the coherence throughout many writings about learning. We have learned much; now the task is to implement what we know. “[T]he vision of equipping all our students with learning deep enough to meet the challenges of the post-industrial age provides us with a powerful incentive to do our work better.” (Joint Task Force on Student Learning, 1998, p. 1)

## PRACTICES THAT FOSTER DEEP LEARNING

In the last 20 years, several pedagogical innovations have appeared in higher education—learning communities, service learning, cooperative and collaborative learning, first-year experience initiatives, problem-based learning, etc. Part of the impetus for implementing new approaches is that they have been seen as ways to deal with some of the problems on campuses: “disengaged, passive, and unevenly prepared students, a fragmented curriculum with little connection between and among courses, and a high freshman to sophomore year attrition rate.” (Strommer, 1999) In general, these approaches have made positive differences in addressing these problems, and as a result, these movements are growing. For my study, I wanted to know whether they also deepen learning. I elected to focus on two innovations about which I felt a need to know more: learning communities and cooperative and collaborative learning. A surprise addition to these began with my visit to Alverno College, where I came to understand that assessment, carefully designed, is also a significant means of promoting deep learning. Therefore, this part of my report consists of three sections, rather than two.

### Learning Communities

First, I learned (from Barbara Smith of The Evergreen State College) at the Southwest Regional Learning Communities Conference in Tempe, AZ, that learning communities, rather than being a pedagogy, are a curricular restructuring that facilitate the use of innovative pedagogies. The traditional structure—50-minute classes, courses taught as separate entities, different students in different classes—lends itself to a lecture format in which students are fairly passive. Restructuring the curriculum into learning communities places a group of students with one another for a longer period of time, allowing for the development of a deeper sense of community and also fostering connections among ideas and issues.

The fundamental purpose of this restructuring is to deepen learning, according to MacGregor, Tinto, and Lindblad (2002). However, ascertaining students’ levels of learning requires more than traditional tests. One effective instrument that assesses students’ intellectual growth is the Measure of Intellectual Development, or MID. For the MID, students write essays at the beginning and end of the term on specific topics. Their essays are scored by raters at the Center for the Study of Intellectual Development in Olympia, WA, whose director is William S. Moore. The MID is based on William Perry’s scheme of intellectual development as explained in “Cognitive and Ethical Growth: The Making of Meaning” in *The Modern American College* by Arthur Chickering. Lindblad (2000), in reviewing the 11 years of the Washington Center’s assessment studies of learning communities, states that

studies using the Measure of Intellectual Development indicate that students in learning communities make "significant intellectual gains." They develop in cognitive complexity at a faster rate than students in traditional classes.

Another way of evaluating whether learning communities contribute to deep learning is to compare their characteristics with what the brain research indicates are optimal conditions for learning. To do this, I will return to the implications of brain research for teaching and learning from Caine and Caine (1997):

**Create learning environment that are “high challenge and low threat.”**

- Because curriculum is integrated in learning communities, the content is more complex and therefore more challenging.
- Threat is removed through the development of a supportive community, typical in learning communities.
- In team-taught learning communities, the multiple perspectives that faculty bring challenge students to broaden their own views and to address real-world problems, which requires the knowledge and perceptions of persons from more than one discipline.

**Embed information in rich, meaningful experiences.**

- Creating larger blocks of time for learning encourages participating in rich experiences beyond the classroom.
- Motivation is often intrinsic in learning communities as students become involved in real-world issues and problems that are meaningful to them.

**Encourage learners to perceive patterns.**

- Interdisciplinary learning communities encourage seeing connections among ideas as well as the patterns involved in those connections, rather than focusing on isolated pieces of information.

**Honor the emotional aspects in learning.**

- Learning communities “bridge the academic-social divide” (Tinto et al., 1994) as they encourage student-student and student-faculty interaction. Working collaboratively automatically involves the emotions.
- Learning communities foster opportunities for working on projects and issues that are important to students.

**Emphasize learning for understanding, rather than memorizing.**

- Focusing on larger problems and issues and looking at them from a variety of perspectives, engaging students’ emotions, encouraging students to construct their own knowledge all foster understanding rather than memorizing.

**Use a variety of teaching strategies.**

- Team-taught learning communities expose students to different teaching styles.
- The structure of learning communities encourages the use of a variety of interactive learning strategies.

### **Help learners make visible what is invisible.**

- Asking students to reflect on their learning is encouraged in learning communities. This use of self-reflection develops increased self-awareness (Lindblad, 2000)

### **Use a variety of assessment strategies.**

- The complex learning that learning communities foster calls for more complex forms of assessment than “one right answer” tests. Assessment strategies that are more authentic, such as portfolios and performance assessments, are more appropriate.

Certainly it is possible to create learning communities that do not conform to these brain-based principles.

And these principles can be used successfully in stand-alone courses. However, the structure of learning communities can facilitate deep learning that is in accord with how the brain learns.

### Cooperative and Collaborative Learning

For years I have puzzled about the use of the terms collaborative and cooperative learning, wondering whether they are synonyms used to describe the same processes or whether there are distinctions between them. An article in *Change* magazine clarified these terms for me. Although cooperative and collaborative learning have in common the use of small groups and active learning, the primary distinction between them is the difference in the role of the teacher. Below is a list of both commonalities and differences:

#### Commonalities:

- Small groups are used to facilitate learning.
- Learning is active.
- Teacher is a facilitator, not the “sage on the stage”
- Teaching and learning are shared experiences between teachers and students.
- Students accept responsibility for their learning as well as that of others.
- Both are based in John Dewey’s philosophy that learning is “a social enterprise in which all individuals have an opportunity to contribute and to which all feel a responsibility.”

#### Cooperative Learning:

- Group activities are structured.
- Instructor moves from group to group, listens, and sometimes intervenes.
- Instructor introduces summarizing activities at the end of class.
- Instructor provides training in small-group skills.
- Groups assess how they are functioning.
- Traditional authority structure between teachers and students is maintained.

#### Collaborative Learning:

- Groups self-organize for specific tasks.
- Instructor does not actively monitor groups.
- Class ends with a plenary session.
- Instructor assumes that students already have training in small-group skills.
- No group processing sessions are held.
- Power and authority issues are confronted as traditional roles are not used.

(Matthews, Cooper, Davidson, & Hawkes, 1995)

Reviewing some of the literature on cooperative and collaborative learning has validated and renewed my enthusiasm for these pedagogies. Pat Cross, who portrays herself as one who rather dispassionately reviews volumes of research on different topics in higher education, is convinced by the research that cooperative and collaborative learning are effective pedagogies. She states that thousands of studies, spanning many decades, demonstrate the positive benefits, both academic and social, for students. In fact, more studies have been conducted on cooperative and collaborative learning than any other pedagogy, including lecturing. And the results from these studies demonstrate both academic and social benefits for students from diverse backgrounds, students from elementary school through college, students studying a wide range of content, and students with a wide range of ability levels. In fact, some research indicates that underprepared students may benefit from cooperative and collaborative instructional methods more than better-prepared students. (Cross, 2000)

Most convincing for Cross is the work of three researchers not involved in cooperative and collaborative learning. First is Alexander Astin's well-known research that indicates that the two aspects of college students' experience that have the most positive effects on them are student-student interactions and student-faculty interactions.. The second research study that convinces her of the efficacy of cooperative and collaborative learning was conducted by Richard Light, who studied 570 Harvard graduates in depth. He concluded that students who get the most out of college "*organize their time to include interpersonal activities with faculty members, or with fellow students built around substantive, academic work*" (emphasis in original). (Cross, 2000, p. 12) Third is the work is Bill McKeachie of the University of Michigan, who reviewed research studies pertaining to effective methods of college teaching. He found that, in general, the best method is "students teaching other students." (Cross, p. 12) These findings, which emphasize relationships, are at the heart of cooperative and collaborative learning.

