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Identifying Professional Development Needs of High School Teachers Tasked with Online Course Design

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Abstract

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M.Ed., The Pennsylvania State University, 2003

BS, Millersville University, 1989

Doctoral Study Submitted in Partial Fulfillment

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Abstract

To satisfy demand for online learning opportunities at the high school level, 3 school districts in the northeast United States established a consortium to share resources to develop and deliver online courses. High school teachers who volunteered to develop courses for the consortium attempted the task without previous training in online course design and facilitation. High school students enrolled in the courses often did not successfully complete them, which obstructed the mission of the consortium. The purpose of this qualitative single critical case study was to explore teachers' experiences with and perceptions of designing and developing online courses without accompanying professional development. The iNACOL National Standards for Quality Online Courses (v2) and technological, pedagogical, content knowledge (TPACK) served as the conceptual frameworks for the study. Five teachers who developed and facilitated an online course for the consortium, without companion professional development, volunteered to be interviewed. Data were reduced using NVivo software and analyzed using a priori codes based on NACOL standards then open-coded for emerging themes. Results indicated that other than content expertise, teachers did not believe they had sufficient competencies in any of the areas identified in the iNACOL standards. Based on these results, an online professional development course for teachers was designed to provide introductory training and to model elements of quality online course design using the Moodle learning management system. Positive social change may be achieved if teachers have the knowledge and skills required to develop high-caliber, innovative, and convenient education opportunities that encourage students' course completion which leads to learning and academic success.

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Dedication

I dedicate this doctoral study to my husband, Tom. It was through his encouragement and unwavering belief in my abilities that I endeavored to take on the completion of a doctoral degree. It was through his continuous support that I was able to persist through the process and achieve this goal.

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I also wish to extend sincerest appreciation to my doctoral chair, Dr. Roberta Albi, who has not only been my mentor, but also my sounding wall, my source for comic relief, and my friend. Dr. Albi was phenomenal when it came to intensely scrutinizing my draft submissions and very quickly providing feedback. I would also like to thank Dr. Irene McAfee and Dr. Mary Howe for their expert guidance and advice. Finally, I would like to recognize Walden University for all of the support they have in place for students. I have been impressed not only with the rigor and organization of their online courses, but also the immense number of resources available to students. This online program has been a source of inspiration as I continue to develop my own knowledge and expertise in developing and offering online education programs.

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Section 1: The Problem

Introduction

Advances in technology have generated the transformation of how, when, and where formal education can take place. The demand for online learning options within the K-12 arena has experienced rapid and consistent growth, with multitudinous programs being made available through commercial suppliers, state-run cyber academies, cyber-charter schools, and regional consortiums that are organized and managed by state education agencies (Evergreen Education Group, 2015). These organizations offer full-time online programs, blended and hybrid learning programs, supplemental online courses, and online credit recovery courses. This variety of online options satisfies students'—and often their parents'—desire for alternatives to brick and mortar education designs. They provide opportunities for students to gain additional credits to accelerate education, to maintain a flexible schedule, and to obtain a full education without attending the physical school building. Moreover, as a component of traditional brick and mortar schools, online learning options can provide students with solutions to on-site scheduling conflicts, access to courses outside of their local school districts' offerings, flexible credit recovery options, and online courses can be a convenient source of instruction for homebound students (Evergreen Education Group, 2015; National Conference of State Legislatures, 2014). K-12 education entities are increasingly integrating online learning options into their education offerings, in response to this increasing demand (Evergreen Education Group, 2015).

One approach many school districts are taking to satisfy the demand for online learning options is to have their professional staff develop online courses (Palloff & Pratt, 2011; Vai & Sosulski, 2011). The abundance of electronic sources of information, often Internet-based, on any topic, along with availability of numerous user-friendly learning management systems (LMS), have provided school district professional staff members with the resources needed to develop online courses both to supplement on-site instruction and to offer fully online venues. In my work as an educational technology specialist, an online course developer, a coordinator of a virtual schools program, and most recently, as the director of an online learning consortium, I have observed that a growing number of school districts are purchasing LMSs such as Schoology and Canvas, or using the open source LMS, Moodle, to design and deliver their own courses, and they are using instructional resources available in-house. I have also observed that teacher preparation for effectively delivering online learning using these LMS' is often scant or nonexistent.

In response to research indicating the necessity to enhance K-12 teacher preparation to include online instruction, universities including Boise State, Florida State, and Arizona State now incorporate online course development, facilitation skills, and field practice in their undergraduate teacher preparation programs (Barbour, 2012; Compton & Davis, 2010; Duncan & Barnett, 2009; International Association for K-12 Online Learning [iNACOL], 2013; Williams & Casale, 2015). Education program elements like these, coupled with the increasing possibility that pre-service teachers have at least taken an online course, are providing teachers who are new to the field with

foundational knowledge of the structure and facilitation of online courses (Allen & Seaman, 2010; iNACOL, 2013).

Many high school teachers who are attempting to design and facilitate online courses received their teaching credentials before online learning entered the mainstream as an education option for high school students. These teachers may not have directly experienced learning online or developed a foundational knowledge of online course design in their previous education preparation programs. Yet, teachers who are inexperienced in the area of online course design are frequently tasked with, or are voluntarily designed online courses, transitioning some or all of their instruction to the online environment, using learning management software provided to them by their school districts (Palloff & Pratt, 2011).

It is common for teachers to undertake online course development without having had any formal training in online course design or in online instructional pedagogy (Carnahan & Mensch, 2014). Consequently, online courses that do not meet established criteria for quality are regularly developed and delivered to students (Palloff & Pratt, 2011). Furthermore, teachers who are unfamiliar with features of quality online courses, or with established criteria for quality online design, may not recognize inferior course design, and thus continue the trend of subpar course development (Palloff & Pratt, 2011). Others may acknowledge the need for training in online course development, but may not be provided with adequate and appropriate professional development (Elliott, Rhoades, Jackson, & Mandernach, 2015).

In this single critical case study, I explored high school teachers' perceptions of professional development needs relative to competencies required for quality online course development, based on their prior experiences building online courses without accompanying professional development to prepare them for the task.

