Continuously Improving Online Course Design using the Plan-Do-Study-Act Cycle

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Abstract

Plan-Do-Study-Act (PDSA) is a continuous improvement process that can be used to inform practice in online education. This article describes how the PDSA cycle was used to enhance a new online health policy course in an accelerated online Registered Nurse-to-Bachelor of Science (RN-BS) program at one Southeastern University. A goal of course development and delivery was to ensure that students could access and understand all directions and guidelines included in the new online course.   A General Questions Forum (GQF) was used as the central repository for student questions. Questions (n=61) in the form of textual data were analyzed for similarities and differences and five themes were identified: (a) clarifying information, (b) figuring it out, (c) using technology and tools, (d) seeking confirmation, and (e) needing more information. Actions to improve the course included clarifying directions, facilitating transfer of knowledge, strengthening the link to technology support, providing opportunities for feedback, and improving course navigation. Recommendations for course enhancement are useful to individuals who design and/or teach online courses and reflect use of data in the decision-making process.

Keywords: continuous improvement; PDSA; online learning; quality improvement; online forum; course design

Introduction

Continuous improvement (CI) is an ongoing process that can be used to improve products, services, and processes (American Society for Quality, 2008), including online education. Plan-Do-Study-Act (PDSA), a specific type of CI, has been used in manufacturing since the early 1980s (The W. Edwards Deming Institute®, 2014), and it also can be used to enhance courses in higher education (Aggarwal & Lynn, 2012; Brown & Marshall, 2008). Indeed, programs being evaluated for initial or renewed accreditation often use the PDSA cycle to demonstrate an ongoing process of improvement that uses data as the basis for decision making.

Learning management systems (LMS), which are software applications used to deliver online courses and programs, are large repositories of data that can be used to inform practice. Students enrolled in online courses submit textual content to blogs, wikis, and discussion forums, and these data provide a wealth of information that when organized, analyzed, synthesized, and prioritized, can be used in the PDSA cycle, and ultimately, drive CI in online education (Mandinach, 2012). This article describes how the PDSA cycle was used to evaluate and enhance course design in a new online course in an accelerated online Registered Nurse-to-Bachelor of Science (RN-BS) program.

Method

Plan

The *Plan* component of the PDSA cycle involves setting goals, devising a plan, and selecting measures or strategies for assessment (The W. Edwards Deming Institute®, 2014). In creating courses that would be delivered online over 7.5 weeks, the first goal was to ensure that students could access and understand all directions and guidelines included in the online course. This was designed to improve learning effectiveness and student and faculty satisfaction, which are pillars of the quality framework for online education identified by the Online Learning Consortium (n.d.).

Once a course was developed, the initial plan was to have it evaluated by university instructional designers to ensure compliance with quality standards. However, the best measure of goal achievement is the response from student learners who actually engage in the course. Therefore, a general questions forum (GQF), a forum where students could pose questions during the course, was incorporated into multiple new online courses that were being delivered for the first time.. The centralized repository was designed to facilitate student access to course content and provide faculty with data about the effectiveness of course design.

Do

The *Do* aspect of PDSA involves implementation of the plan (The W. Edwards Deming Institute®, 2014). In this case, a health policy course was one of the first new courses developed, judged to be aligned with quality indicators, and opened for student enrollment. The GQF was implemented in three separate sections (Section 1-N=23 students, Section 2-N=20 students, Section 3-N=23 students) of the course in Spring 2014. Directions prompted the students to post written questions about the course to the GQF rather than emailing questions to course faculty. However, questions about grades, performance, and personal issues were communicated directly to course faculty via email or phone and not posted to the GQF. The GQF was reviewed by faculty or a teaching assistant each morning and evening and responses to questions were posted. This ensured that students received prompt responses to their questions and allowed course faculty to determine if immediate alterations in course design were warranted. All posts remained visible to students throughout the course, allowing students to see all questions posted by class members and answers posted by faculty. The GQF was introduced on the course overview page, which was accessible from the course landing page, and was accessible at all times from the main course menu. Each section of the course had its own GQF, which was visible only to those enrolled in that particular section.

Results

Study

In PDSA, *Study* is the third step of the cycle. In this step, outcomes indicative of plan success are monitored and areas needing improvement are identified (The W. Edwards Deming Institute®, 2014). The fact that students posted questions to the GQF clearly indicated a need to improve course design in order to enhance student access to and understanding of information on the course site. As questions and responses were posted, course faculty made minor edits to course documents and design. A more comprehensive analysis of the questions posted was conducted after the course concluded. A retrospective analysis of the data extracted from the GQF was completed.

A total of 61 questions were posted by students in the health policy course (Section 1-n = 21 questions, Section 2-n = 16 questions, Section 3-n = 24 questions). Of the 66 students enrolled in the three sections, 25 (38%) students posted at least one question to the GQF. The number of questions posted by individual students over the 7.5 week timeframe ranged from 1 to 7 (mean = 2.4, median = 2, mode = 1, 2). A majority of the questions (n=48; 79%) were posted before midterm.

