QUALITY MATTERS IMPACT ON STUDENT OUTCOMES IN AN ONLINE PROGRAM

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ABSTRACT

The purpose of this study was to evaluate the impact of courses redesigned using Quality Matters (QM) on student learning in an online program at a large university in the southeastern United States. The QM Rubric for course design is widely used in higher education. However, research about its use in nursing education is understudied. This pilot project compared 100% online courses—two courses redesigned to meet QM standards and two traditionally designed courses by faculty. Student outcomes such as quality of online discussion forums, student end of course evaluations, and end-of-course grades, were measured and analyzed. The data analysis included descriptive statistics and parametric group comparisons. Results showed that all indicators, although not statistically significant, were more positive in the QM-redesigned courses. As online education programs continue to explode, assurance of quality in course design is a key factor in meeting student needs.

Keywords: online education, Quality Matters, distance education, student outcomes

INTRODUCTION

As colleges and universities strive to increase access to online educational programs to meet the current demand for them, programs that are quality- and outcome-driven are critical. The theoretical aspects of adult education and constructivist approaches through active and experiential learning are foundational components of designing online programs (Decelle, 2016; Russell, 2015). Post course-design indicators of student success, such as learning outcomes, engagement, and quality of online discussion forums, all serve as a means of evaluating and ensuring the quality of online courses.

Nursing education is pushing rapidly into the online arena due to many factors, including a shortage of nursing faculty, lack of clinical practice sites, and high percentages of qualified student applicants being turned away due to limited classroom seats (National League of Nursing, 2014a, 2014b). This expansion of online, educational opportunities is also a response to the Institute of Medicine's (IOM) 2010 Future of nursing report, which called for a significant increase in the number of Registered Nurses (RNs) to obtain their baccalaureate degrees (BSN). The national goal is to increase the number of BSN prepared nurses from 50% up to 80%. There are now more than 700 RN to BSN programs available in the United States (American Association of Colleges of Nursing [AACN], 2015a, 2015b). Many of these programs are online, and content is often created by individual faculty members based on their personal experience, educational preparation, and professional backgrounds. A clear consensus regarding quality design standards is not evident in the literature as quality is difficult to evaluate. Using design instruments to guide online course design and evaluation is necessary to maximize student outcomes (Baldwin, Ching, & Hsu, 2017). Hence, creating and maintaining quality online courses is becoming an urgent need in many distance, educational programs. To sustain online program enrollments, evaluations and quality

measures need to be implemented to assure best practices are in place.

Quality Matters (QM) is a not-for-profit organization founded in 2003 by a group of colleagues from the Maryland Online consortium (qualitymatters.org). This organization is now viewed as a leader in quality standards for online education and has earned national recognition for its efforts. QM offers a standard process for quality assurance through use of a rubric for online course design and a peer-review process by which courses can be certified by the organization (qualitymatters.org/qa-resources/rubric-standards/higher-ed-rubric). The QM Rubric is widely used in higher education and applicable across academic disciplines (Little, 2009b; Shattuck, Zimmerman, & Adair, 2014). Quality Matters reports having 60,000 members including higher education and K–12 educational institutions (https://www.qualitymatters.org).

LITERATURE REVIEW

A review of the literature—via online databases including CINAHL, Academic Search Complete, and Medline—for articles containing the terms "QM" and "distance online nursing education" found only two studies applicable to this article. Both were from the same author in 2009. Little (2009a) included a review of online education quality frameworks and standards including the QM program. The author suggested that use of standards and a peer review process is important and should be integrated in online programs. She commended the QM program for its ease of use, content validity, and nationwide recognition. In a pilot study, Little (2009b), used the QM rubric as one of the frameworks for the peer review of two online nursing courses and found the QM rubric was more consistent among reviewers and easier to use than other frameworks or tools. Student outcomes such as engagement and learning were not addressed.

There are many ways to measure quality in online courses including student interaction and engagement, which contributes to improved student learning. Smith and Crowe (2017) found in their qualitative study that faculty members believed there was a connection between student engagement and learning outcomes and that the development of relationships in the course increased engagement. Hampton and Pearce (2016) found a positive correlation between engagement and course performance for nursing students in an online program. Mitchell, Ryan, Carson, and McCann (2007) demonstrated that nursing students who logged on early in the course and more frequently demonstrated improved learning outcomes. Gaston and Lynch (2019) reported that although no significant differences were found in student engagement, factors related to the numbers of discussion forum posts and the amount of course content viewed were more positive in the QM-redesigned course compared to traditionally designed (Non-QM) courses. In addition, students in the QM-redesigned courses perceived that there were more methods used to involve them in the course.

