

Conditions for Online Learning Autonomy

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Abstract

This article posits that readiness for online learning has less to do with students' knowledge of technology and digital dexterity than with their knowledge of how to learn and their motivation to engage fully in the process. The authors argue that the progression into the online learning environment should be intentionally built into the undergraduate curriculum as opposed to the current model at some institutions which simply presents students with face-to-face, hybrid, or fully online courses in an open menu of offerings. The authors present a model for curricular review based on types of learning and learning environments, focusing on the online strategies that can foster a shift from transmissive to transactional and transformative learning.

Introduction

A recent survey of online learning revealed that nearly 3.5 million students were enrolled in at least one online course in the fall of 2006 (Allen & Seaman, 2007). A report issued by the Sloan Consortium (Sloan-C) reported that online enrollments have far outpaced enrollment growth for the total higher education population. Online learning is where the growth is in higher education at all institutions, two year, four year, public, and private, and this pattern will likely continue. Academic leaders were asked to identify the major barriers to online learning, and the most common concern was the need for discipline on the part of online students (Allen & Seaman). Anecdotal evidence, as well as studies conducted by individual institutions, suggests that course completion and program retention rates are generally lower for distance-education courses than in their on-site counterparts (Carr, 2001). Student retention is a perennial concern of all institutions and with the rapid growth of online course/program offerings that typically have lower retention rates than face-to-face courses, the issue of the online curriculum and the factors affecting student performance are a growing concern. Some educators believe that students emerging from the K-12 system today have been raised with so much technology that online learning is natural to them. Admittedly today's students are, as Evans (2009) characterizes them, digitally "native" while their teachers, parents, and administrators seem to be "immigrants" in their technology-rich world. She writes that students are functioning as a "digital advance team for the rest of us, adopting and adapting new technologies for increasing productivity beyond our expectations." Evans' views are based on data collected as part of the of the Project Tomorrow *Speak Up Survey* on education and technology. This survey reported on the responses of over 1.5 million students, teachers, parents, and administrators about their use of technology over the

past six years. One question that this raises, however, in relation to online learning, is, why then is it that adult learners, the so-called "immigrants" of the technological world, tend to perform better in fully online learning environments than their younger, "native" counterparts?

The answer most likely is that readiness for online learning has less to do with students' knowledge of technology and digital dexterity than with their knowledge of how to learn and their motivation to engage fully in the process, or, as the administrators in the survey suggested: discipline. If this is the case, then the introduction of online experiences for students should be consciously engineered to best capitalize on their readiness for independent learning.

Learning behaviors associated with independent learning have been defined, measured, and taught (Nancarrow, 2007, p. 23). One of the key behaviors necessary is *self-regulation*, defined by cognitive psychologist Albert Bandura (1999) as the ability of an individual to regulate his or her own progress in achieving learning outcomes. Garavilia and Gredler, 2002; Schapiro and Livingstone 2000; and Zimmerman 2002 have demonstrated that self-regulation can be "consciously embedded in courses and produce significant growth in essential learning behaviors" (Nancarrow, p. 23). Self-regulation can be fostered through carefully constructed learning environments that prompt students to elevate their knowledge (Nygren, 2007) from lower order to higher order thinking. Nygren explains 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).

The progression into the online learning environment should be intentionally built into the undergraduate curriculum, taking into consideration the level of autonomy of the student and the learning environments

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that foster self-regulation, rather than the current model at some institutions which is simply to provide students the choice of face-to-face, hybrid, or fully online courses in an open menu of course offerings.

Rethinking Curriculum Review

If we are to structure the undergraduate experience to account for online readiness, we need to rethink our current curriculum. Schiro (2008) explores how four competing visions of education have given rise to competing views of curriculum. These four visions arise from disparate beliefs regarding the type of knowledge that should be taught, the nature of learners, how teachers should teach, and how learners should be assessed. He labels these four ideologies as follows: the Scholar Academic Ideology; the Social Efficiency Ideology; the Learner-Centered Ideology; and the Social Reconstruction Ideology.

