

**STANDARDS BASED DESIGN: TEACHING K-12 EDUCATORS
TO BUILD QUALITY ONLINE COURSES**

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The number of online courses, programs, and schools are growing exponentially in K-12 education. Given the unique nature of online courses and the distinct skills necessary to create a quality online course, it is essential that effective professional development be provided for teachers designing online courses. Online courses need to be of the same quality as their face-to-face counterparts. Thus, K-12 teachers must learn how to design an online course to meet recognized standards of quality. The current study explored the effects of a professional development model designed to provide an authentic, project- and standards-based experience to K-12 educators. The extent to which teachers designed an online module to meet Quality Matters standards was assessed. Overall, the majority of participants (n=97) were able to successfully transfer learning to design and develop an online course to

meet standards. Areas of concern regarding specific standards are discussed. Recommendations for more rigorous research are suggested to determine the degree to which outcomes are specifically related to the course experience as opposed to outside variables such as learner and instructor characteristics. Results of this study can be used to inform design of effective professional development for online course design.

INTRODUCTION

Over the past decade, the landscape of K-12 education has seen dramatic change in the way instruction is delivered, namely utilization of the Internet to supplement or even replace the face-to-face classroom. Online courses focused on K-12 learners are becoming more prevalent nationwide, meeting evolving needs for a diverse population of students including: centralizing expert teachers for advanced placement and post-baccalaureate programs, offering new options as opposed to alternative schools, and providing consistency in educational practices for homebound and virtual students (Powell & Patrick, 2006). Given this growing trend, and the complicated nature of designing online courses (Wray, Lowenthal, Bates, & Stevens, 2008), it is crucial to ensure that K-12 teachers are provided with the necessary design skills to deliver quality online courses (Chiu, 2013).

Professional development is fundamental to changing the way teachers teach, regardless of the learning environment (Rice & Dawley, 2009). A majority of teachers design and develop the courses they deliver (Powell, 2010). Therefore, it is vital to provide effective professional development for teachers to ascertain the necessary skills to create quality courses. The question is, which approaches to professional development for these skills are most effective? Unfortunately, the lack of empirical research specific to professional development for online course design leaves us with few, if any, real answers to this question.

According to Mercer (2014), participating in a two-day, face-to-face professional development workshop focused on standards-based design can increase knowledge of best practice in online course design, but it is not sufficient to aide teachers in how to apply standards of quality to design online courses. Moreover, when teachers are left to apply standards to online courses without the assistance of experts in instructional design, the outcome is a course that still lacks alignment among assessments and learning objectives (Mercer, 2014).

Mercer (2014) proposed a standards-based, online model for professional development. The model guides participants through six weeks of funda-

mental design principles while they simultaneously build online instruction to meet nationally-recognized standards of quality consistent with the Quality Matters program. Critical to the success of the model is the continuous formative feedback provided to participants as they design an online course to meet QM standards. The present study evaluated the proposed model known as the Virtual Instructor Certificate Program by measuring outcomes of K-12 participants using the essential standards of the Quality Matters Rubric as the benchmark for success.

BACKGROUND

There is little research on effective professional development for K-12 educators learning to design an online course, much less, a course that meets national standards of quality (Shattuck, 2013). Shattuck points out that research continues to focus on comparison studies (Means, Toyama, Bakia, & Jones, 2010), how to meet the needs of learners with distinguishing characteristics such as at-risk students (Archambault et al., 2010), students with special needs (Thompson, Ferdig, & Black, 2012), and those who are considered non-traditional students (Sturgis, Rath, Weisstein, & Patrick, 2010).

Cavanaugh, Barbour, and Clark (2009) conducted a review of research and practice in K-12 online learning, revealing not only the limited published research on K-12 distance education but also the limited focus on specific research related to instructional design as it pertains to online courses developed for K-12 students. Shattuck (2013) expounded upon this review discovering that the literature available specifically related to instructional design and online learning in the K-12 distance education arena is “virtually non-existent” (Shattuck, 2013, p. 3), indicating a clear and continued gap in the literature on a most important topic given the enormous growth of online learning in K-12 schools. However, a more recent review of literature has shown promise in published research related to K-12 distance education with a marked increase in attention to teacher training (Shattuck, 2015). What follows is a discussion of some of the most salient points to be made regarding professional development for K-12 educators learning to transfer skills for lesson design to the online classroom.

Tenets of Effective K-12 Professional Development in Online Course Design

Authenticity. Authentic project-based learning is an essential element necessary for an effectively designed online course (Dabner, Davis, & Zaka, 2012). Authentic project-based learning applies to both the courses offered to students as well as those courses that teach instructors how to design a course online. Authentic professional development provides an opportunity

for instructors to apply newly acquired skills to situations that mirror what their “real” teaching experience will entail. Guidelines released by The National Education Association, The Southern Regional Education Board, and The International Association for K-12 Online Learning recommend that teachers should experience learning in the same way as their students (iNACOL, 2011; NEA, 2006; SREC, 2009). Therefore, effective professional development for online course design would be most appropriately delivered via online instruction.

