THE LEARNER-CENTERED CURRICULUM

Design AND Implementation

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FOREWORD BY **MARYELLEN WEIMER**

Foreword

I am frequently asked in learner-centered teaching workshops whether one learner-centered course is enough to really make a difference in how students learn. The question is motivated by the fact that many courses at many institutions are still not learner-centered but continue to be teacher-centered and focused on content transmission. The questioner's sense is that even if a student has a different kind of learning experience in one course, that it won't be enough to make a significant difference and so maybe what's needed to make a course learner-centered is just wasted effort. Surprisingly, some research evidence is emerging that one learner-centered course early in the curriculum *can* make a difference (Derting & Ebert-May, 2010). Obviously, two courses will make more difference than one, a series would increase the impact still further, and a whole curriculum would be ideal.

The Learner-Centered Curriculum: Design and Implementation describes that ideal. It proposes how a learner-centered curriculum can be created, includes examples that illustrate what it might look like, and tackles the tough issues that surround curricular change. It's an inspiring book. Learner-centered curricula focus on the development of sophisticated learning skills. They don't just cover content but use what is known within a field to develop a strong knowledge base and to build the learning skills today's students will need for the lifetime of learning that awaits them personally and professionally. They are curricula that integrate knowledge across disciplines and topics. They combine the acquisition and application of knowledge with out-of-class experiences that give students

opportunities to use what they are learning. They don't look like traditional curricula, and that's an issue.

Curricular change is never easy. For the most part, classroom are still teachers' castles. Behind their closed doors, they decide both what is taught and how it is taught. Sometimes well-intentioned academic leaders try to foist curricular revision on faculty. They require the submission and approval of course plans consistent with the new curricular goals and objectives. But then faculty return to their classrooms and pretty much teach the course as they've always taught it. Faculty have to want to change, and what makes this book more than just inspiring are the practical suggestions it offers for implementing these innovative curricula. The authors are (or have been) faculty members. They know how faculty members think about course design and curricular change. They offer approaches, arguments, and ideas that respond to faculty resistance to learner-centered approaches specifically and curricular change more generally.

This book can be profitably read by a variety of those in the higher education community. It can be read by that individual faculty member committed to learner-centered course goals who worries that one learner-centered course experience is not enough and wants there to be more. It can be read by curricular committee chairs and members. If a committee has been charged with curricular revision or even the possibility of it, this would be an excellent book for group discussion. It's a great book for department chairs. Learner-centered courses can be developed incrementally. Perhaps, given the politics of the institution or department, the best place to start is with two or three strategically positioned courses within a degree program. They can be taught by faculty committed to learner-centered goals, and this book discusses how those courses can be assessed and how that data can be used to motivate

more curricular change. And certainly this is a book for academic leaders who aspire to change the curriculum at their institution. It makes compelling arguments as to why curricula need to be more learner-centered, and offers examples of those curricula and advice on setting the curricular change agenda.

The Learner-Centered Curriculum follows *Leading the Learner-Centered Campus: An Administrator's Framework for Improving Student Learning Outcomes,* written by Michael Harris and Roxanne Cullen. That book explores learner-centered leadership, proposing a leadership model based on the same learner-centered principles used with students and in classrooms. That kind of leadership sets the conditions for the curricular change described in this book. The two books are really companion works that move interests in learner-centered teaching from individual classrooms to institutions. It's common for institutions to claim they are learner- or learning-centered. These books make clear how that claim must be supported with policies, practices, and curricula that make learning the true centerpiece of an institution.

I also found *The Learner-Centered Curriculum* intriguing because it positions curricular change within a larger context. It isn't just about what is taught or even about how it's taught. It's also about where it's taught—what the classrooms look like, how technology should support learning goals, and how spaces around campus can be created so as to enhance the learning mission of the institution. Some of the richest examples are those derived from the authors' own experiences on their campus. They write about those with candor and insight.

Most of my work has been at the individual classroom level, and that's the focus of much of the literature on learner-centered teaching. Although that may be the easiest and

most sensible place to begin, it is not the level at which significant change is accomplished. Learner-centered ideas have been widely promoted in the literature since Barr and Tagg's seminal article (1995). Unfortunately though, since then it has been mostly about trying to change higher education classroom by classroom. It's time to pick up the pace. Students deserve more than an occasional learner-centered experience. They should be able to participate in whole programs where how they are learning is just as important as what they learn. This book gives that conversation form and substance.