In higher education, the Scholar Academic Ideology has persisted, rising out of the concept of shared governance whereby curriculum is owned by the faculty and dictated by discipline specialization. Content knowledge sits at the center of curriculum design, and accrediting bodies and others responsible for curriculum review examine the knowledge of the discipline as well as the amount of time devoted to individual units of knowledge. This approach is consistent with the instructional model of learning that Barr and Tagg (1995) characterized as educational atomism. In the instructional paradigm, time is the constant and learning is variable. This paradigm, characterized by transmission of knowledge from professor to student, places the student in a passive position where knowledge is delivered in an environment that is highly controlled and competitive in nature. Curriculum review in this paradigm, therefore, is focused on the transfer of specific knowledge to students and the time devoted to that transfer.

Institutions have been striving to shift away from the instructional paradigm to a paradigm that is learner-centered: where competition is replaced with cooperation; where students are active rather than passive; where students become empowered, take control of their learning, and construct knowledge based upon their prior knowledge. The professor in this environment becomes a designer of learning experiences, creating an environment for learning that is community-based and cooperative. Review of curriculum will need to be reconsidered in light of the features of the new paradigm. The Learner-Centered Ideology places the needs and concerns of the individual learner at the center rather than academic discipline or societal needs (Schiro, 2008). The Learner-Centered Ideology is not

new. Schiro quotes Francis Parker, one of the leaders of the progressive school movement, asserting in 1894 that “The centre of all movement in education is the child.” Learner-Centered educators focus on learning environments. Schiro writes, “Central to Learner-Centered educators’ views about curriculum are issues of how to organize instructional materials and activities to maximize the growth of children, adolescents, and adults. Curriculum is not thought of as subject-matter-set-out-to-be-learned but rather as environments or units in which people can make meaning.”

The widespread acknowledgement of learner-centered practices has come more recently to higher education and has been confined mostly to classroom practices. However, if the shift to learner-centeredness in higher education is to become fully realized, all facets of higher education will need to align with this focus. Realignment curriculum will be part of that venture. If, in the learner-centered paradigm, time becomes the variable and learning becomes the constant, then we want to shift our consideration of curriculum revision to a process that takes into account student learning outcomes and the learning environments that support students reaching those outcomes. Placing learning environments and types of learning at the center of curriculum review rather than types of knowledge (for example, hours of general education as opposed to hours in the major) provides new insight to the task of revising curricula. A variety of learning opportunities enriches any curriculum by accommodating individual learners and approaching learning outcomes from multiple perspectives.

Types of Learning

Miller and Seller (1990) define three types of learning according to the role of the learner. The first is *transmissive*, sometimes called assimilative learning, which assumes that knowledge is content, a transferable commodity to be gained by demonstration, telling, and modeling. Transmissive learning is the trademark of the instructional paradigm where students are considered vessels to be filled with content knowledge. The second type, *transactional learning*, assumes that knowledge is constructed by learners and is characterized by experiential activities, student-to-student collaboration, and acts of discovery through active learning and team-based projects. In this constructivist approach, the educator is a designer, one who facilitates active learning opportunities for the students. The third type, *transformative learning*, also arising from a constructivist view, asks the learner to reassess new knowledge in relation to existing knowledge, requiring considerable reflection upon assumptions and biases that the learner has accepted as part of his or her existing

knowledge (Mezirow, 1990). Transformative learning is more typically experienced by adults who have a well established set of assumptions and biases.

While these three types of learning cannot be fully integrated, as they arise from opposing philosophies of learning, it is possible to build a curriculum that progressively shifts from transmissive or instructional-based pedagogy to transactive and transformational learning that characterizes the active learning pedagogy of the learner-centered paradigm. This conception is consistent with the shift that Knowles (1984) identified between teaching children (pedagogy) and teaching adults (androgogy), defining *pedagogy* as the art and science of teaching and *andragogy* as the art and science of helping others learn. Andragogy assumes that adults are self-directed learners and that their life experiences affect their learning both in regard to preconceptions as well as resources for future learning. Adults also have a strong sense of immediacy and require relevance to motivate their learning. Traditional-aged college students are in a transitional phase between pedagogy and androgogy; for while in some respects they can be considered adult learners, unlike the adult learner who has a wealth of life experience and workplace knowledge to draw upon, traditional-aged students emerging from high school do not have a substantial network of previous knowledge from which to draw (Harris & Cullen, 2009). In other words, there is still a need for some transmissive learning opportunities particularly in light of the fact that less mature students tend to favor surface learning and memorization. Myrvaagnes (2007) describes this dichotomy in terms of learners and self-growers. Learners focus on the acquisition of factual base, procedural, and conceptual knowledge. Self-growers tap into intrinsic motivation and self-assessment skills to maximize achievement, solving problems at higher levels and ensuring their ability to grow continuously after completing their formal education.