Relevance

To promote learner engagement, instructional material intended for the adult learner should also be relevant to participant needs (Keller, 1984). Authenticity during instruction creates a natural relevance to future skill use and is thus also a central component to effective course design. Researchers agree that the virtue of project-based learning supports the need for differentiated professional development sessions (Dabner, Davis, & Zaka, 2012; Duncan & Barnett, 2009; DiPietro, Ferdig, Black & Preston, 2008; Jung 2005). Agyei and Voogt (2014) investigated the extent to which beginning teachers transferred their learning after participating in a professional development program designed to help teachers integrate Information Communication Technology in their mathematics classes. Unfortunately, the researchers found that transfer was negatively impacted by a lack of infrastructure to support the initiative, an issue that has arisen in past studies as well (Marek, 2009).

Rice and Dawley (2009) highlighted factors that would impact the delivery and design of professional development opportunities for K-12 stakeholders. Of those factors, context played an integral role in how professional development was delivered. Given the differing influences on contexts and a subsequent need for a differentiated approach in professional development, specific guidelines to standardize the information communicated through professional development sessions are crucial.

Standards based

Effective professional development should incorporate learning objectives that are standards-aligned (Yamaguchi & Gallagher, 2007). Depending on the context, standards for online course design can vary. The International Association for K-12 Online Learning (iNACOL) has developed a set of standards to be used for designing and delivering online courses. Wayer (2013) investigated the extent to which five K-12 educators applied these standards to blended courses after participation in an online professional development course. The course focused on the iNACOL standards, utilized project-based learning, as well as a community of inquiry.

According to Wayer, the most problematic outcome was the lack of course instruction provided to engage students in active learning. However, overall, the participants were able to transfer concepts from the online professional development course to each respective blended course to be taught in the upcoming semester.

Not only is it important to teach educators to apply standards to the design of online courses, but the professional development itself should be aligned with standards to improve outcomes. Holmes, Signer, and MacLeod (2011) used the New York State Learning Standards and National Educational Technology Standards for Teachers, to design a five-week online professional development course for in-service K-12 teachers and subsequently measure outcomes in terms of satisfaction, course quality, and overall perspectives of online professional development. Results suggested that the best method for teaching how to design an online course may be through online professional development, providing an authentic context where the teacher has the opportunity to experience the online learner perspective to inform future design.

However, the existence of standards does not imply use. Although guidelines and standards exist, the administrators fail to adhere to them (Rice & Dawley, 2009). In fact, similar to higher education, many online high schools do not require teachers to participate in online education prior to facilitating online courses. The lack of required training could be one reason available research on effective training is limited. If standards exist, why are teachers not required to follow them? Hathaway and Norton (2012) posited that the demand for K-12 online courses exceeds the supply of available teachers who are adequately trained in online course delivery. This, coupled with stringent budgets, could be the reason school districts sometimes forgo systematized, standardized, online professional development, and opt instead for one or two days of intensive face-to-face workshops (Hathaway & Norton, 2012).

Quality matters

In addition to iNACOL and local standards, some K-12 institutions are using the Quality Matters™ (QM) program either in part or comprehensively to implement methods of quality control. The program is recognized world-wide as a highly reputable method for quality assurance in online learning (Ralston-Berg & Nath, 2008) and uses a rigorous peer-review process to assess the design of an online course (Legon & Runyon, 2007). In fact, the program offers a rubric specific to online course design for K-12 distance educators to both guide design of courses and assess the quality of existing courses. The program's website offers access to its rubrics, but full disclosure of annotations for specific review standards is only available to subscribing institutions.

Because of QM's growing popularity, researchers are beginning to explore the effectiveness of the program's professional development opportunities to aide application of standards to the design of online courses. However, available research seems to focus on higher education, representing a lack of focus in K-12 distance education research on effective professional development. Three studies investigated outcomes of participation in the program's foundational workshop *Applying the Quality Matters Rubric*. Wright (2011) found that participation in the workshop increased faculty self-efficacy with regards to creating a quality online course. Mercer (2014) and Budzick (2014) further investigated variables such as knowledge of best practice in online course design and self-perception of the quality of the individual's online course. Mercer found that while participation in the workshop can significantly increase knowledge of best practice statistically, more was needed for successful application of standards. In addition, Budzick found that participation increased willingness to use the rubric to facilitate course design. These studies help us to have a baseline for effective professional development, but more is needed.

Regardless of why, there continues to be a lack in the existing literature to address impact of standards-based online professional development especially related to K-12 course design. Thus, it is beneficial to use available research from higher education studies to guide K-12 professional development endeavors..