Maryellen Weimer

Preface

A few years ago, when the three of us were all working at the same institution, we took part in a classroom renovation project with the goal of making the classrooms more inviting and comfortable for students. With the aid of a design firm, we transformed sterile-looking, institutional white classrooms into colorful, technologically current learning spaces, with modern carpet design and state-of-the-art moveable furniture. Although this was a huge improvement over the rooms we had, we were limited by the existing spaces, and we could not reduce the number of seats in any classroom simply because of class sizes and increasing demand. The problem was that the most flexible furniture design in the world cannot be used to its true effect if confined in rooms that are too small. So, in many instances, our lovely folding tables with casters remain in their locked positions facing the front of the room.

We begin with this story because it serves as an analogy for the point we want to make about curriculum. Across the country, faculty are innovating and applying learner-centered practices in their classrooms. Too often, though, their courses are wedged into curricula that are not conducive to their innovations. Like a classroom that is too small for the specially designed furniture, the curricular model undermines the intent and restricts faculty members' ability to fully embrace learner-centered practices to the extent they might imagine. A second point is that the learning experience at an institution does not change if students take one or two learner-centered courses. If an institution is to be truly learner-centered, all processes and practices need to be learner-centered, and the curriculum is no exception.

In this book, we will consider ways to break down the walls that confine our imagination and, as in the case of physical spaces, redesign curricular spaces to support and enhance learner-centered teaching. We will make the case that for many existing programs, the curriculum design is predicated on elements of a paradigm that is contrary to what we are trying to achieve through learner-centered pedagogy.

Purpose

Many fine books on curriculum design already exist, and we reference many of them. We aspire to help faculty members and administrators think about curriculum in a new, learner-centered way. We have the same background as many of you. We are not instructional designers by training; we do, however, have extensive experience with curriculum revision from the faculty member's and administrator's perspectives. By exposing habitual ways of approaching curriculum, curriculum planners will become more intentional in their thinking and be able to develop a new approach that is more flexible and aligned with learner-centered pedagogy. Although we do offer suggestions and recommendations, our main agenda is to provoke thinking about how curriculum might be designed differently. In the end, our goal is to share our insights with those interested in joining us on our exploration of innovative, learner-centered curricula that prepare students, and the rest of us, for twenty-first-century teaching, learning, and careers.

Audience

It may be a quirk of English majors and avid readers, but those of us who pay attention to the books on people's

bookshelves or to the books others are reading on a bus or park bench also make judgments about people based on those selections. If you are caught reading this book, we hope we know what people will think about you. At least we know what *we* think about you.

You are reading this book because you care about student learning. You may be frustrated that change in higher education takes so long, or you may be an agent of change trying to be innovative and creative in a system that often fails to accommodate your ideas. You see how rapidly the world is changing, and you want to make your students' educational experience relevant and current. You believe in learner-centered practices, and you want to apply them in new ways throughout your institution. You might be a faculty member interested in curriculum and desirous to make degree programs at your institution more learner-centered, or you might be a faculty developer whose job it is to provide others with curriculum design ideas. You might be a department chair or dean who would like to support curricular change in your unit, or you might be a provost or president who is trying to push forward the learner-centered agenda at the institutional level. Regardless of your role within the institution, you are open to new ideas and are looking for ways to improve the educational experience of your students, with the result being graduates who are prepared for the challenges we know they are going to face. We are writing this book to you and for you.

Structure

Because our aim is to foster intentional thinking about curricula, the first five chapters are organized around questions, specifically: *Why redesign curricula? How did we get to this point? What would a learner-centered design*

look like? How do we implement such a design? Where are they doing it already? After explaining our thinking about these questions, we offer technical advice on how the strategic use of assessment, technology, and physical spaces can support a shift toward a learner-centered curriculum design.

In Chapter One, we reference the numerous calls for higher education to produce graduates who are creative, autonomous learners. We posit that creativity and learner autonomy can indeed be taught and that many of the practices we know as learner-centered pedagogy are consistent with the strategies used to develop creativity and autonomy.

In Chapter Two, we present a history of curriculum development and illustrate the ways in which this traditional design is based on an instructional paradigm derived from a mechanistic view of learning. We explore some underlying accepted assumptions about curriculum design, namely that curriculum is linear in design, that learning takes place the same way for all individuals, that time is an important factor in determining learning, that error is negative, and that knowledge is an entity to be owned and controlled.

In Chapter Three, we present a framework for curriculum design based on learner-centered principles. Using Doll's postmodern theory of curriculum as an organizing principle, we examine each of the assumptions presented in Chapter Two and offer learner-centered alternatives.