Learning Environments

A model of curriculum review focused on learning rather than content attempts to infuse these three learning types, progressively reducing the opportunities for transmissive learning in favor of transactive and transformational experiences. In this more holistic approach, curricula are organized according to broad concepts and the types of learning environments that best support learning as opposed to a sequence of units of knowledge. Redefining curriculum in terms of learning environments as opposed to information transfer holds the promise of transforming the undergraduate curriculum into an educational experience that focuses

on the students' self-conscious attention to the process of learning, a curriculum that is intentional and learner-centered.

Key features of environments conducive to learning have been widely researched. One of the most frequently cited sources is Chickering and Gamson's (1987) *Seven Principles for Good Practice*. Based upon fifty years of research, the seven principles of good practice can be applied to any learning environment including online. The seven principles include: 1) encouraging contact between students and faculty; 2) encouraging interaction and cooperation among students; 3) encouraging active learning; 4) emphasizing time on task; 5) providing prompt feedback; 6) communicating high expectations; and 7) respecting diverse talents and ways of learning.

Bransford, Brown, and Cocking (1999) offer four aspects of quality learning environments based upon a two-year study of brain-based learning. The learning environment must be centered on the learner, knowledge, assessment, and community.

The Sloan Consortium (Sloan-C) identified the elements conducive specifically to online learning. They include features such as a high degree of interaction with instructors and classmates, and communication and community building, trust in the community, along with distinctive characteristics of programs that demonstrate improved learning (Moore, 2002).

An expanded version of Chickering and Gamson's *Seven Principles* is expanded by Smith and Apple (2007) in their ten principles for establishing a quality learning environment. Those ten principles include: 1) establish a high degree of trust; 2) make sure both learning and mentor are committed to the learner's success; 3) get student buy-in early in the process; 4) challenge students; 5) set high and clear expectations; 6) encourage risk taking; 7) seek student feedback regularly; 8) measure and document student growth; 9) create a collaborative learning space; 10) create a balance between structure and flexibility.

Cullen and Harris (2008) developed a rubric for measuring degree of learner-centeredness which distilled the research on learning environments into three categories: establishing community, sharing power, and assessing and evaluating. In addition to community building and assessment/evaluation, this rubric includes power sharing. Research has shown that students' motivation and self confidence are jeopardized by lack of control; the more teachers employ control measures, the more students are resistant to learning (Perry, 1997; Zull, 2002). By allowing students to share power in

making decisions regarding activities, assignments, etc., students tend to take a more active and engaged role in their learning. When students take ownership of and, subsequently, take responsibility for their learning they begin to develop autonomy over their learning and it is the development of autonomy that is critical to success in an online environment.

Curriculum Review

A review of curriculum that reflects a constructivist, learner-centered approach asks the reviewers to consider the way in which the learning environment of the course is designed rather than the content that is being transferred. The function of online learning opportunities is necessarily part of that review. Admittedly the inclusion of online experiences, whether web supported, hybrid/mixed delivery, or fully online, does not assure a constructivist pedagogy; however, the tools typically employed in these virtual environments easily support a learner-centered approach for the teacher, and from the viewpoint of cognitive study of memory and learning, online teaching tools may, in fact, be superior to traditional instructional techniques. Miller (2009) writes that “Instructional technology meshes remarkably well with several of these principles [principles that govern how we remember] opening up new ways for us to make course material memorable.”

Weigel’s 2002 book, *Deep Learning for a Digital Age*, offers a thorough examination of how online tools can be used to foster constructivist pedagogy and learner-centered teaching. Interestingly, he does not advocate fully online courses for most institutions. While the tools available for online learning lend themselves to community building, sharing information, and seeking information outside the confines of the course, online learning by its very nature requires active participation on the part of the student, and a great degree of learner discipline, motivation, and autonomy.