Professional Development Outcomes in Higher Education

Shattuck (2013) noted that much of the available literature in distance education that is conducted in higher education has been applied to K-12 as well. Similarly, we can take what little research exists on professional development for online course design focused in the higher education setting and utilize these outcomes in hopes to build a beginning foundation of how best to proceed in K-12. It is important to keep in mind that even studies focused on faculty in higher education are limited in terms of providing empirical evidence on the effects of specific professional development programs as described in the previous section on QM-focused research in this area. However, available research tends to be primarily descriptive with quantitative measures emphasizing self-report as opposed to objective measures of learning gains (Mercer, 2014).

Faculty new to online learning can feel inadequate based on limited technology expertise (Berge & Muilenburg, 2000; Covington, Petherbridge, & Warren, 2005), concerned that converting a course to an online format will inevitably reduce the quality of learning (Bower, 2001). As mentioned earlier, putting a course online takes a distinctly different set of skills (Wolcott & Shattuck, 2007). Therefore, increasing online self-efficacy could be

considered an important goal of professional development for online faculty and an important contributor to quality assurance. Wright (2011) investigated faculty perceptions regarding their ability to design, develop, and deliver an online course. He found a statistically significant difference for online self-efficacy after faculty completed a Quality Matters™ workshop.

Powell (2010) reported that faculty who completed a total of 11 modules, including seven, two-hour face-to-face sessions also felt more confident. In addition, faculty described the professional development as useful for design and delivery (31%), and effective for selecting appropriate software (30%). However, only 27% of faculty felt confident to teach online, suggesting that increasing confidence is not enough, and perhaps the effectiveness of professional development should be measured in multiple ways.

Reilly, Vandenhouten, Gallagher-Lepak, and Ralston-Berg (2012) integrated Khan's Flexible Framework for Elearning and Communities of Practice (COP) to investigate various faculty attributes relative to elearning and technology. This multi-institutional approach to COP included video conferencing, campus leadership, annual face-to-face conferences, and online courses over a period of five years. Using self-report surveys, faculty described a) an increase in overall knowledge and understanding of elearning, b) an increase in ability to evaluate design and delivery methods for online learning, and c) an intent to redesign current courses based on knowledge gained.

Necessary Competencies for Designing Quality Online Courses

Although there is not extensive research on the effectiveness of specific professional development models for teaching teachers how to design quality online courses (Mercer, 2014), much less specific to K-12 (DiPietro, Ferdig, Black, & Preston, 2008), we do have recommendations for instructional design competencies that should be part of the online K-12 educator's knowledge base. One of the most notable set of guidelines for online teaching was provided by Goodyear, Salmon, Spector, Steeples, and Tickner (2001). More recently, Rozitis (2014) used a Delphi study using experts from a range of organizations including the Association for Educational Communications and Technology (AECT) to provide at the minimum, expectations for what those who are designing courses should know or be able to do. Outcomes specific to design included: presenting accurate information, appropriately using technologies to enhance learning, effectively arranging media and content to maximize learning, creating and modifying engaging content and assessments, employing effective navigation and structure strategies, appropriately selecting technological resources, and designing strategies to encourage active learning and collaboration.

The lack of research available to guide districts, school administrators, and teachers on how to best prepare for delivering online courses to K-12 students necessitates that distance education researchers put more focus on professional development geared towards online course design. Traditional best practices reported in the literature typically center on course delivery. Some of these best practices include frequently contacting with students, providing prompt feedback, summarizing content of discussions, monitoring progress, and helping students trouble shoot technical problems (Chickering & Gamson, 2010; Taylor & McQuiggan, 2008). Mastery of these activities increases faculty confidence (Wright, 2011), satisfaction, and sense of course ownership (Ellis & Phelps, 2000; Orr, Williams, & Pennington, 2009). Although these practices are essential to student success, it is the course design that drives how the course unfolds during the process of delivery. Recently, these best practices in online course development also encourage a systematic approach to design using standards of quality to maximize learning outcomes (Pollacia, Russell, & Russell, 2009). Typically, online trainings provided are tailored to the individual online learning system vendors (Kearsley & Blomeyer, 2004) and less on course design itself (Rice & Dawley, 2009). However, if effective course delivery begins with quality course design (Wright, 2011), then how do we successfully teach educators the skills necessary to design a quality course?

PURPOSE

The purpose of this research was to determine whether a professional development model proposed by Mercer (2014) is a workable solution to teaching K-12 instructors to successfully apply essential standards of the Quality Matters Rubric to the design of a K-12 online course. Therefore, the present study sought to answer the following question: To what extent does participation in an online professional development course centered on instructional design principles help K-12 educators design an online course that meets recognized standards of quality?