Definition of the Problem

High school teachers taking part in the development of online courses for a local online learning consortium have undertaken this task without corresponding professional development in the design of quality online courses for high school students. This has resulted in courses that do not meet established criteria for quality online courses. High school principals from each of the three school districts participating in the online learning consortium reported that many students taking these courses have either failed to complete them, or failed to achieve passing scores (Personal communication, 2014).

The online learning consortium comprises three neighboring, suburban school districts in southeastern Pennsylvania. The purpose of the consortium is to allow the three school districts to share resources (financial and personnel) required to internally develop online courses for blended and distance learning programs. The consortium's steering committee includes the superintendent from each of the three school districts and administrative teams. Administrative teams include assistant superintendents and directors of curriculum and instruction, directors or coordinators of instructional technology, and high school building principals. Pennsylvania Education Association presidents, and a representative from the local chapter of Service Corps of Retired Executives (SCORE) are also members of the committee.

The steering committee has been providing guidance and oversight of the consortium since its inception in 2011. In 2014, the steering committee acknowledged the need for an individual familiar with the administrative, pedagogical, and technical components required of a successful online program, to serve as its director. According to the school districts' superintendents, this was in response to the growing number of enrolled students and to teachers' expressed needs, particularly for more direction in online course development (Personal communication, November 3, 2014). I am the newly appointed director of the consortium, and I am tasked with moving the consortium forward. This includes continuing with the in-house development of additional online courses to add to the consortium catalog.

When I began this position in November 2014, I found there was not a formal professional development plan in place to prepare teachers to design and develop online courses. Rather, the consortium members took a professional learning community approach, where course developers met as a group 1 day per month to collaboratively build courses. Individuals from the districts' technology departments and an instructional technology coach were on-hand to provide technical support and ideas for instructional technology integration within courses. According to one member of the steering committee, no one specified expectations for using a particular set of standards for online course development, and no one conducted follow-up course evaluations to determine alignment of courses to any particular set of standards (Personal communication, November 14, 2014).

Teachers who undertake the task of developing online courses are not often provided with adequate training in online course design and delivery. They may be encouraged or required to transition some or all of their course content to an online platform in response to student demand and/or the decisions of school district administrators to provide online learning venues (iNACOL, 2015). According to research conducted by Gosselin and Northcote (2013) at the university level, faculty often report a lack of confidence in their competencies to develop online courses, along with low levels of self-efficacy when teaching online. These negative self-perceptions are the result of limited, targeted professional development in online course design and delivery provided by their institutions (Gosselin & Northcote, 2013). Further, as Gosselin and Northcote (2013) discovered, lack of sufficient professional development stems from institution administrators having little understanding of the complexity of online course development. Faculty members who participated in the research conducted by Gosselin and Northcote (2013) indicated a need for professional development in competencies that include course design, design of online activities and assessments, online communication, and in developing student-teacher relationships in the online learning environment. Well-constructed and facilitated online courses are key to the success and achievement of online students (Palloff & Pratt, 2011; Vai & Sosulski, 2011).

School administrators continue to recognize benefits of incorporating online learning as a solution for alternative education needs, to offer courses unavailable in the face-to-face classroom, to implement blended and hybrid learning activities within the face-to-face classroom, and to compete with cyber-charter schools for retention of

students seeking fully online programs (Brady, Umpstead, & Eckes, 2010; Gallo, 2014; iNACOL, 2015; Online Learning Consortium, 2015). The International Association for K-12 Online Learning reported continuous growth in various educational entities' development and provision of online instruction, along with increasing student enrollment in online programs (iNACOL, 2015). Similarly, the Evergreen Education Group (2015), which collects data on state-run virtual schools, reported steady increases in those types of online programs across the nation, with latest data indicating a 6.2% increase of enrolled students between the school years 2012-2013 and 2013-2014. The state of Pennsylvania had 32,000 students enrolled in cyber-charter schools in the year 2014 (Gallo, 2014). This number did not include enrollments in online learning programs provided through other learning entities or through students' home school districts (Evergreen Education Group, 2015).

To satisfy the demand for online education options, most local school districts partner with outside entities that are capable of delivering pre-constructed online courses and that provide companion course facilitation services by certified teachers. The provision of these in-house options encourages students to remain enrolled in their local school districts, rather than withdraw to attend an outside cyber-charter school.

Providing in-house online education options is a lucrative endeavor, considering that in Pennsylvania, charter-school tuition currently averages $10,000-$12,000 per year, per student—a cost that must, according to Pennsylvania School Code, be absorbed by the students' resident public school districts (Gallo, 2014). This expense can have a profound and detrimental effect on local school budgets (Gallo, 2014). On the other hand,

paying commercial providers for online courses and facilitation services in order to provide an in-house program is also a costly endeavor for school districts faced with limited budgets. To circumvent the expense of contracting with commercial providers for online courses and companion instructional services, administrators at some school districts are venturing to have their own teachers develop and facilitate online courses in-house. Before attempting this task, however, teachers need to understand and acquire the course design and instructional skills necessary for creating effective online courses (Anderson, Barham & Northcote, 2013). Teachers who undertake the task of developing online courses are not often provided with adequate training in online course design and delivery.

Rationale

Evidence of the Problem at the Local Level

According to iNACOL (2015), a lack of resources to locally develop and provide online instruction drives many school districts to either partner with other school districts to create a consortium that will share the costs of offering an online program, or to contract with a local education agency for the provision of a program. In this particular case, a consortium was formed in 2011 by three neighboring suburban Pennsylvania school districts facing similar online education needs. The purpose of the consortium is to provide internally developed and facilitated online courses to high school students enrolled in any of the three participating school districts. The consortium mission statement is: “To transcend the boundaries of time and space, providing students with innovative options to learn, grow, and achieve.” Currently, high school students who

wish to have the experience of taking an online course, or who need flexibility in scheduling, may enroll in an online course developed and delivered by teachers in the consortium. Students may choose to enroll in the online consortium to take elective courses not offered in their home districts, to incorporate flexibility into their schedules, to experience the online learning environment, for credit recovery (retaking a previously failed course), or for credit acceleration (early completion of credit requirements) purposes. Administrators from the three school districts involved with the consortium hope that this internally developed online program can eventually compete with local cyber-charter schools. Charter schools, since entering the field of online education, are aggressively vying for enrollments of students seeking online education options (Gallo, 2014; Reach Foundation & Alliance, 2015).