In Chapter Four, we explore implementation issues. We begin with a consideration of overarching principles related to curriculum implementation, and then we offer what we refer to as *What if?* conversations, intended to provide leaders with some specific questions to ask and consider in order to keep the conversation focused on new ways of

conceiving curriculum and seeing the process from a learner-centered perspective.

Chapter Five provides examples of curricula that demonstrate the principles presented in Chapter Three. Using a rubric we developed as an instrument to gauge the degree of learner-centeredness in the design, we look at several curricula that illustrate varying degrees of learner-centeredness in their design and conclude the chapter with a hypothetical example of the revision of an existing program.

Throughout the book, we emphasize the need for assessment, noting specifically that both formative and summative assessments are key features of learner-centered pedagogy and that assessment is an effective driver of change. For that reason, we have devoted Chapter Six to assessment practices and offer a wide variety of options both for individual classroom practice and for programmatic assessment.

Chapter Seven is devoted to technology and the many new tools available to educators that can support learner-centered practices and foster autonomous learning. We make the point in Chapter Five that curriculum designs will necessarily vary in degree of learner-centeredness. In this chapter, we show how technology, particularly online learning environments, can assist in removing some of the obstacles to achieving a learner-centered design.

Learner-centered classroom pedagogy and curricula require physical spaces that are amenable to collaboration and engagement, so in Chapter Eight, we explore the importance of physical spaces in relation to learner-centered curricular design. We also recognize that tying renovation to curricular implementation can foster motivation to innovate, resulting in a physical manifestation of learner-centered principles.

Acknowledgments

About the Authors

Roxanne Cullen is a professor of English at Ferris State University (FSU) and coordinator of the bachelor of integrative studies degree program. In her tenure at FSU she has also served as Writing Center director, administrative head of the Department of Languages and Literature, interim associate dean of the College of Arts and Sciences, and assistant and associate vice president for academic affairs. In addition to her administrative service, Cullen is a recipient of the university's Distinguished Teaching Award. She received her PhD in English from Bowling Green State University and her BA in English from SUNY Geneseo. In 2010, she coauthored *Leading the Learner-Centered Campus* with Michael Harris.

Michael Harris serves as the chancellor of Indiana University, Kokomo, and as a professor of public and environmental affairs, education, and business. He received his PhD in public policy from Indiana University, his master's from Tel-Aviv University, and his undergraduate degree in economics and business administration from Bar-Ilan University. He is a graduate of two of the Harvard Graduate School of Education's leadership programs (IEM and MDP). He has published four books and close to forty articles in a variety of journals. Harris has been recognized for his teaching excellence, research, and service. He serves as a political commentator to a variety of broadcast and print media. Harris has been acknowledged nationally for his work in leading change and enhancing innovation and entrepreneurship. He has initiated a variety of projects that brought together international and local partners from government, business, higher education, and nonprofits to

enhance academic excellence, student success, and economic development.

Reinhold R. Hill is dean of the College of Arts and Sciences at Governors State University in University Park, Illinois. Prior to his current position at Governors State, Hill held several administrative appointments at Ferris State University, where he began his full-time career in the Department of Languages and Literature. He earned his BA in communication studies with a minor in English at Brigham Young University. His MA is in English with a folklore emphasis from the University of Southwestern Louisiana. He earned his PhD in English with emphases in folklore and composition studies from the University of Missouri. Hill has regularly taught a full range of courses, including World Folk Literature, Introduction to American Folklore, Composition Theory, American Religious Traditions, Introduction to Literary Studies, and all levels of writing, including a proposal writing course, in both the traditional classroom and online. He was a Fulbright Senior Lecturer at the University of Debrecen in Hungary in 2004.

Chapter 1
Why Redesign Curriculum?

Igor Pušenjak, age thirty-four, was placed fourteenth on *Fast Company*'s 2010 list of the one hundred most creative people. He and his brother designed Doodle Jump, the most popular application for the iPhone. The brothers' $100 investment, coupled with tenacity in the face of five previous failures, led to the game's selling more than four million copies by May 2010. On his Web site, Pušenjak describes himself as a "photographer, multimedia artist, designer, technologist, pilot, and an avid sailor," a modern renaissance man. Pušenjak's place on the *Fast Company* list points to the increasing importance of creativity and adaptability to changing work opportunities.