Cooperative learning is often described as including five essential elements:

Positive interdependence—students work together for one another's success

Promotive interaction—students share resources and help one another learn

Individual accountability—each group member is accountable for his or her share of the work

Development of teamwork skills—students learn interpersonal and small-group skills along with academic content

Group processing—students reflect on their functioning as a group (Smith, 1996)

Proponents of cooperative learning believe that the teamwork skills referred to above must be intentionally taught since many students are accustomed to competitive academic environments. My experience teaching in Maricopa is that students in my classes do benefit from instruction in small-group skills. Following is a taxonomy of these collaborative skills that will be a useful reference to me as I facilitate cooperative learning experiences:

Interpersonal skills

- Be congenial
- Make clear statements
- Listen effectively
- Communicate positively (no put-downs)
- Make appropriate eye contact

Group building/management

- Organize work
- Keep group on task
- Run a meeting
- Participate in group self-analysis
- Show empathy

Inquiry skills

- Clarify
- Critique
- Probe assumptions and evidence
- Probe implications and consequences
- Elicit viewpoints and perspectives

Conflict management

- Prevention
- Resolution
- Mediation (Coach students on productive strategies for confrontation)

Presentation skills

- Identify skills
- Demonstrate skills
- Model skills
- Provide feedback on performance of skills
- Reflect on use of skills (Bosworth, 1994)

Cooperative and collaborative learning are in line with our current understandings of how the brain learns. Since both cooperative and collaborative learning are active, they promote intellectual development because dendrite growth happens when learners are actively processing ideas and making connections. Passively received information goes into the taxon memory, where there are fewer connections; therefore, information remains more isolated and separate. (Cross, 2000, p. 10)

Another principle of brain-based learning is that learning is enhanced in a situation that is challenging but not threatening. Cooperative and collaborative learning create an environment where learners are exposed to challenging ideas and varying viewpoints that encourage them to re-evaluate their own thinking. Hearing a variety



of responses from group members helps learners to explore and discuss contradictions. When previously held understandings are challenged by others, learners are pushed to reframe their thinking and construct new knowledge. (King & Kitchener, 1994, p. 7)

Although schools have traditionally focused on the cognitive domain, the brain research indicates that emotions are an inseparable part of cognition. Students' emotions are engaged as they interact both with others and with the ideas and perspectives that others bring to specific topics. It is impossible to pretend to be dealing only with the cognitive domain in cooperative and collaborative learning.

Kenneth Bruffee (1995) offers a further reason for using cooperative and collaborative learning. He states that they foster re-acculturation. Many students, not only in open-admissions institutions but also in highly selective colleges, are acculturated only locally; they know the culture and language of their own crowd, neighborhood, family. The worlds of their experience have prepared them for "social, political, and economic relations of only the narrowest sort."

(p. 19) Yet to function in an increasingly global society, understanding of diverse communities is essential. Cooperative and collaborative learning make it possible for people to expand their understandings through working together with persons from different communities who bring to the collaborative experience different understandings and assumptions. (20)

It is my personal contention that many students complete higher education without re-acculturation, that is, they still know only their own narrow culture. They have not really wrestled with other viewpoints. To me, an essential component of an educated person is familiarity with other cultures and viewpoints and the ability to see the world through others' eyes. Cooperative and collaborative learning help this to happen.

One of the reasons that I wanted to review literature about cooperative and collaborative learning (besides my assumption that they can contribute to deep learning) was that I wanted to read about solving problems that arise. As an instructor, I occasionally have students complain to me about someone in their group. My task is then to coach them through a resolution, teaching them in the process how to resolve conflicts themselves. Below is a rubric that will be helpful to me when I encounter conflicts in groups:

Anticipate conflict:

- Control emotions before they escalate.
- Take responsibility for your own thoughts and actions.
- Anticipate using "I" statements.
- Try to understand the other person.

Define the conflict:

- Be specific: Cause? Size? Type?
- Be as objective as possible in defining it.
- Be honest.

View the conflict as a joint problem.

Consider the viewpoint of the other person: How does each of you define the conflict?

State the problem:

- State especially the specific behaviors that are problematic for you.
- Use "I" language.

Check your perceptions:

- Make sure your message has been received accurately.
- Make sure you understand the other person's views by paraphrasing.
- Listen with empathy.

Generate possible decisions:

- Be flexible in searching for solutions.
- Ask: What can we do to resolve this?

Reach a mutually acceptable decision:

Consider all possible alternatives together and decide on a course of action acceptable to all.

Implement and evaluate the decision. (Weaver, 1996, pp. 406-412)

### Assessment

I was not planning to learn about assessment. In fact, I have considered it an externally imposed irritation, and for years I have been resolute in my determination to do no more than was absolutely necessary to satisfy others. So my experience at Alverno College was a real shock. It was the most significant single day of my sabbatical.

The day of my visit, by coincidence, was a day when a group of freshmen students was being evaluated on one of Alverno's eight abilities, or learning outcomes: social interaction. The five students that I observed were to simulate a hiring committee, coming together for the first time to discuss the qualifications of applicants for the position of Director of the Environmental Commission for their city. A week earlier, students had been given information about the applicants; however, they had not been given identical information. Some information overlapped, but some students had more information on some applicants while others had more information on others. The purpose of this approach was to compel the students to discuss and share their information in order to get the whole picture. Students had also been given explicit instruction, over time, on the criteria on which they were being evaluated. They had also received a checklist that defined each of the behaviors.

On the day of the evaluation, assessors, both from the college and from the community, had participated in a training workshop for the assessment process. After receiving final instructions, the assessors went to their

assigned rooms, in which five students were seated at a round table. The assessors sat at tables along the periphery of the room. Each assessor had been assigned to observe the social interaction behaviors of one student primarily but to also observe a second student. This strategy meant that each student was being observed by two assessors. During the “meeting” of the students, assessors recorded their observations. At the end of the “meeting,” the assessors left the room, returning to the room where they had received final instructions. They met as a group, reaching consensus about the performance of the five students as they filled out a form for each of them. At the same time, the students were also filling out forms, evaluating themselves and their peers. When both assessors and students were finished, each student came to the room where the assessors were and met with her primary assessor. Throughout this process, I had been “shadowing” one of the assessors, a veteran faculty member at Alverno, and I observed as she skillfully conducted a conversation in which both student and assessor shared their perceptions of the performance. When the student and the assessor had reached consensus, the assessor used the computer to record their evaluation in the student’s permanent electronic portfolio.

As I watched this young woman speak thoughtfully and candidly about her strengths and weaknesses in this performance, I realized that she was engaged in a powerful learning experience, one that would be extremely difficult for a student to “blow off.” This was my “aha!” moment, the beginning of my realizing the importance of weaving authentic assessment into learners’ experiences. I still feel the power of that moment.

I have chosen to write this narrative for two reasons: so that I will remember the details and so that others may get a better sense of the experience than they might if I had written an exposition.

As I have subsequently read about Alverno’s ability-based learning program, I have learned that what is a new realization for me has been a part of Alverno’s understanding about learning for 30 years. Educators at Alverno work from the central conviction that “what *learners achieve*—not what *teachers provide* [italics in original] is at the center of the educational universe.” (Alverno College Faculty, 1994, p. 3) Their assumptions about learning are stated in *Student Assessment-as-Learning at Alverno College*:

Learning is a process that is

- integrative/experiential
- characterized by self awareness
- active and interactive
- developmental
- transferable

They have also thoughtfully developed a set of assumptions about assessment:

- Assessment must judge performance.
- Assessment must include self assessment as well as expected outcomes and developmental criteria that are public.
- Assessment must include feedback and elements of externality.
- Assessment must be cumulative and expansive in nature.
- Assessments must be multiple in mode and context. (Alverno College Faculty, 1994, pp. 16-24.)