Teachers from all three districts may volunteer to develop and facilitate courses for the consortium. Superintendents from the consortium school districts confirmed that teachers who volunteer to participate in the consortium as online course developers and/or facilitators are not required to possess previous experience in the area of online course design and facilitation (Personal communication, November 3, 2014). Therefore, teachers have entered the consortium with varying skill sets and degrees of proficiency in competencies required for successful online course development.

When I initially worked with consortium teachers, I observed that their levels of technology proficiency, particularly in the use of the Moodle learning management system—the platform on which all of the consortium's courses are built—varied greatly. I observed that teachers were not well versed in the functions of many of the tools

available within the Moodle LMS as we reviewed their courses together. Teachers used few of the available tools within the LMS as they attempted to design course content, activities, and assessments. Most courses were built as information repositories, and few of them included interactive components. I also scrutinized courses using the iNACOL *National Standards for Quality Online Courses (v2)* (2011) as a guide, and I found most of the standards pertaining to quality online course design were absent from the consortium courses. Superintendents from the consortium school districts recognized that inconsistencies in online course development competencies possessed by teachers may have prevented those involved with the consortium from producing the high-quality courses and online education experiences hoped for at the outset of the program (Personal communication, November 3, 2014). Further, superintendents acknowledged that the complexity of building online courses was not fully understood at the outset of the endeavor, and only became apparent as several years passed with the majority of teachers making little progress in the development of their courses (Personal communication, November 3, 2014).

On December 19, 2014, and January 8, 2015, the consortium steering committee convened to devise a plan for moving forward with developing online courses. The committee members determined that I should work with teachers during the next year to revise their current courses to meet quality course standards, in accordance with the iNACOL *National Standards for Quality Online Courses (v2)* (2011). Members of the steering committee pointed out that a substantial number of students enrolled in online courses through the consortium ended up either not completing the courses or failing

them, often due to lack of active engagement with the course content (Personal communication, 2014). Courses designed by consortium teachers who did not receive prior training in online course design and development required extensive revision, as many students were not performing well in them.

The consortium steering committee members, therefore, recognized the need for companion professional development for future teacher-developers (Personal communication, 2015). The steering committee members also determined that professional development needs of teachers who attempt to develop online courses for the consortium must be investigated to ensure more efficacious course development in the future (Personal communication, 2014; Personal communication, 2015). Further, teachers new to the consortium must first be provided with targeted training to develop competencies required for building quality online courses, according to steering committee members (Personal communication, 2015).

The experience of the consortium mirrors researchers' findings that classroom teachers who endeavor to design and develop online courses must first be equipped with a considerable set of skills that fall outside of the practice of face-to-face classroom teaching (e.g., Adnan & Boz, 2015; LaPointe-Terosky & Heasley, 2015; McQuiggan, 2012; Vai & Sosulski, 2011). Moreover, as the following review of literature reveals, it is common for face-to-face instructors to enter into the task of developing online courses with little knowledge and understanding of how to design a quality online course. This lack of companion professional development can lead to the development online courses that do not meet established criteria for quality.

Evidence of the Problem from the Professional Literature

Most literature on the topic of instructor preparation for online course development and facilitation currently focuses on higher education. Yet, the issues associated with, and the competencies required for, transitioning from the face-to-face classroom to online instructional design and delivery in higher education are equally relevant to high school level programs. The following literature review highlights some of the obstacles associated with making this transition without companion professional development and the need for additional research in the area of providing appropriate professional development to teachers tasked with building online courses.

In interviewing college level mathematics instructors as they attempted to transfer their face-to-face courses to the online learning platform without corresponding professional development, Adnan and Boz (2015) found that, although instructors eagerly grasped the opportunity to engage in this transformation, they had little understanding of pedagogical differences between face-to-face and online instructional delivery. Other than to upload PowerPoint presentations, instructors had no idea how to deliver content online. They struggled to find ways to gauge their students' understanding of material and to communicate effectively with their online students, which ended in frustration and disillusionment for some (Adnan & Boz, 2015). In other cases, as observed by McQuiggan (2012), teachers simply uploaded recordings of their lectures and called that a course. These are typical scenarios, as teachers tend to teach the way they have been taught (Baran, Correia, & Thompson, 2011; Broussard, Hebert, Welch, & VanMetre, 2014). Without prior experience as online students, teachers tend to try to replicate their

classroom instruction in their online courses (Baran et al., 2011). However, when teachers find they cannot simply replicate their face-to-face instructional practice in the online platform with comparable results, they may become disenchanted and frustrated with the transition to online instruction (Baran et al., 2011).

Advances in technology continue to transform educational practice. Today, teachers "are expected to use tools and techniques that were mostly absent from their [own] experiences as students and as teacher candidates" (Broussard et al., 2014, p. 38). This dilemma traverses the area of online instruction and, as Adnan and Boz (2015) concluded from their study of college instructors engaging in the development and delivery of online math courses, companion professional development in all aspects of online course development and instruction is critical for a successful transition.

Often, however, professional development for online course development focuses mainly on technology, and neglects to address other critical competencies of online course design and instruction (LaPointe-Terosky & Heasley, 2015). Vai and Sosulski (2011) asserted that, even if professional development is provided, many of the most important elements of course development, such as aesthetic and functional layout, the writing style used to deliver course content, and the effective use of media, are often overlooked. Moreover, the study of a group of university instructors with online teaching experience revealed that they perceived the non-pedagogical competencies required for effective online teaching to be just as critical as pedagogical competencies (González-Sanmamed, Muñoz-Carril, & Sangrà, 2014). For example, online instructors have begun to understand that they require skills in various technologies, written communication, and

in the management of online students, including progress monitoring and reporting, according to González-Sanmamed et al. (2014). The peripheral roles recognized here are essential to building an overall understanding of the elements that need to be considered when devising effective professional development to direct individuals in the design, development, and facilitation of quality online courses.