How does this story relate to curriculum design? Lattuca and Stark (2009) believe that looking at curricular change over time reveals that universities are reactive to societal pressures—that curriculum is a reflection, in fact, of its sociocultural context. We believe the time is right for major change in the design of curriculum because of the impact of current social reality and because of the research on learning that can inform the process. Furthermore, the success story of the Pušenjak brothers illustrates two recurring themes that directly impact curriculum design. First, the brothers were not trained in the area of their success; they integrated multiple talents and knowledge bases. Second, they were resilient in the face of failure and no doubt learned from their failures, which eventually led to their success with Doodle Jump.

In this chapter, we will offer our answer to the question, *Why do we need to redesign our curricula?* Beginning with

an exploration of the current and future need for employees who are creative, independent learners, we will then consider how the traditional view of curriculum as a vehicle for transmitting knowledge is counterproductive with regard to the goal of developing graduates with those qualities. Next, we present documentation that supports the belief that creativity and adaptability can be taught. We answer the "Why redesign curricula?" question by demonstrating how realigning traditional curriculum with a learner-centered paradigm has the potential to create learning environments that are conducive to supporting independent learning and creativity.

The Call for Creativity and Adaptability

The societal need for autonomous learners who adapt quickly to new situations, who are engaged in lifelong learning, and who are flexible and innovative in their approach to problem solving is well documented (National Leadership Council for Liberal Education and America's Promise, 2007). A national survey conducted by Peter D. Hart Research Associates for the American Association of College and Universities asked employers to rate new hires in the skills that are generally agreed on to represent the abilities necessary to succeed in the twenty-first-century workforce. The results looked like a bell curve: not many A's or F's, mostly mediocre. Although these results may indicate that the United States is not in the dire circumstances that some have claimed previously, they do show that employers are not completely satisfied either. The results of this survey as well as the findings of other business and industry studies and independent educational research teams all indicate that higher education needs to do a better job of preparing students.

In its publication *College Learning for the New Global Century,* the National Leadership Council for Liberal Education and America's Promise (2007) outlines four broad areas in which all students should be prepared: (1) knowledge of human cultures and the physical and natural world; (2) intellectual and practical skills, including inquiry and analysis, critical and creative thinking, written and oral communication, quantitative literacy, information literacy, teamwork, and problem solving; (3) personal and social responsibility, including civic knowledge and engagement—local and global—intercultural knowledge and competence, ethical reasoning and action, and foundations and skills for lifelong learning; and (4) integrative learning, including synthesis and advanced accomplishment across general and specialized studies. Although the publication focuses on developing general education programs to address these areas, these general education outcomes can also serve as the structure of a reasonable degree program that develops in students an appreciation for and fluency with diversity in all its forms and prepares them for engagement in an increasingly globalized society. Of particular interest to us in regard to curriculum is the call for integrative learning.

As the report states, "In a world of daunting complexity, all students need practice in integrating and applying their learning to challenging questions in real-world problems," and continues, "In a period of relentless change, all students need the kind of education that leads them to ask not just 'how do we get this done?' but also 'what is most worth doing?'" (National Leadership Council for Liberal Education and America's Promise, 2007, p. 13). These perspectives are widely agreed on at the present time, but it is not always clear how we might arrive at the stated outcomes. The report authors argue,

The general public—and many college students—continue to believe that choosing a "marketable" major is the key to future economic opportunity. Guided by this conviction, many students see study in their major field as the main point of college, and actively resist academic requirements that push them toward a broader education. Many policy makers hold a similar view of career preparation, evidenced by their support for occupational colleges and programs that promise initial job readiness but not much else.

Those who endorse narrow learning are blind to the realities of the new global economy. Careers themselves have become volatile. Studies already show that Americans change jobs ten times in the two decades following college, with such changes even more frequent for younger workers. Moreover, employers are calling with new urgency for graduates who are broadly prepared and who also possess the analytical and practical skills that are essential both for innovation and for organizational effectiveness. (pp. 15–16)

As early as 1994, Bridges claimed that the concept of job security was a thing of the past, that today's workforce is operating by a new rule system, a new paradigm in which all workers are contingent and that a worker's value to an organization must be proven on a daily basis. Graduates can no longer expect to spend an entire career with one company climbing the corporate ladder, but rather must think of themselves as in business for themselves and maintain a career-long professional development plan. And this new workplace is a project-based team environment that demands agility and adaptability on the part of the worker. Bridges (1994) wrote, "These new rules are still evolving and are becoming operative in some parts of the economy more quickly than others …. At Sun

Microsystems, Apple Computer, Intel and hundreds of smaller high-tech companies, these rules are already obvious" (p. 52). His predictions proved correct.

