

## A Literature Review on Learner-Centered Online Course Design

According to a report conducted by the Sloan Consortium, an organization that supports online learning, overall online enrollment increased from 1.98 million in 2003 to 2.35 million in 2004 (*Growing by Degrees: Online Education in the United States, 2005*, [http://www.sloan-c.org/resources/growing\\_by\\_degrees.pdf](http://www.sloan-c.org/resources/growing_by_degrees.pdf)). That 16% increase in growth rate is over ten times what was projected by the National Center for Education Statistics for the general postsecondary student population. More than half of the 1,000 colleges that participated in the study rated online learning as essential to their overall strategy ([Sloan, 2005](#)). Fortunately, the advancement of online technologies and technology-inclusive pedagogical practices now makes it possible for universities communities to plan, implement, and support non-linear, interactive, learner-centered online courses. Irrespective of the recent technological progresses, though, universities remain challenged by needs to redesign traditional courses to promote learner-centered, active learning experiences in online courses and by selecting means for evaluating the resulting courses.

### What is A Learner-Centered Online Course?

In 2003, [Maki and Maki](#) highlighted that it is the well-thought technology-inclusive design of an online course and not the technology alone that produces the differences in favor of the online courses when such differences occur. Instructors should take a learner-centered approach to the design of the online course ([Teemant, Smith, Pinnegear, & Egan, 2005](#); [McCombs & Vakili, 2005](#)). When creating a learner-centered online course, [Teemant et al. \(2005\)](#) point out by review of relevant research that the instruction should:

- Be clear and understandable
- Respond to the way in which students learn and communicate
- Acknowledge student interests and motivations
- Honor the social nature of learning
- Engage students, and
- Provide students with meaningful and timely feedback.

Likewise, [McCombs and Vakili \(2005\)](#) assert that support is growing for the design of online instruction that focuses on the student. The researchers identify key issues in using educational technologies learner-centered pedagogies that include:

- Allowing means for learners to build interpersonal connections and relationships
- Finding strategies that acknowledge differing learner needs, abilities, and interests
- Providing personal control and choice to learners, and
- Assessing and addressing the technology self-efficacy of individual learners

[Chickering and Gamson](#) (1991) developed seven principles for good practice in undergraduate education that have been interpreted by several scholars as transferable

to the online and hybrid course environments ([Phipps, 2005](#); [Guidera, 2004](#); [Roby and Hampikian, 2002](#)); The Seven Principles for Good Practice in Undergraduate Education are anchored to the concept of creating a learning-centered environment for students and include:

- Encouraging student-faculty contact
- Encouraging cooperation among students
- Encouraging active learning
- Providing prompt feedback
- Emphasizing time on task
- Communicating high expectations, and
- Respecting diverse talent and ways of learning

A document that was created from over a century of research by the American Psychological Association (APA) Task Force on Psychology in Education (1993) was revised in 1997 to detail 14 learner-centered principles (<http://www.apa.org/ed/lcp.html>). [McCombs and Vakili \(2005\)](#) used those 14 principles to devise a learner-centered framework for online learning. The framework focuses on ways to build a community of learners and suggests that an online course should:

- Focus on inquiry and problem-based learning
- Convey difficult concepts with bi-modal communication software
- Support collaboration as a means for learners to construct their own knowledge and contribute to a group
- Allow students to create electronic portfolios and other authentic assessments
- Incorporate initial and ongoing needs assessments that provide choice of activities and create optimally challenging environments
- Scaffold learning by creating hyperlinks to resources that help learners reach the next level of development
- Use a variety of technologies such as multimedia and streaming technologies to appeal to different learning styles and meet the needs of students with disabilities
- Provide ways for assignments to be graded electronically via a variety of assessments and have electronic feedback and grades available to students

[McCombs and Vakili \(2005\)](#) further endorse the learner-centered framework by insisting that the framework “adds a constant reminder that the human element cannot be left out of even the most advanced technology-supported networked learning communities” ([2005, p. 1597](#)).