Students need to be prepared for these learning opportunities. As the *Speak Up* survey revealed, K-12 education is still dominated by transmissive learning experiences. Students need to be guided through the transition from transmissive to transactive and transformative learning in order to develop the autonomy to be successful in the fully online environment. Weimer (2002) writes that “the transformation from dependent to independent learner is gradual; it does not happen all at once as a consequence of a few learner-centered assignments or courses. It is a sequential process and mirrors other kinds of growth.” She recommends a developmental approach, recognizing that like all human growth “development is not linear, predictable, and exclusively forward.”

Fostering Student Autonomy

Autonomous learning is an essential behavior for students to acquire if they are to continue learning and growing as learners throughout their careers and lives. Sometimes referred to as “self-growers,” (Myrvaagnes, 2007) these individuals are “valued in society because of their ability to leverage their strengths and rapidly address areas for improvement.”

Grow (1991) offered a sequence of four stages in this process of maturing from a dependent learner to an autonomous learner which can provide a helpful reference for consideration of how online experiences might be sequenced in order to best support student learning. Stage one is the dependent stage which is characterized by passive dependence upon authority relying on the authority figure (teacher) telling them what to do and when. According to Grow, students move beyond this dependent learning mode to a second stage characterized by moderate interest and self direction and a third stage characterized by students who are receptive to peer learning and are responsive to the teacher as facilitator. The fourth stage of Grow’s sequence toward independent learning is characterized by students who “thrive in an atmosphere of autonomy.” Teachers at this stage intervene only when necessary. Grow’s stages of autonomy mirror the transition from transmissive to transformative learning and provide a means for identifying learning environments that support them.

For the purpose of this paper, we will focus on identifying learning environments that incorporate online learning in support of autonomous learning. The three modes of online delivery, web supported, hybrid/mixed delivery, and fully online, align with the types of learning, transmissive, transactive, and transformative. We define *web supported* as courses that use the web to support or enhance a face-to-face class. This use of the web may include a grade book function and email, but the primary focus is use of the web for posting additional information for students to access. This modality fosters transmissive learning experiences with the web functioning as a source of content material.

The hybrid or mixed delivery class is aligned with transactive learning. The hybrid course is both face-to-face and online, offering the instructor the opportunity to guide online learning. Hybrid courses can support students’ transition through these stages by providing opportunities to conduct group activities, exchange ideas, and give peer feedback in a structured online environment. Carmel and Gold (2006) studied the effects of hybrid courses in comparison with traditional face-to-face and found no difference in student performance,

retention, and satisfaction *when the hybrid courses were carefully structured and included considerable teacher guidance*. Teacher guidance is key.

Herbert (2006) noted that a critical issue in retaining students in online environments is a student's sense of belonging. Establishing community is a key feature of constructivist pedagogy regardless of course delivery modality. The hybrid course experience offers the opportunity to build upon the face-to-face interactions and carry the sense of community beyond the confines of the classroom through the use of online tools like chat, discussion boards, work groups, blogs, and web pages. The hybrid course provides the teacher with the opportunity to guide the students in the online environment more directly by using the online experiences as an enhancement and reinforcement of the face-to-face experiences. By gradually shifting the learning experiences more and more into the online venue, the teacher can promote students' independence and confidence as well as effectiveness as online learners. As a result of successful hybrid experiences, students will likely become more autonomous in their learning and be prepared for the fully online course experience.

Fully online courses demand active engagement on the part of the student. While they likely make use of the same tools as the hybrid, the physical presence of the teacher is absent and student success relies on the autonomy of the student to fully engage in the environment.

Part of the complexity of examining learning environments this way is the fact that the designations web supported, blended/hybrid, and fully online do not guarantee the design of the learning environment as we have characterized them. In order to gain a clearer picture of the design of the learning environment, we have developed a rubric that examines features of learning environments in relation to autonomous learning. [See Figure 1: Online Learning Autonomy.]

This rubric is an adaptation of a rubric developed by a colleague for use in determining course caps for online instruction with the intention of correlating course design with enrollment. Our version attempts to correlate course design and use of web tools with the features of quality learning environments: student empowerment, which we have labeled *autonomy*; cooperation and collaboration, which we have labeled *community*; and prompt feedback, self-assessment and peer review, all tied to specific learning outcomes, which we have labeled *assessment/evaluation*. We recognize that the use of a specified tool is not a guarantee that the environment is supportive of student autonomy; we present this as an initial attempt to consider design of an online learning environment.