This book contains clear explanations of these principles as well as the processes that Alverno has used to put these principles into practice. Their work is impressive. I now understand why so many colleges and universities have called on Alverno for assistance in developing assessment practices; the Alverno system indeed serves as an exemplary model for the nation.

The eight abilities that Alverno has identified as the desired learning outcomes for their students are carefully woven into the entire curriculum so that students, throughout their college career, have many opportunities to practice and refine their understanding of them as well as their performance of them. Each of the eight abilities has been “broken down” into four levels of competence, roughly corresponding to freshman, sophomore, junior, and senior years. In addition, levels 5 and 6 express levels of competence in each ability for majors and areas of specialization. Yet these eight abilities are not perceived by Alverno educators as the primary outcome of an Alverno education; they are seen as the means of developing educated, mature adults who take responsibility for their lifelong learning. That overriding purpose pervades all activities at Alverno.

## ORGANIZATIONAL LEARNING

W. Edwards Deming, a leader in the quality movement, once stated, “People are born with intrinsic motivation, self-esteem, dignity, curiosity to learn, joy in learning.” (in Senge, 1990b) However, beginning with toddlers, societal pressures work to destroy these qualities. “Unfortunately, the primary institutions of our society are oriented predominantly toward controlling rather than learning, rewarding individuals for performing for others rather than for cultivating their natural curiosity and impulse to learn.” (in Senge, 1990b)

Schools are one of those primary institutions. Therefore, it is not enough to understand how people learn; schools, along with other institutions, must change in order to create a rich environment for deep learning.

Our schools are products of the industrial age. In the nineteenth century, as factories were being developed to produce a variety of machines, educators borrowed the factory model for schools. As a result, schools were “fashioned in the image of the assembly line, the icon of the booming industrial age.” (Senge, 2000, p. 30) Like assembly lines, schools were organized in stages, or grades (1,2,3, etc.) Each grade had a local supervisor, or teacher. “The whole school was designed to run at uniform speed, complete with bells and rigid daily time schedules.” (Senge, 2000, p. 30) Schools were governed in an authoritarian, top-down manner and designed to produce a standardized product.

In *Schools That Learn* (2000), Peter Senge delineates the assumptions about learning and about schools that underlie the industrial model:

### Assumptions about Learning

1. Children are deficient and schools fix them.
2. Learning takes place in the head, not in the body as a whole.
3. Everyone learns, or should learn, in the same way.
4. Learning takes place in the classroom, not in the world.
5. There are smart kids and dumb kids.

### Assumptions about the school

1. Schools are run by specialists who maintain control.
  2. Knowledge is inherently fragmented.
  3. Schools communicate ‘the truth.’
  4. Learning is primarily individualistic and competition accelerates learning.
- (pp. 35-48)

Clearly these assumptions fly in the face of the research of recent decades that sheds light on how people learn. Children (and adults), rather than being “deficient” or empty vessels into which to pour information, actively

construct knowledge, in or out of school. Learning, rather than being solely cognitive, is also social and emotional. Since each brain is unique, people learn in a variety of ways. All human beings have gifts that transcend “smart” and “dumb” labels. Fragmenting knowledge into “subjects” removes it from its real-world contexts and therefore deprives it of much of its meaning. (Fritjof Capra has stated that meaning doesn’t reside in the information; it resides in “the context from which it has been extracted.”) (in Senge et al., 2000, p. 21) The competition that is created by the notion that learning is individualistic leads to high-stress environments, which interfere with learning.

Yet schools, for the most part, still operate under the assumptions of the industrial model, as do the majority of organizations. These assumptions and the behaviors that they generate have become habitual, so habitual, in fact, that we are often unaware that other options exist. Yet evidence is all around us that the industrial model is no longer working, and a new worldview is emerging. Dee Hock (1994) states it eloquently:

“...we are at that very point in time when a four-hundred year old age is dying and another struggling to be born; a shifting of culture, science, society and institutions enormously greater than the world has ever experienced. Ahead, the possibility of regeneration of individuality, liberty, community and ethics such as the world has never known, and a harmony with nature, with one another and with the divine intelligence such as the world has never dreamed.”

In order for this fundamental change to take place, we need to change our core beliefs from those of the industrial age to those emerging from the science of the last 100 years, beliefs that reflect the interconnectedness among all things. One of the shifts that is called for is away from assuming that organizational structure must be top-down, hierarchical, and static and toward the notion indicated by the new science that structures are more fluid. Through this fluidity, structures can change and adapt as they self-organize. Self-organization is one of the foundational principles of the new science. (Caine & Caine, 1997, p. 58)

The systems thinking perspective that has developed over the last 20 years or so expresses the new science in ways that can help organizations transform themselves so that they are in alignment with what we now know about the ways the world works, including the way the human brain learns. Organizations that have used systems thinking to fundamentally re-invent themselves become dynamic rather than static. They re-structure themselves not to reinforce the status quo but to facilitate change; hence they are called learning organizations. “A learning organization is a place where people are continually discovering how they create their reality. And how they can change it.” (Senge, 1990, pp. 12-13) A learning organization is skilled at creating acquiring, and transferring knowledge as well as modifying its behavior.

Daniel Kim (1999), in *Introduction to Systems Thinking*, offers a clear explanation of the basics of systems thinking. He states, “In the most basic sense a system is any group of interacting, interrelated, or independent parts that form a complex and unified whole that has a specific purpose.” (p. 2) There are three levels, or perspectives, of a system: events, patterns, and systemic structures. Events are the everyday occurrences that we usually focus on and react to. Patterns are “accumulated memories of events” in which recurring trends can be seen. Systemic structures are the ways in which the parts of a system are organized. These structures actually generate the patterns and events; in other words, all flows from the structures even though they are often unseen. Therefore, focusing on the structures, rather than the events or patterns, offers more possibility for change. (p. 2)

Because systems are complex, thinking in terms of linear cause-and-effect, which “sees the world as a series of events that trigger other events” is inadequate. (Kim, 1999, p. 6) Instead, systems thinking uses a feedback loop perspective, which “sees the world as an interconnected set of circular relationships, where something affects something else and is in turn affected by it: A causes B causes C causes A, etc.” (Kim, 1999, p. 5) Problems can be better understood when the relationships among all events are considered, rather than seeing events as a causal chain or a stimulus-response situation. Mapping all the possible consequences of given actions in causal loop diagrams can help anticipate problems before they arise and allow persons to become designers and re-designers of systems rather than just operators within the system. (Kim, 1999, p. 16)

Peter Senge, in *The Fifth Discipline* (1990a), describes five disciplines, or practices, based in systems thinking that provide the tools for developing a learning organization. Following is a summary of these:

### **1. Personal Mastery**

Personal mastery is the practice of continually clarifying and deepening our individual vision for the future. In this process we become aware of the gap between our vision and the current reality. The tension created by this gap motivates us to move closer to the vision. (Senge, 1990a, pp. 139-143) Wheatley & Kellner-Rogers (1996) express the potential of the energy that emerges:

Each of us embodies energies of life. We are creating, systems-seeking self-organizing meaning-seeking beings. We are identities in motion, searching for the relationships that will evoke more from us. We bring these desires to our organizations, seeking from them places where we can explore possibilities. Our energy courses through our organizations. This energy is the best hope we have for creating organizations that feel alive. (p. 92.)