METHODS

This study was conducted in the context of a professional development course delivered by the College of Education and Human Development at a large research university to K-12 teachers across the state over the course of approximately two years. The college is part of a subscribing institution to the Quality Matters program and supports the standards delineated in all three rubrics provided by the program. The Virtual Instructor Certificate Program began as a one-day workshop and has evolved over the course of several years into a fully online course based on fundamental design principles. VICP participants include working professionals, faculty in higher education, K-12 educators, and graduate students.

This specific study primarily focused on outcomes related to the essential standards of the QM Rubric fourth and fifth editions. Although QM provides a K-12 rubric, the timing of its creation along with the history of VICP using the higher education rubric with effective results perpetuated its continued use regardless of the participant's professional role (e.g. K-12 educator). In addition, lead instructors for VICP had not yet been certified as K-12 QM peer reviewers and the differences between the two rubrics were not deemed substantial enough at the time this study took place to warrant changing the rubric used to assess final projects. However, VICP participants are now given the choice of which rubric they want used to assess their final project based on the type of course being designed. The following sections will describe in further detail the participants, the VICP online professional development course experience, the instrument used to measure learning outcomes that was based on the QM Rubric, and data analysis procedures.

Participants

Participation in the Virtual Instructor Certificate Program is generally provided at the school district level or based on individual interest. In this study, participants included both options. Participants paid individually or through their corresponding district. The sample for this study included K-12 teachers who completed the VICP course between 2014 and 2015. The total sample size was $n=97$ (female=70, male = 27). Participants were affiliated with eight school districts, one region service center, and one participant was a non-employed K-12 teacher.

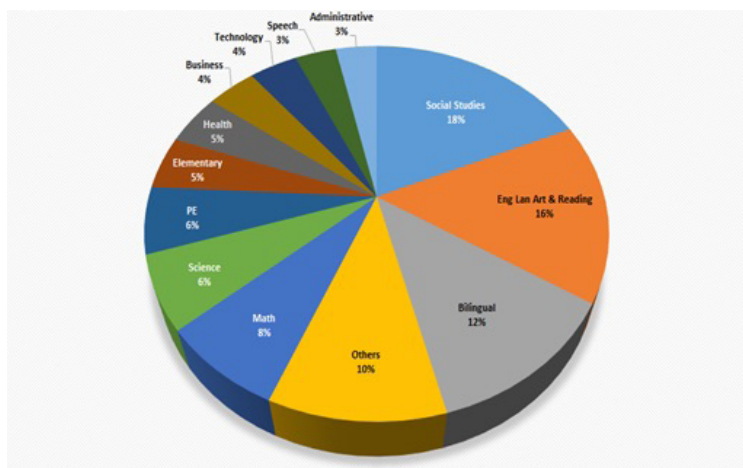


Figure 1. Participants' Subject Area Certifications. This figure illustrates the many areas within which participants were certified to teach.

Among the 97 submitted projects, 42 were scored using the Quality Matters Higher Education Rubric (2011-2013) edition, and 49 were scored using the Quality Matters Higher Education Rubric 5th edition. Moreover, participants had a variety of subject areas certified by the state documented certificates, with many teachers holding multiple certifications. Figure 1 shows the subject areas within which the teachers were certified to teach.

Professional Development: The Virtual Instructor Certificate Program

The Virtual Instructor Certificate Program is a state-approved professional development provider through the state's virtual school network. However, the course is available to anyone interested in learning foundational concepts of instructional design within the context of digital learning. Participants typically include faculty, graduate students, persons working in public education (the focus of this study), as well as educators working in non-traditional environments. VICP is a six-week course delivered completely online. The course prepares participants to design, develop, and manage an online course with specific emphasis on hands-on activities and feedback centered on standards-based design. Course content is founded on fundamental instructional design principles and best practices for delivering online courses. Topics include but are not limited to learner and context analysis, writing measurable learning objectives, designing course activities that align with objectives, creating effective instructional strategies, and preventing academic dishonesty. Upon completion of the program, participants have a fully developed online module embedded in the context of a fully online course that is consistent with essential standards of the Quality Matters Higher Education Rubric. This product provides the participant with a working template for completing the remaining modules within their online course. Participants are awarded a certificate for 60 hours of professional development. If the participant holds a current state teacher certification, they are then able to teach online courses in the state's approved virtual network.

Instrumentation

VICP supports participants as they design and develop an online module within the context of a fully online course. This online module is evaluated at the end of the six-week course using the essential standards of the Quality Matters Higher Education Rubric. The rubric is comprised of eight general standards. Each general standard is then broken down into varying numbers of specific review standards. Standards deemed "essential" are worth three points and are required to be met in order for an online course to potentially be what is referred to as a "Quality Matters recognized course" (See <http://www.qmprogram.org> for detailed rubric information).