Finally, new technologies are often approached in terms of how they can fit into established instructional practices. This commonly occurs when teachers attempt to build online courses. Moodle founder Martin Dougiamas pointed out that, "Most people who are teaching on Moodle have not had the experience of learning in an online environment" (personal communication, August 4, 2015). The online learning platform can, however, provide opportunities for developing and incorporating new instructional strategies that are not present in the traditional face-to-face classroom. New ideas and new tools for providing learning experiences continue to be developed for online learning management systems. As Dougiamis asserted, "We don't even know what's possible yet with teaching online or in Moodle specifically; we are all still learning this together" (personal communication, August 4, 2015). Hence, online course developers must be mindful that effective instructional strategies for online courses continue to be explored and perfected.

These findings and issues mirror the problem of high school teachers attempting to develop online courses without appropriate companion professional development to acquire the skills needed for this multifarious task. Thus far, little to no research has investigated high school teachers' experiences with developing and delivering completely

online courses. Studies exploring instructor competencies and professional development needs for online course development and facilitation in higher education are readily available (e.g., Bigatel, Ragan, Kannan, May, & Redmond, 2012; Gosselin & Northcote, 2013; González-Sammamed, 2014; Storandt, Dossin, & Lacher, 2012), but little is written regarding those same topics at the K-12 level. This gap in information and direction reinforced the need for this study and any resulting increase in awareness related to the professional development needs of high school teachers transitioning to online course development and facilitation.

Definitions

Following is a list of terms specific to this study:

Blended learning: Educating students using a combination of online learning, with the teacher of record being in a remote location outside of the physical school building, and supervised bricks-and-mortar learning experiences, with the teacher of record located within the school building (Evergreen Education Group, 2015).

Cyber-charter schools: Independently organized online learning entities that receive operating funds from the government and from local school districts (Gallo, 2014).

Hybrid learning: Educating students using a combination of online and in-person learning experiences, with the majority of instruction occurring online. The teacher of record is generally the online instructor, while support is provided at a physical location with additional educators (Evergreen Education Group, 2015).

Moodle: An acronym for "Modular Object-Oriented Dynamic Learning Environment, Moodle is an open-source learning management system" (para. 1) used by K-12 and higher-education systems for the development of online courses (Moodlerooms, 2016).

Online course facilitation: Teaching strategies and tasks associated with electronically provided education courses (University of Illinois, 2015).

Online learning/digital learning/e-learning: Receiving education via electronically provided education courses, primarily over the Internet (Evergreen Education Group, 2015).

Open Source: Software that is free of charge and licensure, and is developed by the community for the use of the community (Open Source Initiative, 2015).

Virtual schools/virtual classrooms: Educational venues where instruction is provided using the Internet and associated technologies, rather than in a physical classroom or bricks and mortar building (Learn, 2016).

Significance

Student success and achievement in the online environment depends upon optimal course design and delivery (Frayer, 2014; Lister, 2014; Mayer, 2011; Palloff & Pratt, 2011; Vai & Sousulski, 2011). Determining the professional development needs of teachers endeavoring to design and facilitate optimal online learning environments, and then constructing a plan to address those needs, is crucial and can ensure courses are designed to elicit student engagement and achievement (Baran & Correia, 2014; Elliott, et al., 2015). The research undertaken in this project provided deeper insight into the

experiences and perspectives of high school teachers tasked with developing and facilitating online courses without prior training and/or professional development. This research subsequently contributes to a clearer understanding of how to prepare teachers to navigate an educational territory that remains largely uncharted at the high school level. This understanding may benefit the three-district online learning consortium as it expands and more teachers are added as online course developers. Students who enroll in consortium-provided online courses may, in turn, have a more positive online learning experience if courses are developed and delivered by teachers who receive appropriate professional development in online course design.

The research and resulting project may additionally benefit administrators at similar education agencies who may be considering having their teachers build in-house high school level online courses. They may draw upon the findings of the research to gain insight into teachers' perceptions of their professional development needs. This may help to inform their own teacher preparation process for online course development.

Guiding/Research Questions

The purpose of this project study was to explore high school teachers' experiences with, and perceptions of, designing and developing online courses without accompanying professional development, for the three-district consortium. The guiding research question was: What are high school teachers' experiences with, and perceptions of, designing and developing online courses without accompanying professional development? To delineate this question, the following sub-questions were explored:

1. What competencies do high school teachers perceive as initially absent from their understanding of quality online course design and development?
2. What online course design and development competencies do high school teachers perceive as being the most difficult to grasp without ancillary training?
3. What online course design and development competencies do high school teachers perceive as requiring additional professional development to achieve proficiency?

Little research exists to inform school administrators of the needs specific to high school teachers when it comes to transitioning from the planning and delivery of face-to-face instruction to online course design and delivery. Collecting qualitative data on perceived professional development needs from teachers who have previously attempted to construct online courses without corresponding professional development was beneficial for gaining an in-depth understanding of where and how to concentrate future professional development efforts for the consortium. It provided a more in-depth understanding of teacher professional development needs. The information gathered might be considered by other school administrators who may be looking to transition instruction from a purely face-to-face format to a blended or fully online education structure.

Review of the Literature

The following literature review is presented in two parts: competencies required for online course design and development, and the professional development needs of teachers who endeavor to build online courses. This literature review provides deeper insight into the complexity of developing quality online courses and the scope of professional development required to adequately prepare teachers to undertake this task. I retrieved sources cited in this literature review from the following databases provided by the Walden University library: EBSCO Host and Education Research Complete. I also consulted Google Scholar, textbooks, and print and online books. Key terms and phrases included: *online learning*, *online learning high school*, *online learning K-12*, *online instruction*, *online instruction competencies*, *online teaching, distance learning*, *distance learning high school*, *distance learning K-12*, *e-learning*, *e-learning K-12*, *e-learning high school*, *online course development*, *online course standards*, *online course development competencies*, *online course design*, *online course design competencies*, *online course facilitation*, and *professional development.*

Competencies for Online Course Design and Development

The competencies required for quality online course design and development are more numerous and complex than those required of a face-to-face classroom teacher (Bigatel et al., 2012; González-Sammamed, 2014; Storandt, Dossin, & Lacher, 2012). Moreover, they tend to vary depending upon the context of the online enterprise and the evolution of online technologies and pedagogies (Baran, Correia, & Thompson, 2011; Bigatel et al., 2012). After I conducted exhaustive searches, I found that most current

research pertaining to competencies for online course development was conducted through the lens of higher education. The general nature of most of the competencies, however, allows for their application at the high school level, as well.