All contextual data posted to the GQF were read and coded as student *question*, *faculty response*, or *faculty comment*. A *faculty response* was a direct answer to a question whereas a *faculty comment* was a statement not made in response to a student question. Items coded *student questions* were read and compared and contrasted to identify similarities and differences. Similar *student questions* were grouped to form a theme.

Five themes emerged from the qualitative data: (a) clarifying information, (b) figuring it out, (c) using technology and tools, (d) seeking confirmation, and (e) needing more information.

Clarifying information

The greatest number of questions (n=21; 34%) sought clarification of content that was already posted on the course site and had been reviewed by the student as evidenced by wording of the question. For example, a student wrote, "I am a little confused about the debate assignment. We were notified in the announcement what day of the week the postings are due. I was wondering if you could clarify if those due dates are for this week…."

While most of questions indicated that students had difficulty understanding written directions and assignment guidelines, a few asked for other types of clarification. For example, several modules included blog assignments that consisted of a main blog post and a required number of replies to classmates' posts. The typical directions were, *Please post a response to the blog by Wednesday at 11:30PM and reply to at least 3 peer posts by Sunday at 11:30PM.* In a few subsequent modules, replies to peer posts were not required, and the directions stated, *Please post a response to the blog by Wednesday at 11:30PM.* This prompted questions from students about whether they needed to reply to classmates' blog posts.

Figuring it out

Twelve (20%) questions were associated with figuring out how to complete a learning activity. These questions indicated a need for guidance to complete the assignment beyond written guidelines and directions that were posted on the course site. A majority of the questions were related to formatting written assignments in accordance with the *Publication Manual of the American Psychological Association* (APA, 2010). Students who posted questions indicated that they knew how to use APA formatting for academic papers, but had difficulty translating that knowledge to other assignments. For example, one assignment was to prepare a letter to an elected official about a health policy topic. Students asked how to cite references and include a reference list in the letter and they needed help figuring that out.

Using technology and tools

Eleven (18%) questions posted to the GQF asked about how to use technology to engage in the online course and complete learning activities and assignments. These questions focused on the use of specific tools in the LMS, such as how to post to a blog, reply to a classmate's blog post, or create a video. For example, a student posted, "Is there any way to re-write or correct a blog post that has already been submitted?" While resources were available on the course site to assist students with in using these tools, none of the students who posted questions indicated that they had used the resources.

Seeking confirmation

Students also posted questions (n=9; 15%) in order to seek confirmation that they were correctly completing a learning activity. These questions included restatement of directions the students had accessed on the course site, followed by, "Is this correct?" or "Am I understanding this correctly?" For example, one student wrote,

> From my understanding you wanted us to make a bibliography based on the citations that we used in the power point presentation on the blog post. If this is the case, then I have done that. I wanted to make sure I did the assignment correctly.

Needing more information

Through questions (n=8; 13%) posted to the GQF, students also asked for additional information so they could better understand the learning activity. Their posts indicated they could not locate all of the needed information on the course site, or the information they located was incomplete. For example, all assignment guidelines were posted on the home page, which was accessible from every module, yet some students indicated that they could not locate them. One student posted, "I have looked all over but can't seem to find the grading rubric for our debate…." Also, assignment due dates were posted on the course schedule rather than on the assignment guidelines, and students found them difficult to locate.

Discussion

Act

Act is the final step which closes the cycle and is the point at which decisions are made about making changes for improvement (The W. Edwards Deming Institute®, 2014). The following actions for enhancement of course design were identified. Some changes were made during the course and other, more complex changes or items that could impact course integrity, were made prior to offering the course the second time in Summer 2014.

Clarify directions

One change that was implemented during the course involved repeated activities that had slightly different directions in different modules. For example, when peer replies were due to a blog post in one module, but not another, "*No replies to peers required"* was added to modules where appropriate. Once this change was made, no further questions were posted in this course session, or in Summer 2014, indicating the design change was effective.

It was apparent that course faculty needed to be more aware of requirements in other courses in the program because some students were enrolled in multiple courses simultaneously and they confused the requirements for different courses. For example, some of the students in the health policy course were also enrolled in a writing intensive course in which peer review of drafts was a routine practice. This prompted questions about submitting drafts of their health policy papers for peer review. Course faculty opted to utilize the 'Announcement' tool in the LMS to clarify that peer review was not required in the health policy course. The 'Announcement' page was the landing page for the course and this allowed students to receive information about peer review upon entering the course. Use of the 'Announcement' tool proved to be an effective strategy for clarifying course requirements during the course because no additional questions were raised during the course or in Summer 2014.

Lastly, textual data in the GQF served as the blueprint for the revisions that needed made to assignment guidelines prior to offering the course the second time. While changes were made, 6 of 23 (26%) questions posted by students enrolled in the course in Summer 2014 sought clarification of assignment guidelines. This indicates that additional revisions, based the textual data from Summer 2014, were necessary.