During the time frame of this investigation, Quality Matters published a new edition of its Higher Education Rubric based on new research. Thus, depending on the time a participant completed VICP, two versions of the Quality Matters Higher Education Rubric were used to evaluate projects – the 4th edition (2011 – 2013) and the 5th edition. Differences between the two versions of the rubric were minimal upon comparison with regards to essential standards. For example, Standard 6.3, “Navigation throughout the online components of the course is logical, consistent, and efficient” from the 4th edition is now included in Standard 8.1 of the 5th edition, “8.1 Course navigation facilitates ease of use.” These minor numbering changes are noted in the data analysis section and labeled for ease of use.

Both versions of the rubric contain the same 21 essential standards, one of which (8.1 in the 4th edition; 8.2 in the 5th edition) is not taught during the course of VICP to the extent to which assessment would be valid. Thus, this standard is marked as “met” with a note telling participants that it is not evaluated and giving recommendations to pursue further study of its requirements. This standard has to do with creating an accessible course that is deemed out of the scope of the six-week program.

Although participants in the program, and for this study, were from the K-12 environment, the program also includes higher education faculty. Beginning in 2014, the program began to see an influx of participants from public school educators in K-12. However, instructors for the program were certified Quality Matters Peer Reviewers and experts on the Higher Education Rubric. When comparing the K-12 Rubric with the Higher Education Rubric, minimal discrepancies were noted, especially with regards to essential standards. Therefore, use of the Higher Education Rubric to evaluate course outcomes for all participants was deemed appropriate during the course of this study. VICP K-12 participants are now given the option to have final projects evaluated using the K-12 Rubric.

Lead instructors for the program are responsible for mentoring each participant as they design an online module within the context of a full course in order to meet the essential standards. These instructors are trained using a four-phase process. First, they complete the VICP course as a participant. Second, they are required to shadow an experienced lead instructor to learn how the course works from the instructor perspective. During this time they meet weekly with the program director to discuss questions and figure out how to interact with participants and guide them to success. Third, they co-teach with the director to gain experience grading and providing appropriate feedback. Finally, they are given full responsibilities with monitoring of the director to help with any possible issues of understanding how to determine whether the course does or does not meet an essential standard and why. All VICP lead instructors are experienced instructional designers and extensively trained in Quality Matters. This process increases the likelihood that a participant will receive the same feedback regardless of who is teaching the course.

Data Sources and Analysis

The current study used an existing data set collected by the college from previous VICP cohorts. Unique identifiers were not included in the data set. Data was collected from K-12 teachers who completed VICP between January 2014 and December 2015. Scoring procedures model that of QM's all or nothing scoring method. A module meeting the essential standard was awarded three points. If the standard was not yet met, a score of 0 was awarded with feedback provided and a request for a resubmit. Participants worked with a VICP instructor to revise the module until all essential standards were met.

A quantitative research method was used and descriptive statistics were computed to answer the research question. Two analyses were conducted. First, counts and frequencies were computed using an Excel spreadsheet for all participants assessed using either version of the Higher Education Rubric. To determine the extent to which VICP was effective in helping participants to apply standards of quality to an online course, the number of teachers who met each essential standard in their initial submission were counted. The counts were used to compute the frequency of the participants who met the essential standards assessed. It is important to note that these K-12 teachers did not have existing developed courses. Without an existing course, it was not possible to gather any preliminary data prior to the completion of VICP.

Second, some participants were affiliated with school districts with set online infrastructure in place prior to their teachers taking the course. Thus, the data was further analyzed to explore whether the existence of a distance education infrastructure (i.e. learning management system, shared technical support, and accessibility information page) in place affected outcomes. Two subgroups were created (i.e., districts with infrastructure and districts without infrastructure). The number of teachers who met each essential standard was counted, and the frequency of the projects that met the essential standards was computed within each subgroup. The data from the subgroup was analyzed to compare districts with and without infrastructure. The following section will discuss the results based on individual standards. The reader is encouraged to visit the QM website to view specific standards as they are discussed in relation to research outcomes (www.qualitymatters.org/rubric).

RESULTS

A large percentage of program participants met many of the essential standards in their initial submission (See Figure 2). In particular, 95% (n = 86) met standard 1.2, 98% (n=89) met standard 2.5, 98% (n=89) met standard 6.2, and 99% (n=90) met standard 7.1. Participants performed above average on standards 2.1, 3.2, 5.1, 7.2, and 6.3/8.1, meeting these standards at a frequency between 84% and 87%. Participants performed somewhat poorly on standards 2.4, 3.3, and 5.3, respectively, 61% (n=55) met standard 2.4, 63% (n=57) met standard 3.3, and 59% (n=54) met standard 6.2.

Figure 3 illustrates the count of teachers who met each essential standard based on rubric edition.