Various researchers revealed a wide array of competencies necessary for online instruction, and results are dependent upon the context of the research. For example, Chang, Shen, and Liu (2014) identified "content expertise" (p. 82) and "instructional designer" (p. 82) as the most significant competencies named by university faculty involved with both the development and facilitation of online courses. "Learning assessment and administrative management" (p. 82) followed in perceived importance with this same group (Chang et al., 2014).

Researchers at a different university identified tasks associated with communication as most important in a study that surveyed 197 individuals involved with either the development (web designers) or the facilitation (instructors) of online courses (Bigatel et al., 2012). In that survey, participants were asked to rank 64 different competencies in the order of their perceived importance. Those competencies included instructional components related to student progress monitoring, online workload management, communication, familiarity with technologies used within the course, effectively incorporating multimedia, differentiation of instruction, and accommodation of students with individual needs (Bigatel et al., 2012). Many of these competencies related to the facilitation of pre-constructed online courses purchased from online course vendors, rather than to the actual design and development of online courses.

Adnan and Boz (2015) similarly identified the level of interaction between learner and instructor as the most essential competency when teaching online mathematics. González-Sanmamed et al. (2014) pointed to proficiencies in peripheral roles including "social, evaluator, manager, technologist, advisor/counselor, personal, and researcher" (p. 166) of online teachers as requiring targeted professional development to improve associated competencies. Carnahan and Mensch (2014) identified the understanding and incorporation of education design theories as another area essential to online course development. According to Carnahan and Mensch (2014), online course design and instruction must be based on corresponding and appropriate learning theories, such as Gagne's nine events of instruction, transformative learning theory, and Mayer's theory of multimedia learning.

A number of organizations have published sets of standards related to the design and delivery of online courses. The National Education Association's (NEA) *Guide to Online High School Courses* (2002) encompasses seven areas including: "curriculum, instructional design, teacher quality, student role, assessment, management and support systems, and technical infrastructure" (p. 11). The scope of this set of standards is wide, covering course development, facilitation of online courses, and the expectations of students who enroll in online courses. The International Society for Technology in Education (ISTE) provides a set of *ISTE Standards for Teachers* (2008). Although these standards focus on general technology integration in a full range of instructional settings, some can be applied to the design of online courses. The Pennsylvania State Department of Education (PDE) recently published a teacher effectiveness rubric for online educators.

The competencies listed in the rubric, based on the Danielson framework for teaching (1996), are used as an evaluative tool for the facilitation of online courses (PDE, 2016).

The International Association for K-12 Online Learning (iNACOL), provides several sets of standards relating to online education including: *iNACOL National Standards for Quality Online Teaching (v2)* (2011)*; iNACOL National Standards for Quality Online Courses (v2)* (2011); and *iNACOL National Standards for Quality Online Programs* (2009). Each of these comprehensive sets of standards targets a separate aspect of online teaching and learning.

Online instructional standards and associated competencies are varied, wide-ranging, and dependent upon the context and individual requirements of the instructional program. The disparate results published in the literature indicated that online course design and development, and online course facilitation, each require unique sets of competencies. This study focused specifically on competencies required for online course design and development at the high school level, and high school teachers' perceptions of professional development needed to achieve competencies related to online course design and development.

The *iNACOL National Standards for Quality Online Courses (v2)* (2011) correlate explicitly with online course design at the K-12 education level. The standards are comprehensive and include detailed information regarding aspects of course design, content, and instructional pedagogy that must be considered when developing online courses. The *iNACOL National Standards for Quality Online Courses (v2)* (2011) encompass and reflect most of the online course design and development competencies

pertinent to online course design and development that surfaced in this literature review. Therefore, I chose the *iNACOL National Standards for Quality Online Courses (v2)* (2011) to frame this study. These standards and their associated competencies provided a concrete and practical base for examining high school teachers' perceptions of the professional development needs of those who undertake the task of developing an online course for the first time. My research question and sub-questions all related to the *iNACOL National Standards for Quality Online Courses (v2)* (2011) and the competencies needed to achieve these standards. The standards were relative to the problem that prompted this study—that teachers who undertake online course development and facilitation do not often receive the professional development training necessary to accomplish the task well.

The importance of providing professional development to teachers who attempt online course development was established in the literature review in Section 1 of this study. I found that research is currently directed at determining professional development strategies that will effectively prepare classroom teachers to transition from face-to-face to online instruction. Within the *iNACOL National Standards for Quality Online Courses (v2)* (2011), competencies required for developing quality online courses can be extracted and contextualized, relative to the stated standards. A comprehensive inventory of what teachers need to know and understand to develop quality online courses can be derived from the standards; thus, they were a suitable basis for informing targeted professional development.

Within the iNACOL *National Standards for Quality Online Courses (v2)* (2011), 52 standards for course design are placed into five distinct categories: *content* (p. 7), *instructional design* (p. 10), *student assessment* (p. 13), *technology* (p. 14), and *course evaluation and support* (p. 17). The five standards categories identified by iNACOL (2011) for developing quality online courses are described in detail below. Additionally, the technological, pedagogical, and content knowledge (TPACK) conceptual framework (Mishra & Koehler, 2006) helps to elucidate the competencies derived from the iNACOL standards (see Figure 1). TPACK is the acronym for the convergence of three knowledge areas: content, pedagogy, and technology. Mishra and Koehler (2006) developed the framework to illustrate this convergence and overlap in the digital educational environment. Although the iNACOL *National Standards for Quality Online Courses (v2)* (2011) framework presents competencies as distinct proficiency categories, the TPACK framework provides a conceptual understanding of how online course developers must be proficient in their ability to mesh their content knowledge with pedagogy and technology skills to design a quality digital learning experience.