### **2. Mental Models**

Mental models are our deeply held assumptions about how the world works. Often they are so taken for granted that we are not even aware of their existence. However, even though we may not be aware of them, they shape how we act. Therefore, it is important to surface these assumptions, our internal pictures of the world, so that we can examine them and allow others to see them also. Reflecting on mental models can help us to see where entrenched mental models may be preventing change (Senge, 1990a, pp. 174-76 )

### **3. Shared Vision**

Shared vision is the practice of bringing together our individual visions of the future and working from them to develop a common vision that we want to commit to and build together. The skills involved in building a shared vision are

- Encouraging personal vision
- Communicating and asking for support
- Visioning in an ongoing manner
- Blending extrinsic and intrinsic visions
- Distinguishing positive from negative visions (Senge, 1990a, pp. 205-225 )

### **4. Team Learning**

Team learning is the capacity to think and learn together. It is important because groups can develop an ability greater than the sum of individual members' talents that can move them effectively toward their shared vision. Understanding the distinction between discussion and dialogue and how they can work together is helpful in fostering team learning. The purpose of discussion is usually to have one's views accepted, whereas the purpose of dialogue, which is a free flowing of ideas, is to "go beyond any one individual's understanding" (Senge, 1990a, pp. 236-41 )

### **5. Systems Thinking**

Systems thinking, the fifth discipline, blends the other four disciplines into a coherent whole. It is "the cornerstone that underlies all of the five learning disciplines." (Senge, 1990a, p. 69 ). It helps us understand the forces and interrelationships that shape the behavior of systems so that we can understand complex issues. The laws of the fifth discipline are

1. Today's problems come from yesterday's 'solutions.'
2. The harder you push, the harder the system pushes back.
3. Behavior grows better before it grows worse.
4. The easy way out usually leads back in.
5. The cure can be worse than the disease.
6. Faster is slower.
7. Cause and effect are not closely related in time and space.



8. Small changes can produce big results—but the areas of highest leverage are often the least obvious.
9. You can have your cake and eat it too—but not at once.
10. Dividing an elephant in half does not produce two small elephants.
11. There is no blame. (Senge, 1990a, pp. 57-67)

Terry O’Banion, in *Launching a Learning-Centered College* (1999), applies the concepts of systems thinking to the process of transforming colleges into learning organizations. (One would think they would naturally *be* learning organizations, but higher education has developed along the same industrial model as other organizations.) He states that the purpose of the learning revolution in higher education is to “place learning first in every policy, program, and practice in higher education by overhauling the traditional architecture of education.” (p. 2) When learning is first, all policies and decisions are made in the light of two questions: “Does this action improve and expand learning?” and “How do we know this action improves and expands learning?” (p. 2) This revolution is different from earlier reform movements because it pervades every aspect of higher education; it calls for a redesign of the entire system.

O’Banion states that the learning college is based on six principles:

**Principle I: “The Learning College creates substantive change in individual learners.”** (p. 2)

This principle requires colleges to define learning beyond typical institutional data such as graduation rates, O’Banion defines learning as that which “kindles new ways of seeing, thinking, and doing that lead to changed behavior.” In other words, learning changes people—a very different notion from taking in information! In the Learning College, these changes also take place in faculty, staff, and administrators as they “make learning a central topic of institutional conversation.” (p. 6)

**Principle II: “The Learning College engages learners in the learning process as full partners who must assume primary responsibility for their own choices.”** (p. 6)

Since this is a very different assumption than students bring to the college experience, the college must orient learners to these new expectations and experiences. Learners’ abilities, values, needs, goals are assessed, and a contract is negotiated with the held of an expert assessor. Some learners may need training in using technology, in locating resources, etc. The college provides a variety of options for learners to meet their needs. (pp. 6-7)

**Principle III: “The Learning College creates and offers as many options for learning as possible.”** (p. 7)

These options are in terms of time, place, structure, staff support, and methods of instruction. The purpose of providing as many options as possible is to enable all learners to be successful, recognizing the diversity among learners. In order to avoid starting from scratch in expanding options, colleges can access learning materials and

other resources developed at other institutions and organizations. Advanced technology is necessary to manage the complexities of offering a variety of options. (p. 7)

**Principle IV: “The Learning College assists learners to form and participate in collaborative learning activities.”** (p. 7)

Since learning is a social construct, developing communities of learners facilitates learning, not only for students, but for faculty, administrators, and staff as well. These shared learning experiences provide opportunities to make learning more “real world.” The most widespread form of collaborative learning in community colleges—and a very powerful one—is learning communities. (pp. 7-9)

**Principle V: “The Learning College defines the roles of learning facilitators in response to the needs of the learners.”** (p. 9)

All employees are considered to be facilitators of learning. Everyone sees his or her work through the lens of how it supports learning. Students may also be learning facilitators as they choose such options as being tutors, mentors, lab assistants. The goal of this principle is to utilize the resources of the college most effectively to meet students’ needs. This concept can help colleges move beyond the mental model of one full-time faculty member teaching four or five courses and free all employees to contribute their expertise as appropriate and needed. (p. 9)

**Principle VI: “The Learning College and its learning facilitators succeed only when improved and expanded learning can be documented for learners.”** (p. 10)

“What does the learner know?” and “What can the learner do?” are the questions that provide the framework for assessing learner outcomes. If the primary indicator of learning is changed behavior, as O’Banion asserts, assessment becomes a much more complex process than administering objective exams! Portfolio assessment is a widely used and effective means of documenting learning. It is “a systematic, organized collection of evidence of what the learner knows and what the learner can do. It builds on prior information, is constantly revised and updated, and provides continuity for future learning activities.” (p. 10) Guiding portfolio assessment should be one of the major functions of learning facilitators.

In addition to these six principles of a Learning College, O’Banion also explicates the key steps in developing a learning college, and other authors have written at length about making the shift to a learning-centered institution. The guidelines are in place; institutions only need to put them into practice. (However, doing so is no small task!) As I read O’Banion’s monograph, I was pleased to see that Paradise Valley Community College is on track and has made real progress in becoming a Learning College.

One of my important learnings as I have visited colleges and delved into the literature, is the importance of effective leadership in creating change. During my sabbatical, my first contact with the importance of leadership came when I visited Palomar College in the fall. Five years ago Palomar was a leader in the learning movement. It had initiated a national conference on the Learning Paradigm, and its president, George Boggs, together with Robert Barr and John Tagg, were deeply involved in the transformation of Palomar. However, when I visited, both George Boggs and Robert Barr had left Palomar, and it was on hold, waiting to see what a new president would do with the learning paradigm. In the schedule of classes there was little indication that Palomar was a Learning College. The associate dean with whom I spoke said that employees now spoke the “language of learning” but hadn’t really implemented it. I was shocked that so little seemed to be sustained after the departure of two leaders.

Traditionally we think of leaders as people who “set direction, make the key decisions, and energize the troops,” a perspective that is “rooted in an individualistic and nonsystemic worldview.” (Senge, 1990b) However, in a learning organization the role of the leader is dramatically different. Leaders must “build a shared vision, challenge dominant mental models, and foster systemic ways of thinking”; in other words, “leaders are responsible for learning. ... Building an organization’s culture and shaping its evolution is the unique and essential function of leadership.” (Senge, 1990b) Perhaps George Boggs and Robert Barr left Palomar before the evolution of the Learning College had progressed enough to be sustainable.

