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A collaborative, design-based approach to improving an online program

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ABSTRACT

This paper explores the effects of a collaborative, design-based approach to improving teaching and learning in core courses in an online program. It describes research which tested a model for linking iterative, theory based improvements in the design and implementation of online courses to learning outcomes. The researchers, who are also faculty in a graduate-level Teacher Leadership program, used the Quality Matters and Community of Inquiry frameworks to address first course design (QM) and then course implementation (CoI) issues across multiple semesters. Results show improved learning outcomes in most core courses from this two-step process.

1. Introduction

The number of institutions of higher education offering online courses continues to grow. In the fall of 2011, almost one third of all post-secondary students (6.7 million students), took at least one online course (Allen & Seaman, 2012). This phenomenally rapid growth of online learning challenges college and university programs to make sure that their online offerings are of the same high quality as their traditional classes. In particular, because online learning clearly differs from traditional, classroom learning, new measures of instructional quality and new approaches to course improvement must be employed. This paper explores the use of two measures specific to online learning – the Quality Matters rubric and the Community of Inquiry survey – employed in a design-based, iterative manner to improve core courses in a fully online, master of Teacher Leadership program. In the sections which follow the Quality Matters and Community of Inquiry frameworks are briefly reviewed, as is design-based research.

2. Background

2.1. Quality Matters rubric

The Quality Matters (QM) rubric is a faculty-oriented, process centered, peer review instrument based on instructional design principles (Quality Matters, 2005) designed to assure quality design in online and blended courses. Quality Matters is an input model of learning for the blinded and online courses. It is grounded in an instructional design view of higher education and assumes that effective learning in higher education flows from well-specified outcomes, objectives and assessments.

The QM rubric consists of 41 items in eight categories describing the criteria to be met. Items are assessed on a meets/does not meet basis and the categories are assigned point values of 1, 2, or 3, depending on their perceived importance. To meet QM review expectations, courses must meet all 3-point criteria and earn a total of 72/85 points or more on the entire evaluation measure The eight categories within the rubric are — course overview, learner objectives, assessment and measurement, resources and materials, learner engagement, course technology, learner support, and accessibility (see: https://www.qualitymatters.org/files/QM_Standards_2011-2013.pdf). A QM review is carried out by three trained reviewers who work together to decide whether or not individual items are met and provide suggestions for improvement. A QM redesign involves addressing those issues identified by the reviewers and resubmitting the course for approval. The QM framework thus addresses course design, and, it should be noted, addresses it from an objectivist perspective. The QM framework does not address course implementation and/or the processes of learning, nor does it purport to do so.

Prior to the review by the three evaluators, the instructor provides additional information to include course expectations, technology used, delivery methods for material, audio/visual components, weekly interaction by students with instructor and each other, and level of email usage for communication. This information, combined with the Quality Matters rubric enables the evaluators to better understand the course as developed by the instructor and provides a realistic and honest evaluation.

2.2. Community of Inquiry framework

The Community of Inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000), on the other hand, focuses on learning processes and does so from a collaborative constructivist point of view. The CoI framework represents learning in online environments as supported by three presences – social presence, teaching presence, and cognitive presence – that work together to support deep and meaningful inquiry and learning online. The three presences are not conceptualized as

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belonging to particular actors in the educational experience, rather as distributed across the teacher, the students, and course materials and tools. For example, Shea found evidence of student perceptions of the teaching presence of their classmates and that such perceptions affected their satisfaction and perceived learning in online classes (Shea, Li, Swan, & Pickett, 2005). Research findings have linked social presence (Picciano, 2002; Swan & Shih, 2005), teaching presence (Shea et al., 2005) and cognitive presence (Garrison & Cleveland-Innes, 2005) to each other and to such outcomes as course satisfaction, community, and perceived and actual learning.

In 2008, researchers working with the CoI framework developed a survey designed to measure student perceptions of each of these presences (Swan et al., 2008). The survey consists of 34 items (13 teaching presence, 9 social presence, and 12 cognitive presence items) that ask students to rate their agreement on a 5 point Likert scale (1 = strongly disagree; 5 = strongly agree) with statements related to the CoI framework (see Appendix A). The survey has been validated through factor analysis (Arbaugh et al., 2008) and used to further explore the CoI framework and the interactive effects of all three presences (Garrison, Cleveland-Innes, & Fung, 2010; Shea & Bidjerano, 2009) with some meaningful results. For example, researchers have linked 21% of the variance in program retention to two social presence survey items (Boston et al., 2009).