Figure 1. TPACK Conceptual Framework

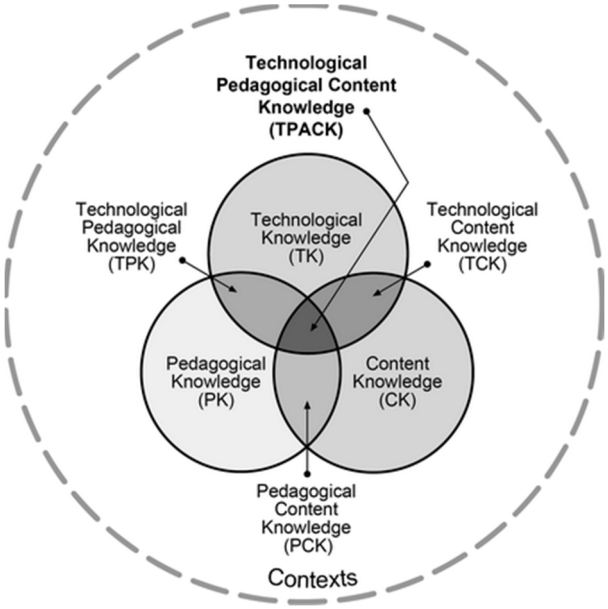

Figure 1. TPACK Conceptual Framework model depicting the interrelationships of Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), and Technological Pedagogical Knowledge (TPK). Adapted from "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge," by P. Mishra and M. J. Koehler, 2006, *Teachers College Record, 108*(6), pp. 1017-1054. Copyright 2006 by Teachers College, Columbia University. Reproduced with permission from the publisher, ©2012 by tpack.org.

The TPACK framework illustrates the way instructors must consider the ubiquitous and transparent integration of technology with content and pedagogy to provide innovative learning opportunities for online students (Benson & Ward, 2013). The interrelationships among the three major components of teaching identified by Mishra and Koehler (2006)—content knowledge, pedagogy, and technology—can be united with the *iNACOL Standards for Quality Online Courses (v2)* (2011) to foster effective online course development and delivery. The TPACK framework helps to

illustrate the breadth of teacher competencies that are associated with each of the iNACOL standards for quality online courses that are described below.

Course content. As specified in *Section A* of the iNACOL *National Standards for Quality Online Courses (v. 2)* (2011), course content needs to be aligned with state standards and it should be provided using multiple forms of learning modalities. Content should be engaging and it should promote mastery. Additional individual competencies related to course content design and development standards include the ability to align content and assessments to state standards, to clearly communicate course goals and objectives within the course, to demonstrate information literacy related to course content, and to effectively disseminate course content. The ability to establish, within the course, a clear protocol for instructor-student-parent communication and the ability to develop and provide a comprehensive course syllabus and explicit expectations of students are also considered content competencies (iNACOL, 2011).

Koehler, Mishra, and Cain (2013) further described content knowledge as not only encompassing teachers' knowledge of their particular subject area, but also their ability to effectively transfer that knowledge to the student, using digital means. It is the ability to merge curriculum, instructional strategies, instructional materials, and assessment with a deep knowledge of content to produce an effective online learning environment (Koehler et al., 2013). The TPACK framework illustrates the interrelatedness of content knowledge with knowledge of instructional pedagogy and technology (see Figure 1).

The online learning platform requires teachers to rethink the way they provide instruction, as delivering content online is quite different from face-to-face classroom delivery and requires additional expertise (McQuiggan, 2012). It is often a labor-intensive process that demands preparation far in advance of delivery, extensive attention to detail, and a fundamental shift in how teachers carry out their roles (McQuiggan, 2012). These new modes of content delivery, supported by and provided through technology applications, may necessitate the provision of professional development to teachers who may not have the familiarity and expertise required to implement them when developing online courses.

Instructional design. In *Section B* of the *iNACOL National Standards for Quality Online Courses (v2)* (2011), instructional design standards for online courses include competencies related to creating engaging, active, and interactive learning activities; communicating effectively throughout the course; and providing individualized learning opportunities. Individual pedagogical competencies related to online instructional design and development, based on the iNACOL *National Standards for Quality Online Courses (v. 2)* (2011), include the ability to logically sequence the course by units and lessons, to provide active learning opportunities that include various ways for students to achieve mastery, and to incorporate activities that require higher-level, critical thinking skills. Additional competencies include the ability to adapt content, activities, and assessments to accommodate individual students' needs; to employ a writing level appropriate to the course content and students' ages and ability levels; and to incorporate opportunities for student to student, and student to teacher communication to ensure continued student

engagement and expected progress are all competencies that align with the instructional design standards included in *Section B* (iNACOL, 2011).

These competencies correlate with those cited by Koehler et al. (2013) as the pedagogical knowledge area of TPACK (see Figure 1), which encompasses instructional methodologies including strategies, techniques, and practices required for engaging students in the learning process, for bringing about learning, and for evaluating student learning. This, the PCK element of TPACK (see Figure 1), overlaps with course content elements described previously. In addition, pedagogy overlaps technology in the TPACK framework (see Figure 1) as the TPK element of TPACK. The essence of technological pedagogical knowledge (TPK), as described by Koehler et al. (2013), is staying abreast of new technology tools and software that may positively influence and support instructional practice, and understanding how to incorporate those technologies seamlessly into the education process. This is particularly relevant to online learning, as technology and the appropriate, comprehensive integration of various technological applications, is central to the development and delivery of quality online courses. While demonstrating competency in content knowledge, teaching pedagogy, and instructional technology are fundamental both to the face-to-face classroom and to the online learning environment, understanding and applying the overlap of these competencies [as described above] is especially imperative for the digital learning environment (Koehler et al., 2013).