Since every organization “is a product of how its members think and interact” (Senge, 2000, p. 19), the leader who wishes to promote change must encourage people to examine mental models, especially about “power, privilege, and knowledge that keep existing structures, regulations, and authority relationships in place” (Senge, 2000, p. 20)

Helen and Sandy Astin, leaders in higher education for many years, reflect the same assumptions about leadership as Peter Senge. Like Senge, they perceive that the primary role of a leader is to foster change. They also understand the concept of mental models when they state that there are values underlying every decision; the question is, *which values* should govern decisions? Additionally, they see leadership, not in the traditional hierarchical sense, but as broad-based, spreading throughout the institution. “Every member of the academic community is a potential leader.” (Astin & Astin, 2001, p. 4) Therefore, it is the role of persons in positions of traditional leadership to engender that potential. They see “the purposes of leadership as encompassing the following values:

- To create a supportive environment where people can grow, thrive, and live in peace with one another;
- To promote harmony with nature and thereby provide sustainability for future generations; and
- To create communities of reciprocal care and shared responsibility where every person matters and each person's welfare and dignity is respected and supported." (Astin & Astin, 2001, p. 4)

When I read this statement, I sensed a return to where I had begun this project, with the readings of Thomas Berry and Matthew Fox, who believe, as I do, that the purpose of education is to promote, justice, peace, compassion, and sustainability. I was pleased to see that two highly-respected leaders in higher education concurred.

## CHANGE

Flowing throughout this paper is the overriding purpose of change. The gap between what we know about how people and organizations learn and the ways that organizations, especially schools, generally operate calls for fundamental change in order to create deep learning for all.

### Obstacles to Change

However, real change is extremely difficult and painful, an “uncertain leap into an unknown future.” (Guskin, 1996) For individuals, “it challenges traditional and personal beliefs and asks us to revisit and reinterpret our own experiences and our own sense of self.” (Caine & Caine, 1997, pp.23-4) A new worldview requires a fundamental shift in perspective—the Game is new; and we can’t bring the points from the old Game. Those who have been successful in the old Game are likely to resist changing to a new system, for they have advanced in that system and know how to do it well. (Barr, 1998) They may feel that their role is threatened as well as their self-esteem, as they must examine the shortcomings of what they have invested in. (Guskin, 1996) There may be intellectual barriers as well, since at least initially the concepts of the new worldview will be filtered through the assumptions of the old, leading to distortions in understanding. (Barr, 1998)

Change is difficult for organizations as well as the individuals within them. Part of the difficulty rests within the nature of organizations. Robert Barr states, “...institutions governed by an existing paradigm are designed to express it, reinforce it, and keep alternative governance principles out.” (1998, p. 20) Colleges and universities represent a “low-risk, low-feedback process culture.” (Barr, 1998, p. 20) There is little market risk, especially in public colleges, which are unlikely to close their doors. In addition, feedback on student learning is not a high priority. As a result, there is little pressure on colleges to change. “...[C]olleges are essentially without a systemic capacity to learn and change.” (Barr, 1998, p. 23) Funding formulas are based on numbers of students enrolled, not on student learning. The Carnegie credit system, “the currency of student learning,” doesn’t necessarily measure learning. (Barr, 1998, p. 23)

Changes in education are also made difficult because of factors beyond the doors of the institution. “...[P]arents, reporters, citizens, children, politicians, and professional educators share an unshakable image of what teachers and students are supposed to do. A common machinery of schooling prevails from kindergarten through corporate training programs.... Its assumptions are that teaching is telling, learning is absorbing, and knowledge is

subject-matter content.” (Spence, 2001, p. 12) Further, the industrial paradigm that has shaped educational institutions sees reality as machine-like and seeking stability rather than flexibility. (Caine & Caine, 1997, p. 33)

Yet the new paradigm dislodges that notion. Meg Wheatley states, “Equilibrium is the stage closest to death for a living system, but we haven’t known that. We have thought that when we are at equilibrium, everything’s fine, and that it is change that causes our disintegration.” (1995, p. 3) In her keynote address at the Systems Thinking in Action Conference in October, 2000, she developed this idea further:

Consider disturbance an ally in exploring the unknown. Certainty is a curse—the increasing complexity of our times makes certainty precarious. We must be willing to let go of our cherished beliefs. The very complexity of life ensures that no one person can explain what is going on to everyone else, or assume that their point of view is the right one.... The need to relinquish our certainty lies at the heart both of modern science and ancient spirituality.” In science, uncertainty begets creativity and discovery. Every spiritual tradition leads us to the Great Mystery, the Unknowable. Remaining in certainty blocks us from experiencing the Divine. (Wheatley, 2000)

Even though Wheatley describes uncertainty as essential for creativity and for exploring the very heart of life, uncertainty is also scary. The complexities are confusing. As implied above, leaders who initiate systemic change, asking others to switch to a new way of seeing the world, are not going to be popular. Sensitive leaders, being aware of this, need to bestow on their colleagues “empathy, congruence, and positive regard” (Caine & Caine, 1997, p. 94) to help quell the fears so that in time they may “enter into the complexity together.” (Wheatley, 2000)

### Implementing Change

Several educational leaders (Astin & Astin, 2001; Barr, 1998; Caine & Caine, 1997; Guskin, 1996; McClenney, 1998) have developed lists of strategies and principles for “enter[ing] into the complexity together.” Because there is significant overlap in these lists, I have synthesized them:

1. The first requirement is the will to do it—and perseverance and courage in carrying it out, knowing that it will be “perilous work” (McClenney, 1998) and will create conflict.
2. Be aware that change must be directed internally, not by external forces such as state legislatures. With internally-directed change, institutions maintain their autonomy and dignity. Internally-directed change must also not be imposed on faculty by administrators or trustees. Work collegially.
3. Be aware that bringing about change requires work in four areas:
  - a. Rational: Operate on the assumption that, given reasons and evidence, people will see the rationale for change.
  - b. Social interactional: Understand that change occurs through a process of social interaction and persuasion.
  - c. Psychological: Deal honestly with people’s fears about change.
  - d. Political: Build coalitions and use governance structures. (Guskin, 1996)

4. “Recognize or introduce disequilibrium” (Caine & Caine, 1997, p. 247) so that people come to recognize the need for change.
5. Seek out faculty, staff, and administrators who are supportive of change and work together to develop a shared vision for the future, understanding that change must be systemic.
6. Examine basic assumptions, or mental models, about how people learn and how organizations work.
7. Pay attention to resisters; they may have some good ideas.
8. Build trust and relationships everywhere possible, including in the community.
9. In developing a learning college:
  - a. “[T]ake responsibility for student learning at both the individual and organizational levels.” (Barr, 1998, p. 24) Doing so doesn’t diminish students’ responsibilities. It’s a “both/and.”
  - b. Acknowledge that the mission is to increase student learning, not to offer courses. Then the criterion for success becomes learning outcomes for students.
  - c. Develop the means to assess student learning at the institutional, program, and individual student levels.
  - d. Develop a “systematic institutional capacity to gather, evaluate, experiment with, conduct, and use research related to learning.” (Barr, 1998, p. 25)
10. Focus on changing organizational structures rather than trying to change people.
11. Recognize that systemic change takes a long time. “These revolutionary changes require evolutionary processes.” (Guskin, 1996, p. 34) Over time the original ideas will undergo changes as they develop. They will become something different from what they were at the beginning.

And the final piece of advice, again from Meg Wheatley, who quotes Thomas Aquinas: “We change one another with delight and pleasure.” Meg adds, “If you change people with delight and pleasure, you encourage their creativity.” (Wheatley, 1997) Perhaps this is the most important tool for change.

## EMPLOYEE DEVELOPMENT ACTIVITIES

Upon my return to PVCC, I have committed to present workshops and activities to employees to help deepen organizational learning. Following are some ideas that I may use if they are appropriate for the context:

### An Activity to Deepen Employees' Understanding about Brain Research:

Explain each of the brain/learning principles from Caine & Caine, 1997, pp. 104-108.

After explaining each one, ask employees to discuss in groups the applications and implications. Have one person from each group share one idea with the whole group.