IBM conducted a global study of the elements needed for enhancing workforce performance in today's turbulent environment. From their survey of four hundred organizations in forty countries, the researchers concluded that the key to enhanced workforce performance was "an adaptable workforce that can rapidly respond to changes in the outside market" (IBM Global Services, 2008, p. 1). In other words, we need workers who are creative and who can adapt and solve problems in new ways. Yet creativity and adaptability have not been a major focus in the undergraduate experience.

Bronson and Merryman (2010) claimed in a *Newsweek* article that American creativity is actually declining. They make the point that while other countries are making creativity a national priority, we're headed in the opposite direction. The authors further note that student scores on creativity tests are dropping at the same time that their IQ test scores are rising. So the question remains, what needs to change in our education system in order to develop creative problem solvers for this world of daunting complexity? Bronson and Merryman pointed to the ironic state of educational reform. Currently the Chinese are replacing their "drill and kill" teaching with problem-based learning. At the same time, we are continuing to argue about standardized curricula, rote memorization, and nationalized testing. These authors noted that "overwhelmed by curriculum standards, American teachers warn there's no room in the day for a creativity class. Kids are fortunate if they get an art class once or twice a week" (p. 3). And herein lies the problem with our current way of thinking about creativity as well as about curriculum. First is the assumption that fostering creativity is the sole

domain of a single discipline, namely art education, and second is the knee-jerk response to a curriculum issue: add a course.

Legislators and others continue to call for more tests in order to drive the needed changes in undergraduate education. More evaluation of the current curriculum will not foster needed change. To use an agricultural metaphor, calling for more testing is like trying to make the sheep fatter by weighing them more often when what they need is a richer pasture. Supplementing the current undergraduate diet with additional courses in global knowledge and critical thinking or creativity will not address the need either. What is needed is a redesigned undergraduate educational experience that will foster creativity as well as learner autonomy.

Can Creativity Be Taught?

Feldman, Czikszentmihalyi, and Gardner (1994) make the case that creativity has multiple meanings, which can sometimes impede communication, so we will begin by defining what we mean by creativity. They define their use of the word as "the achievement of something remarkable and new, something which transforms and changes a field of endeavor in a significant way. In other words, we are concerned with the kind of things that people do that change the world" (p. 1). The most accepted general definition is simply the "production of something original and useful" (Bronson & Merryman, 2010). We like Franken's definition of creativity as "the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others, and entertaining ourselves and others" (2006, p. 396), because it aligns most closely with our curricular goals and is probably a more reasonable way of thinking

about teaching creativity. We are not expecting every student to change the world, but we can expect every student to recognize ideas and alternatives and learn to solve problems in new ways. Gardner (2006) described creative people as those who take risks without fear of failure while seeking the unknown or challenging the status quo. We will return throughout the book to the idea of taking risks with this attitude toward failure, in regard to creating suitable educational environments that foster creativity. Environment is key, as Czikszentmihalyi (1996) asserts. He maintains that creativity is tied to context—to interactions of talented people in an environment that is open and accepting of innovation. The role of environment will also serve as a theme throughout as we focus on environments that are conducive to learning.

In summarizing one hundred years of research on creativity, Plucker (2008) found that creativity more often than not involves teams and collaboration. Creative environments are collaborative and active. Feldman, Czikszentmihalyi, and Gardner's belief that reflection is the single quality that sets humans apart from other organisms (1994) is key to understanding creativity. In discussing the learner-centered curriculum, we will return to the concepts of risk taking, attitude toward failure, collaboration, and reflection as we consider ways to create curricula that respond to the need for creative thinkers.

Czikszentmihalyi's theory as to the role of context and cultural attitude toward creativity is reflected in a recent book that addressed creativity and innovation from a cultural perspective. Senor and Singer (2009) examined the Israeli phenomenon of entrepreneurism. Israel produces more start-up companies than China, India, Korea, Canada, and the United Kingdom in spite of what would appear to be limitations of size, geographical location, and perpetual political turmoil. The authors explain that Israel's

impressive economic growth is a result of a unique mind-set. The Israeli mind-set, what some might call chutzpah, is an outgrowth of unique political and social realities. Senor and Singer attribute this mind-set for entrepreneurism to the military service that all citizens experience, coupled with the incredible diversity of cultural backgrounds within Israel. The military experience gives young Israelis a social range, a sense of responsibility, initiative, and agility of mind as well as ease with confronting authority, challenging accepted ways of doing things, critically analyzing and learning from mistakes, and assuming risk. Although the Israeli military experience may not be intentionally designed to foster creativity, there are certainly lessons to be learned. First, the experience creates an intense sense of community. Senor and Singer claim that the military experience creates a lifelong networking system that young Israelis capitalize on once their military experience is over. Control is also a key feature of the experience. The young Israelis are expected to confront authority, they are given tremendous responsibility, and competence is expected. There is an acceptance of mistakes, provided that the individual learns from the mistakes and maximizes his or her potential as a result. In short, the environment fosters creative thinking.