The authors created the conceptual model presented in Figure 1. This model visually depicts the interconnectedness between student-centered outcomes of learning and engagement being dependent upon the course design framework of QM, learning theories, and student characteristics. The interaction of these three components results in student learning and engagement.

Figure 1. Conceptual Model

PURPOSE

The purpose of this study was to evaluate the effect of QM-redesigned courses on student learning outcomes in a 100% online nursing program. This study focuses on the following goals: (1) to examine whether QM-redesigned courses had a positive impact on student learning; and (2)

to evaluate the quality of discussion forums. The research questions included:

1. Is there a difference in student learning outcomes among QM-redesigned courses compared to traditionally designed (Non-QM) courses?
2. Is there a difference in the quality of student discussion forums in QM-redesigned courses compared to traditionally designed (Non-QM) courses?

METHODS

This pilot study was a retrospective data review to compare two QM-redesigned courses versus two traditionally designed courses (Non-QM) that were taught in 2015 in an online degree program and delivered via the Moodle2 Learning Management System (LMS). The nursing program participated in a universitywide QM initiative by redesigning two of the 10 courses for a 12-month program offered 100% online. The QM redesigned courses used the QM framework and eight standards to guide redesign. Each faculty member was paired with an instructional designer. Traditionally designed courses, or Non-QM courses, were those courses that were developed by faculty individually based on their online teaching experience with no guiding framework. Student outcomes including final course grades, student satisfaction, and quality of student online discussion forums were measured. Data files were created in Excel, and some reports were exported directly from the LMS. All files were password protected and stored in Dropbox. Expedited IRB approval was obtained prior to the start of this study.

These procedural steps were taken:

a. Sent email to all faculty listed as instructors for the courses to request permission to access their online courses and then use the information in this research study.
b. Requested student survey evaluation results from the data security officer.
c. Reviewed all courses and sections to verify whether the course was QM-redesigned or a traditionally designed course.
d. Modified the qualitative tool by Nandi, Hamilton, Chang, and Balboa, (2012) to evaluate the student discussion forums for content and interaction and to calculate a total quality score.
e. Data were then extracted and entered into Excel and SPSS for analysis.

ANALYSIS

The data were extracted from the Moodle2 LMS by both authors and exported into Microsoft Excel. Quantitative data were calculated and extracted from the online courses including grades, total number of student posts in discussion forums, number of student-to-student interactions in forums, and number of student views of course content. In addition, a qualitative analysis used a modified rubric (Nandi et al., 2012) to evaluate student interaction and quality of student content in the discussion forums. The Director of Information Technology provided end-of-course student evaluation data without any identifiers. The data analysis included descriptive and parametric statistics. Statistical significance was set at .05.

Research Question #1

1. Is there a difference in student learning outcomes among QM-redesigned courses compared to traditionally designed (Non-QM) courses?

To answer this question, a comparison of course grades was conducted using descriptive and parametric statistics. Course grades for students in QM-redesigned and Non-QM courses were compared (n = 891). An independent samples t-test was conducted in SPSS to compare the grades of students in QM-redesigned courses compared to traditionally designed courses (Non-QM). In a second analysis, a one-way ANOVA analysis was conducted to compare each of the four courses (two QM and two Non-QM) to determine if differences existed between the subgroups.

In addition, the students evaluated their courses by answering the question, "Overall I learned a lot in this course," on a scale from 1 to 5, with 1 indicating strong disagreement up to a 5 indicating that students strongly agreed with the statement.

End of course mean evaluation scores were compared between QM (n = 13) and Non-QM (n = 13) course sections. An independent samples t-test was conducted in SPSS. In a second analysis, a one-way ANOVA analysis was conducted to compare each of the four courses to determine if differences existed between the subgroups.

Research Question #2

2. Is there a difference in the quality of student discussion forums in QM-redesigned courses compared to traditionally designed (Non-QM) courses?