After this introductory session, ask whether some participants would like to form a group to explore each of the brain/learning principles in more depth.

### An Activity to Introduce the Concept of Downshifting:

Simulate downshifting with employees:

Give a competitive quiz. (Employees may respond like children.)

Then stop the process and together review the responses. Reflect on what happened and on experiencing downshifting.

### An Activity to Explore Mental Models

(Adapted from Caine, Caine, & Crowell, 1994, pp. 14-16)

Use some or all of the following questions:

1. What does learning mean to you?
2. What is teaching?
3. Where does learning take place?
4. What is the core curriculum?

Ask participants to reflect on these questions and make some notes.

Then, one question at a time, share some of your thoughts with those in your group.

Ask one person from each group to record responses on newsprint or the board.

For each question, listen for similarities and differences in responses among your group.

Discuss these responses in terms of the mental models, or underlying assumptions, that they express.

Report to the larger group.



An Activity to Explore the Concept That Every Living System Strives to Grow and Define Itself

(Adapted from Caine, Caine, & Crowell, 1994, pp. 66-68)

Think about the times in your life when you have had an urge to do more with your life, to try something new, to become more proficient, to raise your standards. Jot some notes as you reflect.

Choose one of these times to share with your group.

Then consider the common denominators that may have been present for you during these times as you respond to the following questions:

1. From where did this urge come?
2. How did you deal with it?
3. Did it seem natural?
4. Can you remember feeling it as a young child?
5. Do you still feel it now?

After you have answered these questions, reflect on what insights you gained as you participated in this process. How do these insights relate to your work as a facilitator of learning? Share some of these thoughts with your group.

An Activity to Explore the Concept That Every Brain Simultaneously Perceives and Creates Parts and Wholes

(Adapted from Caine, Caine, & Crowell, 1994, pp. 137-139)

Ask participants to answer the following questions in writing:

1. In your work, how do you and can you incorporate the following?
  - Stories
  - Projects
  - Simulations
  - The Arts
  - Integration of the Curriculum
  - Thematic Instruction
  - Ecological Thinking
2. How much time and what sort of organization does it take to incorporate these elements effectively?
3. Is there ever a difference between your view of the parts and a whole and the students' views of parts and a whole? What does that difference mean for your practice?
4. Do you regard the various processes listed in the first question as separate or connected? Explain.

Workshop on Forming Coalitions for Powerful Learning

*This is a 1 1/2 hour long workshop developed at the Washington Center for Improving the Quality of Undergraduate Education at The Evergreen State College, Olympia, WA.*

***Make a copy of the following directions for each participant.***

Arrange yourselves in groups of four or five and then read through these directions.

Someone needs to volunteer to be the timekeeper, and someone needs to be the reporter.

Work your way through the four exercises below, and then reconvene for a discussion of what you discovered.

**1. Sit for a few minutes and think about powerful experiences of learning in your own life. Pick one to focus on and jot some notes:**

*What made the experience powerful for you?*

*What were the actual conditions of this experience? (Where were you, what materials were available, how much time, etc.)*

*Who else was involved, and what roles did they play?*

*What did you learn?*

After you write, share your experiences within your group and listen for any common characteristics. (thinking/writing 5 minutes; sharing 10 minutes)

**2. Next, consider these points:**

*Where and when and under what circumstances in your institution do students have experiences of learning like the ones you just discussed?*

*Who is involved in creating and supporting these experiences?*

*What are students learning?*

Again, jot notes and then as you share them, listen for common characteristics. (thinking/writing 5 minutes; sharing 10 minutes)

**3. In an ideal world, what kind of experiences of learning would you like students at PVCC to have, and why?**

*Be as imaginative as you can be; describe what you would like students to have the opportunity to learn, how they might learn it, and with whom.*

*Then shift your focus just a bit and also write about why you have chosen this experience.*

*Listen for any commonalities as you share your ideas and your rationales with each other. (thinking/writing 10 minutes; sharing 10 minutes)*

**4. To practice putting theory into practice, choose one learning experience to focus on for this last task.**

It might be analogous to what you described in #1; it might be your example from #2; it might be what you dreamed up for #3. The only criterion for choosing the experience should be that you believe it could result in deep and powerful learning for students.

*Then imagine that colleagues on your campus are interested in seeing that more students have this experience. No one is saying no to you. Whose help do you need to make this happen, and whose wisdom could you draw upon to make it powerful? Notice who you immediately turn to, and then imagine that part of your goal is to form alliances with colleagues you don't ordinarily work with. With that in mind, who else could become part of your circle?*

*Make notes for yourself, and then as you share your thoughts with each other, ask yourselves what keeps you from forming these "coalitions." (thinking/writing 10 minutes; sharing 10 minutes)*

When you have worked through these four steps, reconvene as a large group and focus on this last question.

*Even if the chosen methods differ, who at PVCC shares the value of supporting powerful learning for students?  
How might you build alliances that cross differences in practice and get at the heart of what you share in common?*

## CONCLUSION

I realize that in doing this sabbatical project, I have created my “marching orders.” I began this project by reading Matthew Fox’s *The Reinvention of Work*. I have re-invented my work; I have come full-circle. Succinctly stated, as I return to teaching, my work is to:

Weigh each day’s teaching against what I now know about how the brain learns.

Continually seek out connections: among ideas, among tasks and programs, with the larger community.

Relate effectively with students and colleagues, seeking to understand their perspective as well as to communicate my own.

Help to create an environment where the principles of learning are expressed in all the functions of the institution.

Provide opportunities—for students and faculty—for reflective practice.

Teach skills in context of disciplines. Alverno has learned that it is impossible to teach for abilities without a subject-matter context. In addition, the literature on developmental education says that teaching skills in isolation of content is ineffective. Do this through:

Learning Communities

Integrating reading into all disciplines rather than teaching separate classes

Work to improve coherence in students’ learning experiences. Consider sequentiality in Learning Community and Service Learning experiences.

Create faculty development opportunities about Classroom Assessment Techniques.

Using CAT can be part of creating a “culture of evidence,” according to Pat Hutchings of the Carnegie Institute for the Advancement of Teaching.

Improve my use of cooperative and collaborative learning, as well as conflict resolution, in the classroom.

Continue to develop Learning Communities.

In all things, work to contribute to the growth of justice and compassion in the world.

How shall I do all of this? To paraphrase Mohandas Gandhi, “[I] must *be* the change [I] wish to see in the world.”

## REFERENCES

### Foundational Works

Berry, Thomas. (1999). *The great work*. New York: Bell Tower.

Capra, Fritjof. (1996). *The web of life*. New York: Doubleday.

Fox, Matthew. (1995). *The reinvention of work*. San Francisco: Harper.

Goerner, S.J. (1995). Chaos and deep ecology. In F.D. Abraham and A.R. Gilgen (Eds.), *Chaos theory in psychology*. Westport, Conn.: Praeger.

Palmer, Parker. (1998). *The courage to teach: Exploring the inner landscape of a teacher's life*. San Francisco: Jossey-Bass.

Whitehead, Alfred North. (1929). *The aims of education*. New York: Macmillan.

### **Brain Research**

Bear, M.F., Connors, B.W., & Paradiso, M.A. (1996). *Neuroscience: Exploring the brain*. Baltimore: Williams & Wilkins.

Begley, S. (1996, February 19). Your child's brain: How kids are wired for music, math, and emotions. *Newsweek*, 57-60.

Bransford, J.D., Brown, A.L., & Cocking, R.R., Eds. (1999). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press.

Caine, G., Caine, R.N., & Crowell, S. (1994). *Mindshifts: A brain-based process for restructuring schools and renewing education*. Tucson, AZ: Zephyr Press.