Understanding and employing effective aesthetic and cognitive elements in the development of online courses relates to the instructional pedagogies outlined in *Section*

B of the *iNACOL Standards for Quality Online Courses (v2)* (2011). Mayer's guide to media-based instruction is relevant to the standards and to those individuals who are designing and developing online courses (2011). Competent aesthetic and cognitive design of online courses ensures the logical sequence of course activities and content, provides a platform for effective communication, generates heightened student engagement with the content, and ultimately leads to an improved learning experience (Mayer, 2011). The following twelve principles and associated recommendations should, as Mayer (2011) suggested, guide the development of media-based instruction:

1. Coherence Principle – Extraneous sounds, pictures, and words easily distract the online student. Avoid including items that serve no purpose in helping students to understand course content.
2. Signaling Principle – When cues that highlight essential material (e.g. boldface text) are added, students learn better.
3. Redundancy Principle – If a screen includes animated narration, adding on-screen text can negatively impact student cognition and performance.
4. Spatial Contiguity Principle – If printed words and graphics must appear on the same page, incorporating explanatory text into the graphic itself, rather than adding it outside of the graphic, is more conducive to student cognition and learning.
5. Temporal Contiguity Principle – Narration should be presented during a video segment, rather than before or after it. Even a delayed soundtrack

can detract from the viewer's understanding of the concept being presented.

6. Segmenting Principle – Complicated material needs to be presented in small parts (chunked) for optimal understanding.
7. Pre-training Principle – Students learn better if they have been presented with key concepts previous to, or at the start of, a lesson.
8. Modality Principle – Students learn better when oral explanations and verbal dialogue accompany animation, rather than from printed text that accompanies an animation. A written caption that accompanies a picture causes a split attention or cognition problem; the individual must process both words and images, which engages two different parts of the brain at once. Spoken explanations, however, require less cognitive load, and processing capacity is increased. This principle only works for a fast-paced lesson with complex material. In a slower paced lesson, it is better to have printed text accompany images.
9. Multimedia Principle – Students learn better when pictures/images accompany text, than they do from text alone.
10. Personalization Principle – Students learn better from multimedia lessons where language used is conversational and colloquial, rather than formal.
11. Voice Principle – Students learn more deeply when the narration is spoken by a human voice rather than by an artificial (computer generated) voice.

12. Image Principle – Adding the speaker's image to the screen when delivering a multimedia lesson does not increase learning. (pp. 85-200)

Although these principles may be fundamental for trained web designers, they may not be intuitive to individuals trained as classroom teachers and who likely have not had previous training that cultivates this knowledge and skill set (McQuiggan, 2012). Mayer's (2011) multimedia instructional design principles, along with Mishra and Koehler's (2006) TPACK framework, emphasized that online instruction pedagogy is different from, and includes more diverse components than, face-to-face classroom instruction. Hence, comprehensive multifaceted professional development for teachers endeavoring to design pedagogically sound online instruction may be necessary.

Student assessment. In *Section C* of the iNACOL *National Standards for Quality Online Courses (v2)* (2011), student assessment standards for online courses include competencies related to employing a variety of strategies for assessing student achievement and for providing continuous, detailed feedback. Individual competencies related to student assessment include the ability to design evaluations that are adequate, appropriate, representative of the scope of the course, and are consistent with course objectives. Additionally, the ability to provide ongoing, embedded assessments that can be used to inform instruction and individual student needs, to provide timely and frequent feedback on student progress and achievement, to develop and include grading rubrics, and to explicitly describe grading policies and practices are required competencies that fall within the iNACOL *National Standards for Quality Online Courses (v2)* (2011).

The *ISTE Standards for Teachers* (2008) similarly include standards for the design of assessments appropriate for a digital learning environment. These standards align with the iNACOL (2011) standards, in that they promote the use of technology to develop varied formative and summative assessments that address diverse learning styles and the individual needs of students. The ISTE (2008) standards additionally promote the use of authentic assessment and assessments that encourage students to exhibit their creativity through the use of digital tools.

Assessments can be provided in a variety of formats if teacher-designers are skilled in the overlap between content and technology as depicted in the TPACK (see Figure 1) framework (Koehler et al. 2013). For example, numerous features of the chosen LMS—in this case, Moodle—can be used to design a variety of formative and summative assessments for individual and group learning, if teachers are fully trained in the use of these applications (Sewell, Frith, & Colvin, 2010). Objective questions, including true/false, multiple choice, and matching-type questions, are often used as formative and summative assessments, in online courses, depending upon their structure. In his seminal research, Webb (1997) asserted that objective assessment questions should be designed to incite critical thinking and application of knowledge to authentic situations. Well-developed objective questions help to ensure the rigorous integrity of online courses. However, teachers may require targeted professional development relating to structuring rigorous objective questions, when developing assessments for an online course. They may also benefit from professional development that introduces alternate assessment

methods, such as multimedia projects, discussion forums, and collaborative activities that are appropriate in the online learning environment (Vai & Sosulski, 2011).

Technology. In *Section D* of the iNACOL *National Standards for Quality Online Courses* (2011), technology standards include understanding and implementing a variety of user-friendly and appropriate technology tools that enhance learner accessibility. Individual competencies related to technology include understanding and using a course architecture (LMS) that provides the ability to add a variety of content, multimedia, and assessment activities; designing a consistent course navigation structure; and abiding by copyright laws when developing content (iNACOL, 2011).

Technology skills are omnipresent throughout the *ISTE Standards for Teachers* (2008). Category 3 of those standards describes competencies related to employing digital tools and resources to provide students with innovative learning opportunities, to implement technology tools for collaborative activities, to communicate with students and parents, and to advance the understanding of how to use technology for research and learning. Category 4 of the *ISTE Standards for Teachers* (2008) addresses the need for modeling and promoting digital citizenship, online etiquette, and appropriate online social interaction. These standards are categorized into types of technology competencies, yet they cannot be treated as separate sets of competencies to be mastered individually. All of the technology competencies stated are requisite for online course development (Anderson et al., 2013).