To answer this question, the quality of discussion forums was rated using a rubric adapted from Nandi et al. (2012). This tool required modifications in order to measure the quality of student content, student interaction, and a total quality score based on the average of both the content score and the interaction score. Each category (content and interaction) was rated by the authors on a scale of 1 to 4 (1 = poor, 2 = satisfactory, 3 = good, 4 = excellent). An independent samples t-test was conducted on a random sampling of student discussion forums (n = 192) to compare student quality ratings in the QM-redesigned courses versus the traditionally designed (Non-QM) courses. In addition, one-way ANOVA analyses were conducted to compare student quality ratings among the four courses, two QM (n = 96) and two Non-QM (n = 96), to determine if differences existed between the subgroups.

RESULTS AND DISCUSSION

Research Question #1

Following the analysis, final course grades in QM courses were slightly higher. However, no significant differences were found in final course grades in QM-redesigned courses (M = 95.94, SD = 7.59) compared to traditional (Non-QM) courses (M = 95.73, SD 5.86; t (889) = .475, p = .635, two-tailed)(see Table 1). The magnitude of differences in the means (mean difference = .22, 95% CI: -.68 to 1.11) was very small (eta squared = .000). A one-way, between-groups analysis of variance was conducted to explore whether differences existed in the student end of course grades among the four courses. No significant differences were found.

The end-of-course student evaluation scores for the question "Overall, I have learned a lot in this course" were higher in the QM courses (M = 4.35, SD = .19) versus the traditional (Non-QM) courses (M = 4.25, SD = .36; t (18.4) = .823, p = .421, two-tailed)(see Table 2). The magnitude of differences in the means (mean difference = .12, 95% CI: -.111 to .343) was moderate (eta squared = .061). A one-way, between-groups analysis of variance was conducted to explore whether differences existed in the student end of course evaluation scores among the four courses. No significant differences were found.

Therefore, grades were higher in QM courses and from the students' perspective, they perceived that they learned more in the QM-redesigned courses, although the students were not aware of whether their courses were QM-redesigned or traditional (Non-QM). Historically, students

Table 1. Student Final Course Grade Comparisons QM vs. Non-QM (RQ1)

Group Statistics

		N	Mean	Standard Deviation	Standard Error Mean
Final course grades	QM	450	95.9476	7.58943	.35777
	Non-QM	441	95.7316	5.85578	.27885

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Final Course Grades	Equal variance assumed	.000	.989	.475	889	.635	.21597	.45477	-.67657	1.10851
	Equal variance not assumed			.476	842.819	.634	.21597	.45360	-.67435	1.10629

Table 2. Student End of Course Evaluation Data (RQ1)

Group Statistics

	QM vs. Non-QM	N	Mean	Std. Deviation	Std. Error Mean
Overall, I learned a lot	QM	16	4.3737	.23483	.05871
	Non-QM	13	4.2577	.35915	.09961

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Overall, I learned a lot	Equal variance assumed	2.874	.102	1.048	27	.304	.11606	.11074	-.11117	.34328
	Equal variances not assumed			1.004	19.867	.328	.11562	.11562	-.12523	.35735

Table 3. Quality of Student Discussion Forums (RQ2)

Group Statistics

	QM vs Non-QM	N	Mean	Std. Deviation	Std. Error Mean
Content Score (1–4)	QM	96	3.76	.518	.053
	Non-QM	96	3.81	.392	.040
Interaction Score (1–4)	QM	96	3.26	.771	.079
	Non-QM	96	3.22	.771	.079
Total Quality Rubric Avg	QM	96	3.5104	.48111	.04910
	Non-QM	96	3.5156	.47269	.04824

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Content Score	Equal variance assumed	3.398	.067	-.785	190	.433	-.052	147.227	-183	.079
	Equal variances not assumed			-.785	177.015	.433	-.052	147.227	-183	.079
Interaction Score	Equal variance assumed	.040	.841	.374	190	.708	.042	233.208	-178	.261
	Equal variances not assumed			.374	190.00	.708	.042	233.208	-178	.261
Total Rubric Ave	Equal variance assumed	.412	.522	-.076	190	.940	.06884	201.051	-.14099	.13058
	Equal variances not assumed			-.076	189.941	.940	.06884	201.051	-.14099	.13058

perform at a high level, and overall course grades are traditionally high in the online RN-to-BSN nursing curriculum. Thus, the lack of a significant difference in scores was not surprising. Grades and student perceptions are two measures of learning. Other factors related to student success need to be considered to determine the overall impact of how course design affects learning.