Caine, R. N. & Caine, G. (1994). *Making connections: Teaching and the human brain*. Reading, PA: Addison-Wesley.

Caine, R.N. & Caine, G. (1997). *Education on the edge of possibility*. Alexandria, VA: Association for Supervision and Curriculum Development.

Damasio, A.R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Avon Books.

Diamond, M. (1988). *Enriching heredity*. New York: Macmillan.

Diamond, M. & Hopson, J. (1998). *Magic trees of the mind*. New York: Dutton.

Fischbach, G.D. (1992). Mind and brain. *Scientific American*, 27 (3), 48-57.

Gardner, Howard. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.

Jensen, E. (1998). *Teaching with the brain in mind*. Alexandria, VA: Association for Supervision and Curriculum Development.

Kagan, S. (2001, Jan. 24). Kagan structures are brain-based. *Kagan Online Magazine*.  
<http://www.kaganonline.com/Newsletter/00101/SpencerNote.html>

Kotulak, R. (1996). *Inside the brain: Revolutionary discoveries of how the mind works*. Kansas City, MO: Andrews and McMeel.

Leamson, R. (2000, Nov.-Dec.). Learning as biological brain change. *Change*, 32 (6), 34-40.

Maclean, P. (1990). *The triune brain in evolution*. New York: Plenum Press.

Marchese, T. (1998). The new conversations about learning. American Association of Higher Education.  
[http://www.aahe.org/members\\_only/TM-essay.htm](http://www.aahe.org/members_only/TM-essay.htm)

Nussbaum, P.D. (2001, Nov.-Dec.). Ingredients of the learning vaccine. *Aging Today*, XXII (6), 17.

Ramachandran, V.S. & Blakeslee, S. (1999). *Phantoms in the brain: Probing the mysteries of the human mind*. San Francisco: Harper.

- Sacks, O.W. (1998). *The man who mistook his wife for a hat*. New York: Simon & Schuster.
- Schatz, C.J. (1992). The developing brain. *Scientific American*, 27 (3), 60-67.
- Smilkstein, R.P. (1993, Winter,). The natural human learning process. *Journal of Developmental Education*, 17 (2), 2-4, 6
- Sylwester, R. (1995). *A celebration of neurons: An educator's guide to the human brain*. Alexandria, VA: Association for Supervision and Curriculum Development.

### **Learning in Higher Education**

- Abel, S.K., Cennamo, K.S., & Chung, M. (1996). A "layers of negotiation" model for designing constructivist learning material. *Educational Technology*, 36 (4), 39-48.
- Armstrong, T. (1994). *Multiple intelligences in the classroom*. Richmond, VA: Association for Supervision and Curriculum Development.
- Cross, K.P. (1999). *Learning is about making connections: Cross paper #3*. Mission Viejo, CA: League for Innovation in the Community College.
- Entwhistle, N. (1996). Motivational factors in students' approach to learning. In R. Schmeck (Ed.), *Learning strategies and learning styles*. New York: Plenum Press.
- Ewell, P.T. (1997). Organizing for learning. *AAHE Bulletin*, 50 (4), 3-6.
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. New York: Bantam Books.
- Handy, C. (1998, Sept.-Oct.). A proper education. *Change*, (30) 5.
- Healy, Je. (1990). *Endangered minds: Why our children don't think*. New York: Simon & Schuster.
- Hundert, E.M. (1995). *Lessons from an optical illusion*. Cambridge: Harvard University Press.
- Jenrette, M. & Napoli, V. (1994). The Miami-Dade teaching/learning project. In T. O'Banion (Ed.), *Teaching and learning in the community college*. Washington DC: American Association of Community Colleges.
- Joint Task Force on Student Learning. (1998). Powerful partnerships: A shared responsibility for learning. A joint report of the American Association for Higher Education, the American College Personnel Association, and the National Association of Student Personnel Administrators.  
<http://www.aahe.org/assessment/joint.htm>
- King, P.M. & Kitchener, K.S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.
- Langer, E. (1997). *The power of mindful learning*. New York: Addison-Wesley.
- Miller, J., Groccia, J.E., & Wilkes, J.M. (1996). Providing structure: The critical element. In T.E. Sutherland & C.C. Bonwell (Eds.), *Using active learning in college classes: A range of options for faculty*. New directions for teaching and learning, 67, San Francisco: Jossey-Bass.
- Oxford Centre for Staff Development. (1992). *Improving student learning*. Oxford, England: Oxford Brookes University. Reprinted in Deep learning, surface learning. *AAHE Bulletin*, 46, April 1993, 10-11.

- Pascarella, E.T. (2001, Dec.) Cognitive growth in college. *Change*, (33), 6, 21-27.
- Perry, W.G., Jr. (1981). Cognitive and ethical growth: The making of meaning. In A. Chickering & Associates, *The modern American college*. San Francisco: Jossey-Bass, 76-116.
- Shulman, L. (1986). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57, 11-22.
- Spence, L.D. (2001, Dec.) The case against teaching. *Change*, 33 (6), 10-19.
- Vaill, P.B. (1996). Learning as a way of being: Strategies for survival in a world of permanent white water. San Francisco: Jossey-Bass.

### **Practices That Promote Deep Learning**

#### Learning Communities

- Armes, N. & McClenney, K. (1990). Building communities: A checklist for evaluation and discussion. *Leadership Abstracts*, 3 (3), 1-2.
- Bean, J.C. (1996). *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom*. San Francisco: Jossey-Bass.
- Borden, V. and Rooney, P. (1998). Evaluating and assessing learning communities. *Metropolitan Universities* 9 (1).
- Commission on the Future of Community Colleges. (1998). *Building communities: A vision for a new century*. Washington, DC: American Association of Community Colleges.
- Heller, R. (1998, Fall). Learning communities: What does the research show? *AAC&U Peer Review*, 1 (1), 11.
- Levine, J. H. (Ed.). (1999). *Learning communities: New structures, new partnerships for learning*. Columbia, SC: University of South Carolina, National Resource Center for the First-Year Experience and Students in Transition.
- Lindblad, J. (2000, spring). Learning community assessment studies: What the Washington Center resources show. *Washington Center News*, 26.
- MacGregor, J., Tinto, V., & Lindblad, J.H. (2002). Assessment of innovative efforts: Lessons from the learning community movement. Unpublished paper presented at the Southwest Regional Learning Communities Conference, Tempe, AZ, Feb. 28-March 1, 2002.
- Perry, W.G., Jr. (1981). Cognitive and ethical growth: The making of meaning. In A. Chickering & Associates, *The modern American college*. San Francisco: Jossey-Bass, 76-116.
- Smith, Barbara L. (Fall, 2001). The challenge of learning communities as a growing national movement. *Peer Review* (3), 4.
- Strommer, D.W. (1999). Teaching and learning in a learning community. In J.H. Levine, (Ed.), *Learning communities: New structures, new partnerships for learning*. Columbia, SC: University of South Carolina, National Resource Center for the First-Year Experience and Students in Transition.
- Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, 68 (6), 599-623.