Perceptions, however, are a subjective measure, and while very appropriate in the constructivist frame, they may not be everywhere appropriate. Accordingly, CoI researchers have recently begun exploring ways to link the framework and its three presences to course outcomes (Arbaugh et al., 2008; Boston et al., 2009). Quality Matters (QM) researchers have begun likewise investigating the relationship between course redesign and course outcomes. The research reported in this paper explores links between course design (as guided by the QM rubric), learning processes (as measured by the CoI survey), and course outcomes.

2.3. Course redesign

Design-based approaches blend empirical research with the theory-based design of learning environments. "Design research is grounded in the practical reality of the instructor, from the identification of significant educational problems to the iterative nature of the proposed solutions" (Reeves, Herrington, & Oliver, 2005, p. 107). Further, it centers on the systematic investigation of innovations designed to improve educational practice through an iterative process of design, development, implementation and analysis in real-world settings (Wang & Hannafin, 2005). Design-based research helps us understand "how, when, and why educational innovations work in practice" (Design-Based Research Collective, 2003, p. 5), because the innovations it explores are grounded in educational theory. Elements of design-based research that most resonate with our project include: intensive collaboration among researchers, commitment to theory construction while solving real-world problems, a focus on broad-based problems critical to higher education, and rigorous and reflective inquiry to refine learning environments (Bannan-Ritland, 2003; Design-Based Research Collective, 2003; Kelly, 2003).

The research reported in this paper did not start out to be design-based, but was pushed in that direction when its initial findings confounded expectations. The research was originally concerned with whether the Quality Matters (QM) review and revision of one fully online graduate course in Educational Research would result in improved learning processes (as measured by the Community of Inquiry (CoI) survey), and whether such improved learning process would, in turn, improve student performance (Day, Bogle, Swan, Matthews, & Boles, 2012; Swan, Matthews, Bogle, Welch-Boles, & Day, 2012). Outcome measures included scores on two major course assessments – a research proposal and the final exam – and final course grades. These assessments were standardized to percentage scores and compared before and after the QM revisions (Bogle et al., in press).

After an initial QM review of the Educational Research course (section B) which highlighted the lack of explicit learning objectives, the course was revised and passed a second QM review. Scores on the CoI survey and major course assessments were compared before and after the revisions. Initial findings, however, confounded our expectations. They showed reductions in student perceptions of all three CoI presences, but increases in student scores on the research proposal and final exam after the QM redesign (Fig. 1). These increases were not significant, however, because of the small numbers of subjects involved.

The findings led us to realize what we should have known from the beginning — that the QM and CoI frameworks are orthogonal. The former is objectivist, while the latter is constructivist. Likewise, the QM rubric and CoI survey measure different things, namely course design, and course implementation. That realization, in turn, led us to investigate whether iterative changes across multiple semesters to course implementations based on responses to the CoI survey could both raise those scores and result in improved student performance.

And they did. By reviewing CoI scores and addressing issues raised by the lowest scoring items on it, the course instructors made implementation changes from one semester to the next which resulted in both higher CoI scores and improved outcomes (Matthews, Bogle, Boles, Day, & Swan, 2012). Indeed the combination of an initial QM revision together with iterative changes based on student responses to the CoI survey was so successful in improving student outcomes in the original Educational Research (B) course to which it was applied, the approach was applied to a second version of that course (A) and two other core courses. This paper reports on the collaborative, design-based review and revision of courses undertaken by the faculty in a graduate program in Teacher Leadership at a small, mid-Western public university.

The research was designed to answer the following questions:

- Can course redesign based on meeting Quality Matters standards (QM revisions) result in improved student learning outcomes?
- Can changes in course design and implementation targeted to enhance particular Community of Inquiry scores (CoI revisions) result in increased CoI scores, and improved student learning outcomes?
- Can the combination of QM and CoI revisions over time lead to improved student learning outcomes?

3. Methodology

This study was grounded in design-based methods. Design-based approaches begin with the theory-based design of learning environments then use empirical findings from real-world implementations of those designs to iteratively refine them. This study involved four core courses in a Teacher Leadership program that were redesigned across multiple semesters by their individual instructors following a similar heuristic but their own epistemological beliefs. Initial redesign was based on a Quality Matters (QM) review that is grounded in instructional design theory. As previously noted, empirical findings from the first implementation of QM revisions confounded our expectations. Thus, an iterative process of redesign based on Community of Inquiry (CoI) survey data was instituted. This process was followed in all four courses, although in differing time frames. That process is described in the section which follows.

3.1. Subjects and setting

Subjects were graduate students of education enrolled in core courses in a fully online graduate program in Teacher Leadership at a small, Midwestern, public university. Students ranged in age from 24 to over 50 years old. Approximately 80% of the students were female; approximately 8% were minority students. The core courses included two sections of Educational Research (A and B) consistently taught by