We believe that students' introduction to online learning should progress through these three modalities of delivery with the strongest emphasis on hybrid/mixed delivery. Fully online delivery should be reserved for the mature student who has already experienced the hybrid/mixed delivery modality and has acquired a substantial knowledge base in the subject area.

Conclusion

Students' progression into online learning environments should be addressed as part of the larger context of curriculum review, for the opportunities that online learning in its various formats can offer the learning environments are too robust to be left to chance. Goldsmith's (2001) qualitative study on student responses to online learning reminds us that "students respond positively to what we understand as good pedagogy—active learning, excellent interaction amongst students, and a knowledgeable faculty member who is actively involved with students and provides constructive and timely feedback to their work." Good teaching, face-to-face or online, is about creating conditions to foster student learning. The online environment simply provides additional options for creating those conditions. An important point made by Sloan-C in relation to web course design is that the goal is not to replicate the face-to-face experience but to use tools available to achieve the same learning outcomes.

The tools that are available for online teaching are just that: tools. We need to keep in mind the guidance offered by Weimer (2002) when she cautioned that students are not ready for many learner-centered practices, so learner-centered strategies need to be introduced to them incrementally and students need to be prepared for the experience. This is true for online as well as face-to-face learning. We need to prepare our students to engage in their learning using these tools and keep in mind that independent learning is a learned behavior that happens over time. Reviewing curriculum comprehensively with a focus on types of learning holds the promise of creating an undergraduate experience that is transformational and prepares students for the challenges of today's workforce and a life of continuous learning.

Figure 1: Online Autonomous Learning

	Focus	Transmissive / Web Supported	Transactive / Hybrid / Mixed Delivery	Transformative / Fully Online
Engagement & Empowerment	Level of Autonomy	Low	Emerging	High
	Role of Professor	Professor directs all learning, stands as authority over content and understanding of content	Professor guides students through interactions with course content, when possible/appropriate allowing for individual interpretation	Professor facilitates student interaction with course materials and serves as supporter and mentor
	Independent Learning Opportunities	Professor provides all course content via textbook, handouts, posted materials on web	Professor guides students in drawing connections between new content material and previously learned concepts or experiences; encourages independent research outside course confines	Students encouraged to reflect on course content in relation to their prior knowledge and experiences; Independent investigation required; outside learning required; share outside learning with class
Assessment & Evaluation	Course Outcomes	Mostly or entirely lower-order skills (recognition, identification, reporting factual information, etc.)	Some lower- and some higher-order skills	Mostly or entirely higher-order skills (analysis, synthesis, complex application, problem-solving, etc.)
	Learning Assessment Methods	Automated - all or nearly all student work is scored or assessed using scantron or automated tools. Little feedback beyond test and quiz scores	Multiple means of meeting learning outcomes; collaborative work incorporated and assessed; opportunities for peer assessment	Individualized - instructor scores and/or responds to each student's work; self assessment incorporated as well as collaboration and peer assessment
Community Building	Technologies/ Tools Used	Course uses some online tools such as e-mail, assignments; web used for posting additional content material and course procedures and policies	Course regularly uses most learning management tools including discussion or chat, groups, whiteboard both in face-to-face instructor led sessions and independently	Course employs most learning management system tools, including chat, groups or Tegrity, along with outside tool(s) such as wiki or Google Docs, web conferencing, virtual world/ lab, etc. No face-to-face instruction
	Student-Student Interaction	Low - little or no student-student interaction	Moderate - occasional to regular discussion OR collaborative activity	High - regular discussion AND collaborative activity
	Student-Instructor Interaction	Low - instructor interacts primarily with whole class synchronously in lecture format	Moderate - In addition to face-to-face meetings, instructor regularly interacts with class and individuals or groups asynchronously via announcements, e-mail, discussion OR synchronously via chat/phone, web conference	High - instructor regularly interacts with whole class and individuals or groups asynchronously AND synchronously