Creative thinking thrives in environments that offer individual freedom, alternative thinking, safety in risk-taking, and collaboration and teamwork. Gardner (2008) noted in regard to educational environments and creativity that

Too strict adherence to a disciplinary track operates against the more open stances of the synthesizer or the creator. Options need to be kept open—a straight trajectory is less effective than one entailing numerous bypaths, and even a few disappointing but instructive cul-de-sacs. (p. 84)

In other words, the educational path needs to be more flexible and integrative.

Creativity requires seeing possibilities, seeing from a new perspective, and perceiving difference, or what Langer (1989) would call mindfulness. She defined mindfulness as the ability to create new categories and to maintain an openness to new information and an awareness of more than one perspective. Without these abilities, individuals become entrapped in habitual ways of thinking, solving problems, and seeing, thus leading them to miss new signals and opportunities. The ideal in teaching creativity as well as learner autonomy lies in teaching mindfulness, or, as Langer would define it, becoming attuned to our cognitive processes, thinking about what we perceive and deliberately noticing difference and distinctions in our observations. We will refer to this as intentionality, becoming aware of one's own process of learning.

Langer (1997) talks about the conditional and context-dependent nature of the world, cautioning against teachers' fostering a belief in one right answer. She writes, "Teaching skills and facts in a conditional way sets the stage for doubt and an awareness of how different situations may call for subtle differences in what we bring to them" (p. 15). In Chapter Three, we will discuss her research to support this belief. Svinicki (2004) also discusses the limitations on student learning as a result of believing in one right answer. What she refers to as the "illusion of comprehension" is, in part, the result of students using flashcards or rereading as a means of studying. "They find comfort in looking at the same material over and over, mistaking their recognition of it in familiar context with an ability to recognize it out of context" (p. 117). She contends that this is why it is important for students to *use* information rather than simply identify it. When they are required to *do* something with the information, to take it

from the familiar context and introduce it to another context, their illusion of comprehension is revealed; that, she claims, strengthens motivation to learn.

The seventh of seven principles of excellence espoused by the National Leadership Council for Liberal Education and America's Promise is "Assess students' ability to apply learning to complex problems." The principle emphasizes both the student's ability to apply learning in multiple contexts and the assessment of student abilities. We will return to the necessity of applying skills in unfamiliar contexts, or transfer, in subsequent chapters, as it is a fundamental principle for assessing deep learning, a concept we will look at in greater depth in Chapter Three.

Csikszentmihalyi (1999) examined the role society plays in innovation and creativity and determined that

> creativity is not simply a function of how many gifted individuals there are, but also of how accessible the various symbolic systems are and how responsive the social system is to novel ideas. Instead of focusing exclusively on individuals, it will make more sense to focus on communities that may or may not nurture genius. (p. 335)

In other words, our classrooms as well as our institutions need to nurture creativity. Csikszentmihalyi recognized that creativity is the result of three elements in interaction: the individual, the cultural domain, and the social field, or those who pass judgment on the quality of the creative work. This implies that teachers, those who are the judges of the quality of creative work, can foster learning environments that support and encourage creativity through increasing the openness and flexibility of those environments and accepting learning from multiple sources. Rosenthal, Baratz, and Hall (1974) found that teachers' expectations about students' performance clearly

influence that performance. Further, when students see their own teacher as more intrinsically oriented toward work, they perceive themselves as more competent and more intrinsically motivated. Langer (1997) concludes that students' intrinsic motivation and hence creativity are likely enhanced both by teachers' attitudes toward autonomy and self-direction in work as well as by their own ability to model those same behaviors.