## **How Should A Traditional Course Be Redesigned for Online?**

Technological gains in the past decade allow for added robustness of online courses; linear, flat-text, unidirectional courses are not only antitheses of learner-centered instructional practices; they are examples of uninspired use of the technology in an academic context. And there is a profound difference between putting a traditional course online and redesigning a traditional course for a learner-centered online

experience. But redesigning a course is “far from simple and requires expertise that may be distributed among different individuals” (Cox, p. 1780). Some of the anti-online sentiments exhibited by some faculty members mask a fear of changing long-standing traditional teaching strategies (Weigel, 2002).

The Program in Course Redesign, an \$8.8 million grant from the Pew Charitable Trusts ([www.center.rpi.edu/PewGrant.html](http://www.center.rpi.edu/PewGrant.html)) was created in April 1999 to address the issues many colleges have with using online technologies for the purpose of improving the quality of student learning, decreasing student attrition, and reducing costs of instruction. Thirty institutions from across the United States received grant monies to redesign large-enrollment courses of various disciplines in order to have a significant impact on the largest number of students. In each case the whole course, not just the individual section was considered for redesign.

Of the 30 courses redesigned, 19 showed improved student learning and 11 showed no significant difference (Twigg, 2003). The redesigned courses also demonstrated “increased course completion rates, improved retention, better student attitudes toward the subject matter, and increased student satisfaction with the new mode of instruction” (Twigg, p. 24). Twigg (2003) also noted that many of the courses reported significant improvements in their drop, failure, and withdrawal rates. Successful techniques employed in the redesign courses included continuous assessments and feedback, increased interaction among students; modules that grouped interactive tutorials, exercises, and assignments; readily available support from the instructor, teaching assistant, and peer tutors; and undergraduate learning assistants (ULAs) who tended to be more in tune with the course material and communication style of the students than graduate teaching assistants (GTAs).

## **What Are the Components of Learner-Centered Online Courses?**

Components for online courses can vary greatly. However learner-centered online courses often employ similar technologies and means for interaction (Roby, 2002). In addition to hyperlinked text files that allow non-linear branching, multimedia presentations, audio and video files, message board and chat rooms, and relevant websites, instructors are more frequently employing interactive Java applets to present information. Applets allow presentation and frequent review of complicated course content in a concrete, contextualized, and meaningful manner (Coder, 2005; Riffell, 2004; Teemant et al., 2005, Whitehouse, 2005). Applets also enable the use of simulation and gaming exercises such as in a science course where the student would observe the effect on an image's distance and height if the object's position or the mirror's focal length is adjusted (Coder, 2005). According to Coder (2005), an instructor who frequently uses Java applets in his own online courses, “students consistently state that applets provide a learning experience far superior to reading the textbook or listening to traditional lectures” (Coder, ¶6, line 6). Other benefits of including applets in online courses are garnered by providing students with means to view and review intricate, abstract, expensive, or hazardous experiments. Applets can also require students to perform high order thinking skills and improve problem solving skills, and

curious or intrinsically motivated students can manipulate other variables or aspects of the applet for further exploration ([Coder, 2005](#)).

### Other Course Management Features

Contrary to popular belief, online teaching does not necessarily amount to less work for the instructor ([Sheppard, 2002](#)). Beyond the course content, an online course also involves “interaction, dialogue, mentoring, and coaching” ([Oblinger, 2006, p. 15](#)). Particularly with higher-enrollment courses, it is easy to initially feel overwhelmed ([Sheppard, 2002](#)). Online instructors must prepare for the upcoming week’s instruction and interact with students via email and other discussion forums as well as meet with TAs every week to talk about the approaching week’s course material and discuss any issues with labs and assignments in addition to other responsibilities. Fortunately, using a course management system can help in managing the online course. Students can take quizzes online that are automatically graded and randomized, which would prevent copying of answers, require students to stay on task, keep the students engaged, promote active learning ([Scheines, Leinhardt, Smith, & Cho, 2005](#); [Roby and Hampikian, 2002](#)), and provide the instructor with more data ([Sheppard, 2002](#)).

[Pascarella and Terenzini \(1991\)](#) and [Roby and Hampikian \(2002\)](#) suggest that the availability of the instructor via email may increase student perceptions of the quality of interaction experienced in the course. But faculty must create protocols to avoid getting inundated with emails ([Waterhouse and Rogers, 2004](#); [Sheppard, 2005](#)) and effectively facilitate the interactions ([Zhao et al., 2005](#)). Controls can include predetermined email and discussion board response hours ([Sheppard, 2002](#), [Roby, 2004](#)), TA response to non-content related emails, and a declaration of student responsibilities with regard to submitting questions and communications ([Waterhouse and Rogers, 2004](#); [Roby, 2005](#); [Roby 2004](#)).