Research Question #2

Following the analysis, no statistical significance was found in the quality of discussion forums (see Table 3). For the quality of the discussion, comparisons were made between the QM content score (M = 3.76, SD = .52) and the Non-QM content score (M = 3.81, SD = .39; t(190) = -.785, p = .433, two-tailed). The magnitude of differences in the means (mean difference = -.05, 95% CI: -183 to .079) was very small (eta squared = .003).

The interaction score (1–4) for QM-redesigned courses (M = 3.26, SD = .771) compared to traditional (Non-QM) courses (M = 3.22, SD = .771) found no significant differences (t(190) = .374, p = .708, two-tailed). The magnitude of differences in the means (mean difference = .04, 95% CI: -178 to .261) was very small (eta squared = .000).

The calculated average of the content score and the interaction score equaling the overall quality of discussion forum score for QM-redesigned courses (M = 3.51, SD = .48) was not statistically different from the traditional (Non-QM) courses (t(190) = -.076. p = .522, two-tailed). The magnitude of differences in the means (mean difference = -.005, 95% CI: .069 to-.141) was very small (eta squared = .000). Rubric scores were very similar in both QM and Non-QM courses. There is a need to create better rubrics for evaluating online discussion forums and to promote a level of standardization for discussion forums across a curriculum or program of study. There was great variability throughout the online nursing courses, which made it difficult to measure differences.

A one-way, between-groups analysis of variance was conducted to explore whether differences existed in the quality of discussions among the four courses. Each course (n = 48) was compared, and no significant differences were found for the content score F(3, 188) = .416, p = .74; interaction score F(3, 188) = 1.24, p = .297; or total quality score F(3, 188) = .941, p = .422.

The quality of online discussions is an important concept when evaluating student learning. The interaction of students and the quality of the student content posted in courses are important factors to evaluate. Although not significant, higher interaction scores in QM-redesigned courses support previous studies related to engagement and improved student success. The impact on whether discussion forums accurately reflect student learning depends on how discussions are used by faculty during the course. The rubric utilized focuses on two major areas: content and interaction and how both reflect total quality. One area not considered in this study was faculty and student factors. These factors play an important role in the quality of discussions regarding the types of questions asked and the depth of student responses. In addition, student perceptions relate to how the discussions were viewed during the course and the course requirements placed on participation in the discussions.

LIMITATIONS

The limitations of this study include various elements that could not be controlled such as online course design and organization, LMS constraints, and differences in faculty members creating and delivering course content. No consistent course organization or teaching approach was found in the four individual courses after reviewing all the course sections in both QM versus Non-QM courses. For example, courses varied in: (a) the number of discussion threads (6–24) for each course, (b) the total postings by students in a course (461–1,483), and (c) the number of course content pages (21–88).

The LMS had limitations that inhibited data collection. For example, when content files were placed in subfolders by the instructors, the LMS generated reports were often inaccurate. This means that when students accessed the course content folder for a particular learning module, the report counted this as one versus the actual number of individual course files that were in the subfolder. This reporting difference resulted in difficulty isolating and extracting accurate data. Also, differences in faculty members' teaching experiences, ways in which they facilitated course content, and the impact these two factors had on course evaluations and student outcomes cannot be accurately measured. Overall, students are very successful in all RN-

to-BSN nursing program courses as evidenced by their high grades. In addition, faculty members who teach in this program are experienced online teachers as well. Therefore, those teaching Non-QM courses already use many best practices in their courses, thus limiting differences. As a consequence of these limitations, the results of this study cannot be generalized beyond these specific online nursing courses, within this nursing school, at one university.

Future studies should include faculty and student perspectives to determine if QM-designed courses have an impact on student success. For example, faculty factors such as previous online teaching, the extent of individual faculty members' development, and the use of varied, active teaching strategies are variables that may have affected results. Finally, student perspectives also need to be considered. Their perceptions of the course expectations, how faculty and activities engage them in learning, the achievement of learning outcomes, their preparation for online learning, and their past online learning experiences may provide further insight into online course success and engagement.

In conclusion, as quality is becoming a significant factor in online education, this study provides essential information to important stakeholders and faculty regarding the impact of QM programs on student outcomes. This study found higher student evaluation scores, higher interaction scores in discussion forums, and higher end of course grades for the QM-redesigned courses. The results support quality-driven course design and may indicate that QM designed courses lead to better student engagement, thus contributing to increased student learning. Using a standardized approach and peer review process such as QM provides faculty with the essential tools needed to design high-quality online courses that support student learning and success.

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