New research in neuroscience is shedding more light on how creativity works. Bronson and Merryman (2010) summarize the research. They explain that creativity has been popularly thought of as a left-brain activity, but research is showing that it is in fact an activity involving both right and left hemispheres. When a person tries to solve a problem, the first brain activity involves sifting through familiar solutions and obvious facts, a left-brain activity. If the answer cannot be found there, the neural networks from the right side look for memories that might be relevant. Information that would normally be ignored by the left brain becomes available, thus widening the possibilities for solving the problem.

> A wide range of distant information that is normally tuned out becomes available to the left hemisphere, which searches for unseen patterns, alternative meanings, and high-level abstractions. Having glimpsed such a connection, the left-brain must quickly lock in on it before it escapes. The attention system must radically reverse gears, going from defocused attention to extremely focused attention. In a flash the brain pulls together these disparate shreds of thought and binds them into a new single idea that enters consciousness. (p. 4)

These two modes, referred to as divergent thinking and convergent thinking, are what characterize creative

thinking, combining new information with old, even forgotten ideas. "Highly creative people are very good at marshaling their brains into bilateral mode, and the more creative they are, the more they dual-activate" (p. 4). They integrate diverse thoughts in order to solve problems.

Recent experiments have shown that this dual activation of the brain is teachable. The University of Georgia, the University of Oklahoma, and Taiwan's National Chengchi University have independently studied creativity training exercises aligned with this science, all finding that creativity training works (Bronson & Merryman, 2010). Collaboration, creative problem solving, and problem-based learning have all been shown to increase creativity in children. This recent research supports what earlier researchers have maintained about creative learning environments: they must be flexible, free, open to unusual or divergent answers, and collaborative.

To summarize what we know about creativity, we know that it is a whole-brain activity that involves making connections between sometimes remote ideas. We know that the ability to do this is fostered through environments that are open and supportive of creativity and divergent thinking, and that teachers can either stifle or promote creativity in their students, through their own behaviors and through the learning environments they create.

To summarize what we know about whether creativity can be taught, we know that the attitude as well as the behaviors of teachers are key to creating an environment that fosters creative problem solving. Maintaining an openness to new ideas, a willingness to allow students to make choices in how to engage, and presenting information in a conditional way rather than assuming only one right answer are all strategies that teachers can use to foster creativity. We also know that employing active learning

strategies and encouraging teamwork and collaboration enhance creative output.

Can Adaptability Be Taught?

In addition to the societal call for creativity is the call for adaptability. Adaptability has to do with autonomy, with individuals who can learn on their own. In fact, many of the same recommendations regarding educational environments that foster creativity are also known to develop learner autonomy. These learner-centered strategies aim at developing independent learners who can think critically and solve problems—who can sort out the world of daunting complexity. As early as 1975, Knowles recognized that transmission of knowledge to passive recipients was no longer a viable means of education. Knowles (1975) identified the importance of self-directed learning in regard to adult learners and emphasized that when individuals take initiative for their own learning, they benefit not only by learning more but by retaining more.

More recently, Candy (1991) differentiated between self-directed learning as an educational goal and self-directed learning as an instructional method. As a goal, self-directed learning refers to self-management and personal autonomy. As a method of instruction, it refers to learners' assuming increased control in formal educational settings as well as planning and executing projects outside the formal setting. Here we refer to self-directed learning as a goal of education. Cognitive psychologists refer to this as self-regulation, a skill that can be developed through the incorporation of pedagogical strategies built into curricular design. Self-directed learning is essential to the development of inquiry skills that individuals need in order to adapt to rapid changes in their environment and to manage the great influx of information to be learned.

Self-regulation is defined by cognitive psychologist Albert Bandura as the ability of an individual to regulate his or her progress in achieving learning outcomes. Garavalia and Gredler (2002), Schapiro and Livingstone (2000), and Zimmerman (2002) have demonstrated that self-regulation can be intentionally crafted in courses to produce significant growth in essential learning behaviors. Self-regulation can be fostered through carefully constructing learning environments that prompt students to elevate their knowledge. McCombs (1989) and Zimmerman and Schunk (1994) identified skills that typify self-regulation; they fall into three categories: self-observation skills, self-judgment skills, and self-reaction skills. Nygren (2007) explained that "the knowledge expertise becomes stronger as the learner transfers and applies the skill in slightly different contexts. Eventually the learner will be able to use the skill in a completely new and unfamiliar context" (p. 165). In subsequent chapters, we will consider ways in which transfer of learning to different contexts can be integrated into the design of curricula.

Why Change Curricula?