- Tinto, V. (2002). Learning better together: The impact of learning communities on student success. Unpublished paper presented at the Southwest Regional Learning Communities Conference, Tempe, AZ, Feb. 28-March 1, 2002.
- Tinto, V., Love, A.G., & Russo, P. (1994). Building learning communities for new college students.: A summary of research findings of the Collaborative Learning Project. Syracuse University, National Center on Postsecondary Teaching, Learning and Assessment. Unpublished document.
- Wenger, E. (1999). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Collaborative Learning
- Bolton, R. (1979). *People skills: How to assert yourself, listen to others, and resolve conflicts*. Englewood Cliffs, NJ: Prentice-Hall, 203-257.
- Bosworth, K. (1994). Developing collaborative skills in college students. In K. Bosworth & S.J. Hamilton (Eds.), *Collaborative learning: Underlying processes and effective techniques. New directions in teaching and learning*, 59, San Francisco: Jossey-Bass.
- Brookfield, S.D. & Preskill, S. (1999). *Discussion as a way of teaching: Tools and techniques for democratic classrooms*. San Francisco: Jossey-Bass.
- Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18 (1), 32-42.
- Bruffee, K.A. (1995). *Collaborative learning: Higher education, interdependence, and the authority of knowledge*. Baltimore: The Johns Hopkins University Press.
- Cooper, J. (Ed.). (1993) First national conference on cooperative learning in higher education attracts 250 attendees. *Cooperative learning and college teaching* 3 (2), 1-15.
- Cross, K.P. (2000). *Collaborative Learning 101: Cross Paper # 4*. Mission Viejo, CA: League for Innovation in the Community College.
- Cuseo, J.B. (1992). Cooperative learning: A pedagogy for diversity. *Cooperative Learning & College Teaching*, 3(1), 2-6. Finkel, D.L. (2000). *Teaching with your mouth shut*. Portsmouth: Heinemann Boynton Cook Publishers.
- Finkel, D.L. (2000). *Teaching with your mouth shut*. Portsmouth: Heinemann Boynton Cook Publishers.
- Gamson, Z.F. (1994). Collaborative learning comes of age. *Change*, 26 (5), 44-60.
- Johnson, D.W., Johnson, R.T., & Smith, K.A. (1998). *Active learning: Cooperation in the college classroom*. Edina, MN: Interaction Book Company.
- Johnson, D.W., Johnson, R.T., & Smith, K.A. (1998, July-August). Cooperative learning returns to college. *Change*, 30 (4). 26-35.
- Johnson, D.W., Johnson, R.T., & Smith, K.A. (2000, Jan.-Feb.). Constructive controversy: The educative power of intellectual conflict. *Change*, 32 (6), 29-37.
- Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
- Kourilsky, M. & Wittrock, M.C. (1992). Generative teaching: An enhancement strategy for learning of economics in cooperative groups. *American Educational Research Journal*, 29, 861-876.



Matthews, R.S., Cooper, J.L., Davidson, N., & Hawkes, P. (1995). Building bridges between cooperative and collaborative learning." *Change*, 27, 34-40.

Millis, B.J. & Cottell, P.G. (1998). *Cooperative learning for higher education faculty*. Phoenix: Oryx Press.

Slavin, R.E. (1990). *Cooperative learning for all*. Exton, PA: Swets & Zeitlinger.

Smith, K.A. (1996). Cooperative learning: Making "groupwork" work. In T.E. Sutherland & C.C. Bonwell (Eds.), *Using active learning in college classes: A range of options for faculty. New directions for teaching and learning*. San Francisco: Jossey-Bass.

Weaver, R.L. II. (1996). *Understanding Interpersonal Communication*. New York: HarperCollins College Publishers, pp. 406-412.

#### Assessment

Alverno College Faculty. (1994). *Student assessment-as-learning at Alverno College*. Milwaukee: Alverno College Institute.

Helm, M. & Baker, R.L. (2001). Evaluating individual student learning: Implications from four models of assessment. *Learning Abstracts*, 4 (3). Phoenix, AZ: League for Innovation in the Community College.

MacGregor, J. (1993, Winter). Learning self-evaluation: Challenges for students. In J. MacGregor, (Ed.). *Student self-evaluation: fostering reflective learning. New directions in teaching and learning*. San Francisco: Jossey-Bass.

Mentkowski, Marcia et al. (2000). *Learning that lasts: integrating learning, development and performance in college and beyond*. San Francisco: Jossey-Bass.

Moore, W.S. & Hunter, S. (1993, Winter). Beyond "mildly interesting facts": Student self-evaluations and outcomes assessment. In J. MacGregor, (Ed.). *Student self-evaluation: fostering reflective learning. New directions in teaching and learning*. San Francisco: Jossey-Bass.

#### Organizational Learning

Astin, A. & Astin, H. (2001, Jan.) Principles of transformative leadership. *AAHE Bulletin* (53) 5, 3-6, 16.

Hock, Dee. (1994). Institutions in the age of mindcrafting. San Francisco: Paper presented at the Bionomics Annual Conference.

Jacobs, R. (1994). *Real time strategic change: how to involve an entire organization in fast and far reaching change*. San Francisco: Berrett-Koehler.

Kim, D.H. (1999). *Introduction to systems thinking*. Waltham, MA: Pegasus Communications.

Kofman, F., and Senge, P.M. (1993). Communities of commitment: The heart of learning organizations. *American Management Association*, 5-20.

O'Banion, Terry. (1999). *Launching a learning-centered college*. Mission Viejo, CA: League for Innovation in the Community College.

Por, George. (2000). Nurturing systemic wisdom through knowledge ecology. *Systems Thinker*, 11 (8), 1-5.

Senge, Peter. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday.

Senge, P.M. (1990, Fall). The leader's new work: Building learning organizations. *Sloan Management Review Reprint Series* 32 (1).

Wardman, K.T. (1994). *Reflections on creating learning organizations*. Cambridge, MA: Pegasus Communications, Inc.

Wheatley, M. J. (1999). *Leadership and the new science revised: Discovering order in a chaotic world*. San Francisco: Berrett-Koehler.

Wheatley, M. J. & Kellner-Rogers, M. (1996). *A simpler way*. San Francisco: Berrett-Koehler.

### **Change**

Astin, A. (2001, May). Fostering student engagement in learning: Lessons from recent research. *Faculty Development: The Collaboration for the Advancement of College Teaching & Learning*, 15, (3), 1-6.

Boggs, G.R. (1999, Jan.). What the learning paradigm means for faculty. *AAHE Bulletin*, 51 (5), 3-5.

Clark, B.R. (2000, Jan./Feb.). Collegial entrepreneurialism in proactive universities: Lessons from Europe. *Change*, 32 (1), 4.

Engelkemeyer, S.W. & Landry, E. (2001, Feb.) Negotiating change on campus. *AAHE Bulletin*, 53 (6), 7-10.

Fraser, S.W. (2000). Spread good practice by walking in my shoes, not treading on my toes. *The Systems Thinker*, 11 (8), 10.

Guskin, A. E. (1996, July/August). Facing the future: The change process in restructuring universities. *Change*, 28 (4), 16-25.

Guskin, A. E. (1994). Restructuring the role of faculty. *Change*, 26 (5), 16-25.

Kotter, J.P. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review*, 73 (2), 59-67.

Marchese, T. (2000, Jan./Feb.). Entrepreneurial universities. *Change*, 32 (1), 4.

McClenney, K.M. (1998, Aug.). Community colleges perched at the millennium: Perspectives on innovation, transformation, and tomorrow. *Leadership Abstracts*, 11 (8).

O'Banion, T. & Milliron, M.D. (2001). College conversations on learning. *Learning Abstracts*, 4 (5).

Palmer, P. (1987, Sept.-Oct.). Community, conflict, and ways of knowing: Ways to deepen our educational agenda. *Change*, 19 (5).

- Por, G. (2000, Oct.). Nurturing systemic wisdom through knowledge ecology. *Systems Thinker*, 11 (8), 1-5.
- Schneider, C.G. and Shoenberg, R. (1999). Habits hard to break: How persistent features of campus life frustrate curricular reform. *Change*, 31 (2), 30-35.
- Wheatley, M.J. (2000). Disturb me, please! Keynote address, Systems Thinking in Action Conference. San Diego: October 23-25.
- Wheatley, M.J. (1997, Oct.). Managing by delight and pleasure. *Women in Higher Education*, 20.