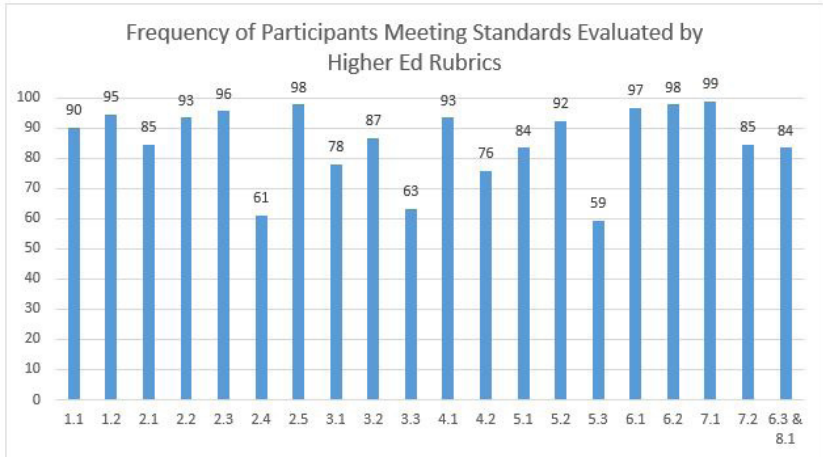


Figure 2. Frequency of participants meeting standards.

This figure illustrates the percentage of participants who met each essential standard from both the 4th and 5th edition of the Higher Education Rubric. Participants who were assessed based on the K-12 rubric were not included.

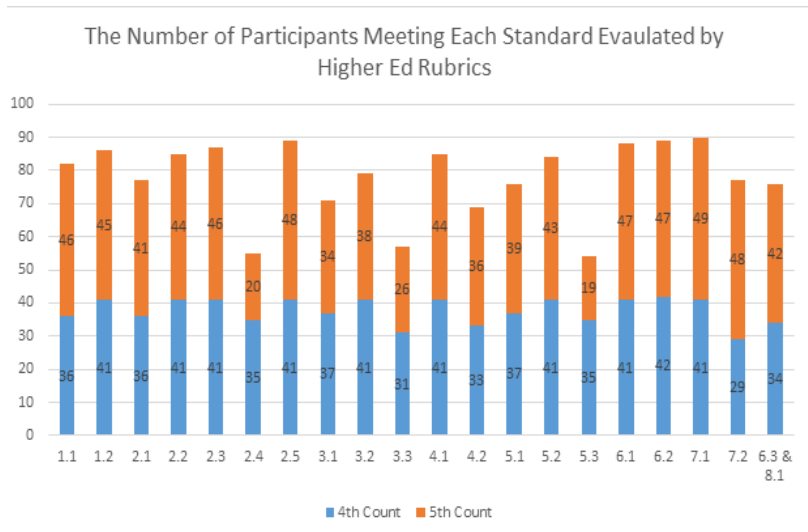


Figure 3. Number of participants meeting each essential standard.

Figure 3 shows the specific count of participants who met the standard based on the rubric used to assess the final project.

Infrastructure vs. Non-infrastructure

Results indicated that approximately half of the participants from school districts with infrastructure did not generally meet standards 2.4, 3.3, and 5.3, with only 54% (n=59) meeting standard 2.4, 56 % (n=59) meeting standard 3.3, and 52% (n=60) meeting 5.3. Figure 4 displays how often participants who had some infrastructure in place met each of the essential standards of the 4th and 5th edition of the QM Higher Education Rubric.

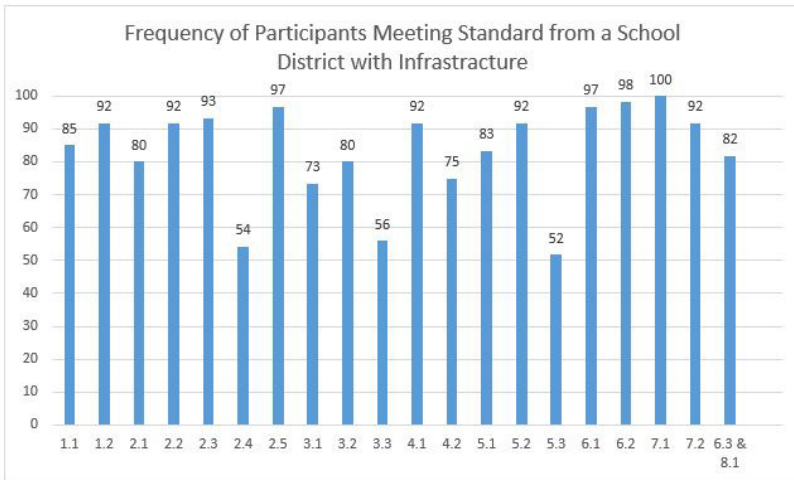


Figure 4. Frequency of participants meeting standard from a school district with infrastructure.

This figure illustrates the extent to which participants met essential standards who were also affiliated with a district that had an online learning infrastructure in place.