### Does Inclusion of Active Learning in Online Courses Make a Difference?

Many educators insist that in traditional settings learning best occurs when students actively participate in their learning environment ([Coder, 2005](#); [Riffell & Sibley, 2004](#); [Cooper & Robinson, 2000](#), [Roby 2005](#)). Similarly, active learning environments in online courses can engage students and encourage students to retain concepts ([Riffell & Sibley, 2004](#), [Dede, 2005](#)). According to [Oblinger \(2006\)](#), instructors should be challenged to “move beyond the notion of a course as covering content to the idea of a course as constructing a series of learning environments and activities” ([Oblinger, 2006, p. 14](#)).

In 2003, [Riffell and Sibley \(2004\)](#), converted a traditionally face-to-face course into a hybrid course (the class met both in person and online). The course focused on introductory science and enrolled over 100 non-science major students. The rationale for the course redesign centered on the lack of information retention exhibited by the students, as well as the absence of higher order thinking skills and motivation for learning ([Riffell & Sibley, 2004](#)). Two sections of the course were taught by the same

instructor. One course was hybrid and one was completely face-to-face. The face-to-face lectures included two passive lectures per week during which the students were presented with information and one active learning exercise in the middle of the week. The hybrid course included online problem-based assignments for the two days the traditional course met and the same active learning exercise as the traditional course in the middle of the week. The active learning exercise included a 5 – 15 minute overview, problem activities in informal groups, and a 5 – 15 minute activity summary.

In assessing student performance in the hybrid and traditional courses, Riffell and Sibley found that students in the hybrid course used their textbook more often, contacted other students with questions, studied more frequently in groups, and did better on the pre- and post-tests for the course ([Riffell & Sibley, 2004](#)). Both freshmen and upperclassmen in the hybrid course scored higher on questions that dealt with the materials covered during the active learning exercise. Overall, their findings indicated that active learning hybrid course formats can substantially improve the amount of effectiveness in a high-enrollment, lecture course, especially for upper-class, resident, non-science major students.

Learning occurs in a variety of formats. In a series of experiments in 2000 and 2001, [Scheines, Leinhardt, Smith, and Cho \(2005\)](#) delivered instruction of the same course in two methods: one principally online and one principally by lecture. In the online version of the course, students received weekly modules consisting of content with interactive simulations and exercises. The modules were followed by an online mastery quiz that required a minimum 70% successful completion. Students in the online course were not allowed to go to the classroom lectures, but they were expected to attend one interactive recitation per week, identical to that required by the lecture version of the course. During the recitation, students were encouraged to ask questions about the material and TAs covered problem sets and case studies related to the coursework. In the lecture version of the course, class consisted of two lectures per week that followed the content provided in the online modules and a weekly recitation identical to that for the online course. Voluntary assignments approximating those offered interactively online were handed out to lecture students.

[Scheines, Leinhardt, Smith, and Cho \(2005\)](#) compared the described delivery formats on over 650 students in five different semesters at both the University of California at San Diego and the University of Pittsburgh. The researchers found that the online students consistently performed slightly better than the lecture students, independent of any course feature or demographic measured. [Scheines, et al. \(2005\)](#) also found that the immediate feedback and active learning included in the online courses had positive correlations to student achievement and perceptions, but they also learned that online students were less likely to attend the weekly recitations, which had a negative correlation with achievement for the online students.