If individual teachers can incorporate pedagogical strategies in their classroom in order to foster creativity and learner autonomy, why do we need to revise the entire curriculum? We believe that relying on individual classroom efforts to change the learning environment on a programmatic, college, or institutional scale is not strategic and does nothing to link and integrate those individual experiences. We believe that for graduates to develop the skills we have referred to in this chapter, curricular coherence, repeated experiences, and reflection on learning across courses are necessary. The design of the curriculum needs to integrate learning experiences for

students in order to facilitate their growth as creative, independent learners.

The Association of American Colleges and Universities (AAC&U, 2004) and the Carnegie Foundation for the Advancement of Teaching issued a statement in which they defined integrative learning as the learner's abilities to "integrate learning across courses, over time, and between campus and community life" (p. 1). This statement grew out of a project called Opportunities to Connect, in which ten campuses were selected to experiment with a variety of integrated learning strategies—linked courses, capstones, service learning, and learning portfolios—to create the "institutional scaffolding" for integrated learning. There has been widespread success with many of these strategies, and the successes individual campuses have achieved have been the result of extreme effort and dedication on the part of individuals committed to improving student learning outcomes. Part of the reason that these achievements have required such expenditure of energy and creativity on the part of the implementers is that our existing institutional scaffolding, also known as curriculum, is not conducive to flexibility and creativity.

The disconnect between traditional curriculum design and current student learning is the result of our approach to curriculum as a mechanistic process rather than an organic one. In the instructional view of learning that we will examine in greater depth in Chapter Two, learning is assumed to be the result of the professors' dispensing the right ingredients—course content. Once all the content has been dispensed, the student is complete. We know, though, that learning is an organic process dependent on numerous variables, including a student's prior learning, learning styles, motivation, and so on. Our curriculum design needs to reflect the organic nature of the process.

Rather than thinking of course content as pieces of a puzzle or ingredients in a recipe, we might use the metaphor of a gardener, who tends to the plant and provides nourishment, fertile ground, and other conditions conducive to growth, but who must stand aside and watch the plant grow on its own. Curriculum in this view is flexible and focuses on those elements that provide the learner nourishment and the conditions conducive to growth. The goal of this curriculum framework is to develop autonomous learners. Specifically, the design of curriculum must shift from the traditional discipline-based approach in which types of knowledge (as in hours of general education versus hours in the discipline major) are at the core of the curriculum to a constructivist or learner-centered approach that focuses on the development of the learner.

The 1970s hosted a considerable number of experiments in curriculum designed to foster independent learning and interdisciplinary thinking. Many proved ineffective. What we propose differs in large part because of the significant advances in research on learning that have taken place since that time, the research that serves as the basis for the learner-centered agenda. The learner-centered agenda proposes to shift responsibility for learning to the student, with the added benefit of stimulating student motivation for learning. It lays the foundation for creating learning environments that foster learner autonomy as well as creativity.

The Learner-Centered Environment

Bransford, Brown, and Cocking (2000) identify four features characteristic of learner-centered learning environments; they must be "student centered, knowledge centered, assessment centered and community centered" (p. 153). In thinking about curriculum, educators tend to

focus on knowledge and skills that students must acquire but rarely discuss the role of learners' attitudes and beliefs or the environment. When we speak of environment, we mean the surrounding influences, the set of conditions that have an impact on learning. There are a multitude of such influences, including the attitude or mind-set for learning that the learner brings, the impact of the student's prior learning, the culture of learning that is fostered, the physical environment, and more. The current efforts to transform educational environments toward learner-centeredness are to a great extent an attempt to motivate students to be intentional learners and to change their attitude about learning—to develop a new mind-set.

Alfred Binet, inventor of the original IQ test, is quoted as saying, "[Some] assert that an individual's intelligence is a fixed quantity which cannot be increased. We must protest and react against this brutal pessimism" (Shenk, 2010, p. 29). Yet probably most people continue to believe that they inherit their intelligence from their parents and that's that. A body of research from both neuroscience and psychology suggests that intelligence is not only malleable but capable of growing in response to specific environmental stimuli. Shenk concludes that "intelligence is not an innate aptitude, hardwired at conception or in the womb, but a collection of developing skills driven by the interaction between genes and environment" (p. 29). He asserts that the question of nurture versus nature should be replaced with an acceptance of both nurture *and* nature. "The dynamic model of genes times environment (G × E) turns out to play a critical role in everything …. We cannot embrace or even understand the new world of talent and intelligence without first integrating this idea into our language and thinking" (p. 27).

Most difficult to recognize and perhaps the most powerful belief that affects learning is the student's belief in his or