While participants without a set infrastructure (n=31), were relatively successful in meeting standards for either the 4th or 5th edition of the Quality Matters Higher Education Rubric, only half of these participants met standard 7.2. Figure 5 depicts essential standards where infrastructure may play an important role.

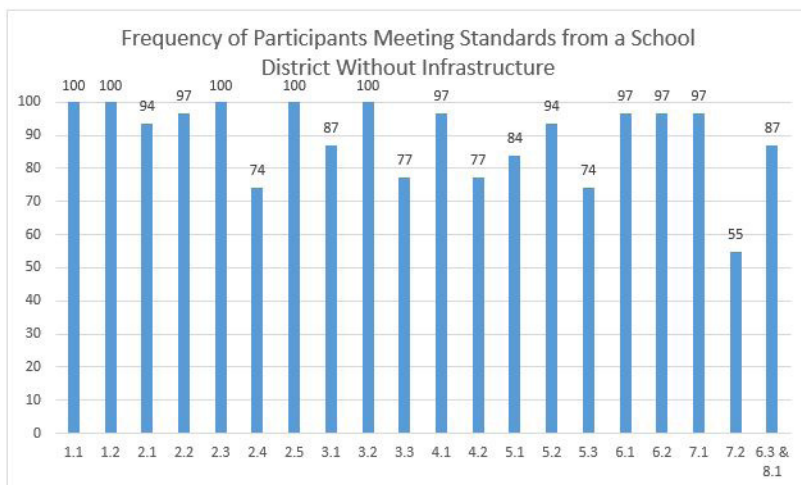


Figure 5. Frequency of participants meeting standards from a school district without infrastructure.

DISCUSSION

Teachers in K-12 have long carried out the duties of an instructional designer without having a formal name for the process to which they commit much daily work (Gyabak, Ottenbreit-Leftwich, & Ray, 2015). However, designing an online course requires a distinct set of skills (Wolcott & Shattuck, 2007). One important skill is that of learning to design a course such that it meets recognized standards of quality in order to maximize learning outcomes (Budzick, 2014; Mercer, 2014).

The present study explored the extent to which a six-week, authentic, project- and standards-based online professional development course helped K-12 teachers design a quality online course. Similar to Wayer (2013), outcomes suggest that the course supported transference of concepts to the design of an online course. Results indicate that 84% of participants met 15 out of the 20 essential standards assessed in their initial project submission. Out of these 15, areas of success appear to be within the areas of course introduction (General Standard 1), learning objectives (General Standard 2), course technologies (General Standard 6), learner support (General Standard 7), and usability (General Standard 8). In fact, at least 90% of participants met 10 of the essential standards, with almost half of those standards centered on learning objectives. Learning objectives are foundational to the field of instructional design and central to alignment, a concept espoused by Quality

Matters to be pivotal to online course quality (qmprogram.org). In fact, on average, 90% of participants met standards related to alignment (with the exception of 3.1 noted in the next paragraph) upon initial submission.

Similar to findings of Mercer (2014), the area of greatest concern was in assessment (General Standard 3). Specifically, issues arose in standards 3.1 and 3.3 that focus on aligning assessment with learning objectives and providing appropriate explanation for how the assessment will be evaluated. Seventy-eight percent of participants met Standard 3.1, and only 63% met Standard 3.3. This raised a red flag given the importance of aligning assessment with objectives and providing adequate explanations for students to understand how to meet instructor expectations for those assessments.

Other areas for concern included one topic related to learning objectives (Standard 2.4) and another focused on instructional materials (Standard 4.2). Sixty-one percent of participants did not adequately demonstrate the relationship between the course activities and the learning objectives, and only 76% of participants clearly explained to students the purpose of the instructional materials.

The standard with the lowest percentage of participants was Standard 5.3. This standard is about response time on the part of the instructor. Only 59% of participants met this standard upon initial submission, despite the fact that within one assignment, participants are given a checklist and are asked to provide this information within the course as one of the items on that list. Although this was the standard met least among all participants, overall standards related to this area were met by at least 84% of the participants, and, thus, General Standard 5 was not noted as a primary area of concern.

Roughly half of the participants were assessed on each version of the Higher Education Rubric. Thus, outcomes of comparing counts of participants who were assessed by the two editions indicate that two standards show a decline in success. The annotation for Standard 2.4 changed from the 4th to the 5th edition. Therefore, the ways QM suggests meeting this standard changed. This could account for the decline on this particular standard. However, participants performed better when assessed with the 4th edition on Standard 5.3 yet this annotation did not change. Further investigation is needed to determine possible reasons for this outcome.