## **What is the Body-of-Knowledge Saying about Online Learning Effectiveness?**

More comprehensive than the [Scheines, et al. \(2005\)](#) study, [Zhao, Lei, Yan, Lai, and Tan \(2005\)](#) conducted a meta analytical study of research on distance education to identify factors that affect the effectiveness of distance education and explore the benefits of hybrid courses over face-to-face only interactions. [Zhao, et al. \(2005\)](#) demonstrated that while on an aggregate level most traditional and online course comparisons resulted in the no-significant-difference conclusion, a closer look at the data revealed that 67% of the studies showed there is distinct difference across the studies in favor of online instruction and 33% of the studies outlined the opposite. According to Zhao, et al., studies published before 1998 did not seem to find a significant difference. That trend changed in and after 1998. When grades or student perceptions about the course were measured, distance learning showed a significantly better outcome than traditional learning. Instructor involvement was the most significant moderator among all the identified factors, which suggests that instructor involvement is positively correlated with course outcomes for the online course; the more involved the instructor, the higher the achievement and perception of the course by the students. Almost all content areas showed no significant difference between the two instructional formats except computer science, which favored distance learning. Courses that employed both synchronous and asynchronous interactions showed online education to be significantly better than traditional instruction and courses that included a face-to-face component with the online course (a hybrid course) demonstrated a preference for online learning over traditional instruction. Students on the undergraduate level experienced more positive learning outcomes online than students with a high school diploma, but students with a college degree did not perform better than undergraduate students in online courses. Relatedly, undergraduate students performed better online than face-to-face, but students with a high school diploma and students with a college degree showed no significant difference in how they performed in traditional and online courses. In essence, the [Zhao, et al. \(2005\)](#) findings support the position that distance education coupled with face-to-face instruction is the more effective learning approach for students than face-to-face only instruction.

In a separate study of 15 community colleges, three of which were located in California, [Cox \(2005\)](#) observed six components that determined a college's capacity to provide sustainable online courses. The components included:

- Administrative commitment from at least one senior administrator with authority to affect resources for the courses
- A full-time instructional designer concerned with curricular and programmatic issues
- Technical support services for online students
- Professional development designed to help instructors learn to facilitate online
- Financial and technical resources to assist instructors with time to development courses and with online teaching issues, and
- An adequate level of faculty participation of more than four faculty members

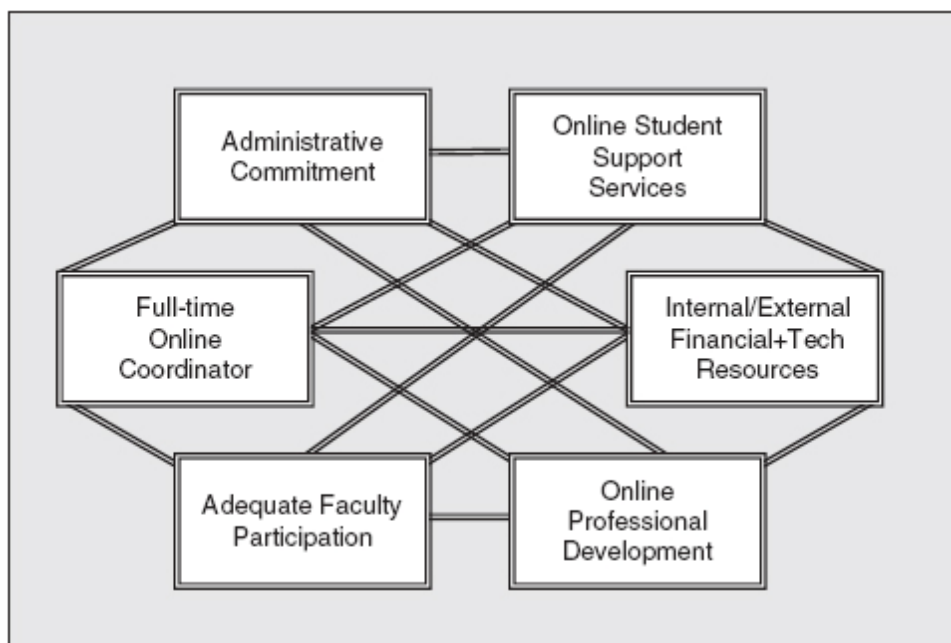


Figure 1. Components of Basic Online Capacity (Cox, 2005)

Though [Cox \(2005\)](#) found that 5 of the 15 colleges that were included in the study processed the six components for sustainable online courses, none of the schools demonstrated resolution of issues concerning faculty compensation, intellectual property, and course evaluation.