Facilitate transfer of knowledge

It was determined that use of a Frequently Asked Questions (FAQ) page could help students figure out or translate knowledge to new learning activities. The page would address a list of frequently asked questions about formatting assignments, with answers or responses that would guide them to appropriate resources and/or examples. Again, the textual data in the GQF informed decisions about what to include in the FAQ document.

Use of templates and/or checklists (Franz & Spitzer, 2006) and style sheets (Chism & Weerakoon, 2012) have been identified as effective strategies for teaching the mechanics of APA formatting. A resource block containing tools such as these needed to be added to the course. Another option, which proved to be effective, was incorporating APA formatting requirements into discussion activities. This provided students with opportunities to utilize available resources before completing a major graded assignment that had to be formatted according to APA guidelines.

Lastly, in response to student questions about formatting, faculty began to direct students back to resources that were already available on the course site or required for the course. This was intended to help students gain experience using the resources and minimize overuse of the GQF by students who simply did not take the time to use available resources. When the course was offered for the second time, no questions were posted about APA formatting.

Strengthen the link to technology support

Providing students an orientation to online programs and the use of technology can help the students gain a better understanding of online education (Carruth, Broussard, Waldmeier, Gauthier, & Mixon, 2010; Dixon, Beveridge, Farrior, Williams, Sugar, & Brown, 2012; Tomei, Hagle, Rineer, Mastandrea, &

Scollon, 2009). While students enrolled in this program were required to complete an orientation to the program and to the LMS, it was unclear when they actually did this. Therefore, it was necessary to make certain that students were completing the orientation prior to starting the course.

Including links to technology support and/or directions about how to access such support are indicators of quality online education (Online Learning Consortium, 2014; Quality Matters, 2014). Students in the health policy course needed more guidance to effectively use technology and the available resources. Links to resources available at the institution, videos and written directions about how to use various tools in the LMS, and contact information for the technology helpdesk were added to a page that was labeled as 'technology support' and to the 'Start Here' page, both of which were accessible from any page on the LMS. As a result of these changes, only two questions about the use of technology were posted by students in Summer 2014.

Provide opportunities for feedback

Some students needed confirmation that they were proceeding correctly with a particular learning activity. There will always be some students who need this feedback from course faculty. Providing opportunities for peer and faculty review of assignment drafts would help students receive confirmation or redirection prior to completing an assignment for grading. This could be accomplished by setting up a discussion forum as an assignment café where students could voluntarily submit assignment drafts for feedback by peers and/or faculty. While this strategy was not implemented in the health policy course, it was successfully implemented in another new online course in the RN-BS program. All students chose to post a draft of their work to the peer review forum and received feedback on their submission from at least one peer.

Improve course navigation

Though students posted questions indicating that they needed more information, all of the information they requested was available on the course site at the time when the question was posted. Either students could not locate the information, or they did not make the effort to do so. While students should take the initiative to access and use information posted on the course site, they should not need to spend a lot of time searching for it. To ensure accessibility and usability, an external reviewer acting as a 'student learner' should navigate a course prior to going live with the course to ensure that information is logically placed and easily accessible. A course tour should be provided as part of orientation to the course to help students understand course layout, including the location of course documents.

Another strategy that was used to enhance course design involved asking students who had questions about missing information, where they initially expected to locate the information, and/or where they looked. This allowed for items to be placed where students expected to find the information and improved navigation. For example, assignment guidelines are used at various points throughout the course and must be readily accessible to students. In the new course, these guidelines were placed on the 'Start Here' page, along with other course documents. Several students in the course indicated they could not locate the guidelines and when asked, stated they had expected to locate the guidelines with the respective module, rather than on the 'Start Here' page. During the course, the guidelines were added to the respective module. However, information about the location of the guidelines needed incorporated into a course tour. In Summer 2014, no questions were posted about the location of assignment guidelines, indicating the changes were effective at facilitating student access to these documents.

Lastly, to discourage students from going directly to the GQF, rather than accessing information provided on the course site, students were directed to the information by course faculty. This increased their familiarity with course layout and use of available resources.

Conclusion

Indicators are available to guide the development of quality online courses (Online Learning Consortium, 2014; QM, 2014). However, the true test of accessibility and clarity of the information on the course site occurs when student learners actually engage in and navigate the course. In the case of the new health policy course, student questions uncovered flaws in course design. However, planning for and using (doing) the GQF produced data that when studied, ultimately led to action. A variety of strategies to enhance student access to course content, and overall course design were identified. Many of the

changes improved the quality of this particular course and are also best practices that are transferable to other online courses. Some of the changes, such as revisions to assignment guidelines, continued to elicit questions from the students. This indicates that the CI process must continue each time the course is offered. Through the CI process, the goal of ensuring that students can access and understand all directions and guidelines in an online course can be achieved.

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