References

- Allen, I. E., & Seaman, J. (2007). Online nation: Five years of growth online. Retrieved July 20, 2009 from, www.sloan-c.org/publications/survey/pdf/online_nation.pdf
- Bandura, A. (1999). The social cognitive theory of personality. In D. Cervone & Y. Shoda (Eds.), *The coherence of personality: Social-cognitive bases of consistency, variability, and organization* (pp. 185-241). New York: Guilford Press.
- Barr, R., & Tagg, J. (1995). From teaching to learning: A new paradigm for undergraduate education. *Change*, 27(6), 13-25.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). How people learn: Brain, mind, experience, and school. Washington D.C: National Academy Press.
- Carmel, A., & Gold, S. (2007). The effects of course delivery modality on student satisfaction and retention and gpa in on-site vs. hybrid courses. Retrieved July 28, 2009 from, tojde.anadolu.edu.tr/tojde26/pdf/article_11.pdf
- Carr, S. (2001). Is anyone making money on distance education? *Chronicle of Higher Education*. Retrieved July 27, 2009 from <http://chronicle.com/free/v47/i23/23a0410101.htm>.
- Chickering, A., & Gamson, Z. (1987, March). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39:7, 3-7.
- Cullen, R., & Harris, M. (2008). Assessing learning-centeredness. *Assessment and Evaluation in Higher Education*, 34(1), 115-125. First Published Online April 2008, DOI10.1080/02602930801956018
- Evans, J. (2009). High-tech cheating? Students see it differently. Retrieved July 18, 2009 from <http://www.eschoolnews.com/news/top-news/index.cfm?print&print&i=59609>
- Garavalia, L. S., & Gredler, M.E. (2002). Prior achievement, aptitude, and use of learning strategies as predictors of college student achievement. *College Student Journal*, 36, 616-25.
- Goldsmith, D. (2001). Communication, humor and personality: Students' attitudes to online learning. *Academic Exchange Quarterly*, Summer.
- Grow, G. O. (1991). Teaching learners to be self-directed. *Adult Education Quarterly*, 41(3), 125-149.
- Harris, M., & Cullen, R. (2009). A model for curriculum revision: The case of engineering. *Innovative Higher Education*. 34(1), 51-63. DOI 10.1007/sw10755.08-9090-z.
- Herbert, M. (2006). Staying the course: A study in online student satisfaction and retention. *Online Journal of Distance Learning Administration*, 9(4), Retrieved July 28, 2009 from, elizabethtown.kctcs.edu/.../notifications/Retention_Publication.pdf
- Knowles, M. S. (1984). *Andragogy in action: Applying modern principles of adult learning*. San Francisco: Jossey-Bass.
- Mezirow, J. (1990). *Fostering critical reflection in adulthood: A guide to transformative and emancipator learning*. San Francisco: Jossey-Bass.
- Miller, J. P., & Seller, W. (1990). *Curriculum: Perspectives and practice*. Toronto: Copp Clark Pitman.
- Miller, M. D. (2009). What the science of cognition tells us about instructional technology. *Change*, 41(2), 16-18.
- Moore, J. (2002). Elements of quality: The Sloan-c framework. Neeham, MA: Sloan Center for Online Education.
- Myrvaagnes, E. (2007). Performance levels for learners and self-growers. In S. W. Beyerlein, C. Holmes, & D. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (pp. 87-90). Lisle, IL: Pacific Crest.
- Nancarrow, C. (2007). Profile of a quality learner. In S. W. Beyerlein, C. Holmes, & D. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (pp. 23-26). Lisle, IL: Pacific Crest.

- Nygren, K. (2007). Elevating knowledge from level 1 to level 3. In S. W. Beyerlein, C. Holmes, & D. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (pp.165-168). Lisle, IL: Pacific Crest.
- Perry, R. P. (1997). Perceived control in college students: Implications for instruction in higher education. In R. P. Perry, & J. C. Smart (Eds.), *Effective teaching in higher education: Research and practice* (pp. 11-60). New York: Agathon.
- Schiro, M. S. (2008). *Curriculum theory: Conflicting visions and enduring concerns*. Los Angeles, CA: Sage.
- Shapiro, S. R., & Livingstone, J. A. (2000). Dynamic self-regulation: The driving force behind academic achievement. *Innovative Higher Education*, 25(1), 59-76.
- Smith, P., & Apple, D. (2007). Creating quality learning environments. In S. W. Beyerlein, C. Holmes, & D. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (pp. 311-314). Lisle, IL: Pacific Crest.
- Weigel, V.B. (2002). *Deep learning for a digital age: Technology's untapped potential to enrich higher education*. San Francisco: Jossey-Bass.
- Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70.
- Zull, J. (2002). *The art of changing the brain: Enriching the practice of teaching by exploring the biology of learning*. Sterling, VA: Stylus.