### What Resources Do Faculty Need to Create Successful Online or Hybrid Courses?

Traditionally, online courses have been created by trail-blazing faculty who are intrinsically motivated – or administratively designated. Many university departments have found that the ad hoc course model is rarely sustainable or scalable ([Oblinger, 2006](#)). Faculty team collaboration on online projects is essential to the success of the online courses ([Oblinger, 2006](#), [Trinkle, 2005](#); [Donohue and Howe-Steiger, 2005](#); [Cox 2005](#); [Cohn, 2004](#)). From navigating through the mazes of available technologies through developing appropriate course content to creating ideal learning environments, online and hybrid courses are most effective when undertaken collaboratively. In a faculty team environment, Cohn (2004) states that faculty members can partner by:

- Creating content-consistent sections of the same course taught by multiple faculty members
- Producing seamless content for successive courses within a program
- Designing complimentary content for related courses between programs, or
- Developing an all-encompassing master course for learners from multiple course sections taught by multiple faculty members

Though a positive start, faculty working in collaborative teams with the idea of effective online courses is not alone enough to bring that goal into fruition. In addition to the faculty teams who allow their “autonomy to yield to collaboration” ([Oblinger, 2006, p. 15](#))

is the requirement of administration to willingly endorse online and hybrid courses (Cox, 2005) by “finding ways to balance traditional classroom modes with successful, cost-effective electronic models ([Donohue and Howe-Steiger, 2005, p. 23](#)). Technically skilled staff with the necessary “attitude of respect, cooperation, and support for the instructors” ([Donohue and Howe-Steiger, 2005, p. 23](#)) is also a requisite. DePauw University, recipients of the 2004 EDUCAUSE Award for Systemic Progress in Teaching and Learning, embrace the concept of technology and curricula fusion by aligning the school’s technology initiatives with the institution’s missions and goals. DePauw’s university culture considers technology fluency to be a liberal art inasmuch as the original liberal arts core was thought of as areas of knowledge that are “essential to a well-rounded individual and to meaningful, life-long engagement in the world” ([Trinkle, 2005, p. 20](#)) and should be taught at the level of critical thinking and reasoning by being unobtrusively integrated into each college curriculum and experience ([Trinkle, 2005](#)).

### **How Should Online Courses be Evaluated?**

As universities approach the topic of offering online courses, they must delineate their purposes for developing and providing online learning and clearly specify their educational objectives ([Mandinach, 2005](#)). Effective evaluations of the online courses depend on clear objectives and stakeholders of the online learning initiatives must agree that their purposes and objectives are appropriate ([Mandinach, 2005](#)). Evaluation of online courses and programs can be made from various angles that are not exclusive. According to [Mandinach \(2005\)](#), evaluations can be based upon:

- The learning movement, under which is the premise that stakeholders should learn from an evaluation
- The theory-based movement that suggests interpretation must occur within a theoretical framework, and
- Evidence-based evaluation, which uses experimental methods in attempt to determine what works.

Other evaluation methods that are helpful in evaluating online learning are implementation analysis, which is designed to connect process and outcome analysis by examining what variables affect implementation, and the formative experiment, which examines how the technology is being implemented when the goal of its use has been identified (the Rubric for Online Instruction (ROI) created at California State University, Chico, <http://www.csuchico.edu/tlp/onlineLearning/rubric/rubric.pdf> is an example of both methods) . [Mandinach \(2005\)](#) recommends a mixed methodology model that combines both qualitative and quantitative techniques that are appropriate for the questions being asked and cautions that a critical factor in evaluating online learning is whether it meets the standards of the governing accrediting association for the university. Mandinach also asserts that though there is great value in assessing the learner, evaluating assessment techniques, and conducting needs analyses for the online courses, instructors and pedagogical processes should be primary foci for inquiry: “It may be premature to concentrate on student learning processes and outcomes without understanding the pedagogical skills teachers or professors need to

bring to e-learning” ([Mandinach, p. 1826](#)). Finally, Mandinach posits that it is imperative that researchers ask questions about online learning that are of interest to the funding, policy, and administrating stakeholders for online courses and programs within the university.

## **Conclusion**

In the process of exploring new distance learning opportunities, it can be easy to overlook the central role that learner-centered principles can play. Researchers have shown that hybrid and online courses can add value to the students’ learning experience if done correctly. It is therefore incumbent upon instructional designers and instructors – with the support of administrators and other stakeholders – to address learner needs by promoting purposeful, motivational, social, and academic outcomes.

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