Participants from school districts without infrastructure outperformed participants from school districts with infrastructure on almost all essential standards except Standard 7.2. According to Marek (2009), infrastructure has been shown to positively impact quality. Therefore, the result may seem unexpected. However, most standards are dependent on the work of the designer and not the infrastructure within which the course is housed, with the exception of 7.2. More than 90% of participants from school districts with infrastructure met standard 7.2, as opposed to 55% of participants from school

districts without infrastructure. Standard 7.2 is about institutional policies related to accessibility. If the administration has created an infrastructure that values accessibility, then most likely this standard is easy to meet and only requires awareness on the part of the course designer. Interestingly, these same participants performed poorly on standards 2.4, 3.3, and 5.3, similar to what resulted in the full sample aggregate. However, they outperformed participants from school districts with infrastructure on these standards, suggesting that prior administrative infrastructure had little impact on participants' performance and characteristics of the K-12 educator played a larger role in course outcomes.

LIMITATIONS

The results of this study should be considered within the context of various limitations. As mentioned earlier, in order to conduct the number of cohorts of the VICP course, it is essential to use more than one instructor throughout the year. These instructors are trained using protocol for how to interact with participants, types and extent to which feedback should be provided, as well as how to determine if a standard has been met. However, there is always a level of subjectivity to determining whether a standard has been met. In addition, some instructors may provide more extensive feedback than others for reasons such as experience, time available, or interest in the project. Furthermore, each participant in the VICP course comes from a background of knowledge that was not included in this study. Some participants have experience teaching online, while others do not. These background characteristics are sure to influence the degree to which one participant meets a standard when another does not, even though both may work for the same district and have access to the same resources. These characteristics could influence course outcomes as opposed to the course experience and feedback provided. Finally, no pre-test data was collected because participants did not already have fully developed courses that could be assessed according to QM standards.

CONCLUSION

The present study explored outcomes of a professional development course focused on supporting K-12 educators to create an online course that meets national standards of quality. Current research and national guidelines recommend that this type of professional development should be authentic, project-based, and standards-based. Outcomes demonstrate this model for professional development can successfully prepare participants to design an online course to meet standards. The VICP provided participants an

authentic learning experience by which they took the role of online student for six weeks. The course required that participants complete a project consisting of a fully online module of instruction within the context of a fully online course. This project was assessed using the Quality Matters Higher Education Rubric, a set of nationally recognized standards for assessing the quality of an online course.

To determine the extent to which K-12 educators were able to apply national standards of quality to an online course, data was collected from initial project submissions to analyze the number and type of standards met after completion of the VICP course. A majority of the participants were able to meet 15 of the 20 essential standards used to determine quality of the module. All but one standard related to alignment were met by almost all participants demonstrating this model of professional development is successful in helping participants understand and apply the concept of alignment to an online course.

In comparison to prior research on this topic, standards related to assessment are still of great concern and need further exploration on how best to teach course designers how to design assessments to meet quality standards. In addition, participants need further support in understanding how to demonstrate the relationship between course activities and learning objectives as well as sharing the purpose of the learning materials and expected response time as it pertains to course feedback.

Participants who were affiliated with a district that did not have an infrastructure for online learning in place outperformed participants who were affiliated with districts who did. Most likely this is because most essential standards are specific to the teacher's preferences and belief system with regards to each standard's requirements. The primary example from this study was Standard 5.3 that requires instructors to provide a time frame for responding to students. Districts without a set infrastructure would have no such mandated time frame, and thus meeting the standard is left to the discretion of the instructor and their support of this practice. On the other hand, Standard 7.2 addresses the importance of including accessibility policies. Districts with infrastructure in place can provide an accessibility home page, which may be why participants from school districts with infrastructure typically met this standard. Although infrastructure is necessary for learner success (Marek, 2009), there are sure to be other factors to consider.

This study was significant in providing empirical evidence of the effects of a specific professional development model purposed with preparing educators to design online courses to meet national standards of quality. As noted in the literature (Cavanaugh, Barbour, & Clark, 2009; Mercer, 2014; Shattuck, 2013), there is very little research providing guidelines on how best to teach this distinct set of skills (Wolcott & Shattuck, 2007). Although the

outcomes were positive, there were concerns that arose with regards to specific standards that participants did not meet for reasons that are not clear and need further investigation. In addition, limitations to the study such as multiple instructors across cohorts, varying amounts of feedback, and unknown learner characteristics necessitate that a more controlled study be conducted.

Future research should include pre and post data to provide stronger evidence as to the effectiveness of the program. For example, Mercer (2014) conducted a t-test using pre and post-test data regarding faculty knowledge of best practice in online course design. A similar instrument could be used to measure participants' prior understanding of best practice in online course design and used to determine the extent to which VICP improves this knowledge. In addition, inter-rater reliability among lead instructors could further be demonstrated using a sample of participant submissions whereby comparisons can be made regarding assessment outcomes across instructors. Finally, future research should include more information regarding participant characteristics and investigate course outcomes across instructors according to instructor characteristics so as to provide further clarity on outcomes that can more confidently be attributed to the VICP course.

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