The TPACK framework (Mishra & Koehler, 2006) illustrates the overlap of technology competencies across content and pedagogical aspects of instruction, as seen

previously. Every aspect of online course development requires knowledge and understanding of how technologies can be used do design engaging activities, effective content delivery, and valid, reliable student assessments (Anderson et al., 2013; McQuiggan, 2013). Technology competencies should not be segregated into one category, but should extend throughout the instructional process (Anderson et al., 2013; Koehler et al., 2013). In *Section D* of the iNACOL standards, the importance of understanding the chosen LMS, and using the tools contained within to their fullest potential is accordingly emphasized.

Acquiring knowledge and skills related to the various technologies inherent in online course development is another area that may require targeted professional development. Teachers attempting to design and deliver online courses may not be familiar with all of the technologies available and their abilities to enhance the quality of a course. Because technology is ubiquitous throughout online courses, and is used in myriad ways, it is reasonable to presume that teachers tasked with online course development may need professional development in at least some aspects of technology integration (Barbour, 2012; Rice, 2011; Shepherd, Bolliger, Dousay, & Persichitte, 2016).

Course evaluation and support. In *Section E* of the iNACOL *National Standards for Quality Online Courses (v2)* (2011), course evaluation and support standards include regularly reviewing and evaluating all aspects of the online course and making necessary improvements. Additionally, the course must be continually updated to reflect advances in online course design and delivery. Individual competencies related to

course evaluation and support, as outlined in *Section E* of the iNACOL *National Standards for Quality Online Courses (v2)* (2011), include the ability to design course evaluation tools that adequately assess course effectiveness, knowing how to provide instructional and technical assistance to students, and knowing how to stimulate student engagement. Also, having an understanding of the importance of staying abreast of advances in technologies and strategies related to online course development and delivery; understanding the behavioral, social, and emotional aspects of online learning; and understanding the importance of continually updating the course are additional competencies specified in *Section E* (iNACOL 2011).

Continuous evaluation of a course, using innovative methods to collect data related to the effectiveness of a course in promoting learning, is especially important in the online learning environment, according to Peterson (2016). There may be little to no face-to-face interaction between students and the instructor; therefore, feedback needs to be collected throughout the course (formative) as well as at the end of the course (summative) (Peterson, 2016). Peterson (2016) suggested referring to email or other student/teacher correspondence and discussion activities, as they are often excellent sources of information regarding the effectiveness of a course—even better than the typical end-of-course survey, which provides only a snapshot evaluation. Within the TPACK (see Figure 1) framework (Mishra & Koehler, 2006), this standard is ubiquitous, as it is expected that teachers continually update their courses to reflect advances in content delivery and online learning pedagogy. As well, including course evaluations

would be considered a pedagogical aspect of online course development (PCK) and the technologies implemented to extract evaluation data would constitute TPACK.

Teachers may need training in various aspects of course evaluation and support. Various types of evaluations including end-of-course evaluations and formative evaluations may need to be introduced, along with methods of integrating those evaluations into an online course (Benson & Ward, 2013). Additionally, training may be required to assist teachers in designing appropriate questions for a summative online course evaluation, and to gain an understanding of the technologies available to collect and analyze evaluative data.

Moodle Learning Management System

Building exemplary online courses also requires expertise in the use of the selected learning management system (LMS). An LMS is defined as "a software application or Web-based technology used to plan, implement, and assess a specific learning process" (Rouse, 2015, para. 1). Rouse (2015) additionally described the LMS as providing the means to "create and deliver content, monitor student participation, and assess student performance" (para. 1). The online courses for this particular program are built using the Moodle learning management system (LMS). Moodle is an open source application that can be accessed free of charge. Moodle founder, Martin Dougiamas' intention for marketing this application as an open source package was to provide teachers and Moodle platform developers with the means to expand their knowledge and understanding of pedagogical skills involved with facilitating online learning (Dougiamas & Taylor, 2003).

Consortium members selected the Moodle LMS as the platform for course development because of its availability as a free open source application, requiring minimal investment to implement and maintain. Using an open source application enhances the cost-effectiveness of the consortium's program and allows easy access to courses by all consortium member school districts. Moreover, Moodle allows the course developer to deliver content sequentially, building formative assessments throughout the delivery to gauge students' comprehension. Lessons may be designed to be mastery based, requiring students to revisit content that is not mastered to the degree established by the course developer or facilitator. Mastery-based lessons are a vital component in consortium-developed courses to ensure student success and achievement in the online learning environment and to remain competitive with outside vendors who routinely provide this feature in their programs. Finally, Moodle provides an internal grade book feature, which is connected to graded assignments within a course. The grade book automatically populates assignment scores and calculates grades to correspond with parameters set by the instructor. It also tracks course access data including the amount of time a student spent in a course, and in particular lessons on a given date or during a particular time period. Moodle is available to all three school districts in the consortium, and to any teacher within those school districts. There is no limit to the number of courses that may be developed within the Moodle LMS.

A notable caveat, however, is that no formal vendor-provided training exists for Moodle. Individuals developing courses must independently learn the software. School district instructional technology staff may aid in the process by providing training

workshops, but only if they have gained an adequate level of expertise with the software. Further, frequent system updates and continued addition of new features make staying abreast of the capabilities of the Moodle LMS a time consuming task. Most information regarding this LMS is located in a Moodle user blog and through independently conducting Web searches on particular tools or system issues. Because Moodle is an open source application, a formal organization-provided training program is not available to users. Therefore, user training must be provided independently.

As revealed in the *iNACOL Standards for Quality Online Courses (v2)* (2011), and in the TPACK framework, technology is a ubiquitous element of online course design. Central is the LMS on which courses are built and the course design tools available within that LMS. Attaining the competencies required for designing quality online courses that meet the iNACOL standards requires a fundamental understanding of the LMS and of the tools available within. For example, the Moodle lesson tool can be used to interactively present content with embedded formative assessments, while the workshop and wiki tools can provide collaboration opportunities. The survey tool can be used to gather feedback, and the forums can be used to gauge students' ability to synthesize concepts. Strategically employing Moodle tools to build engaging and effective online courses requires continuous training, as the Moodle LMS is enhanced regularly. The many features provided in the Moodle LMS makes it a complex system to learn. Yet, learning to use the system effectively is at the root of mastering the competencies aligned with the *iNACOL Standards for Quality Online Courses (v2)* (2011). My analysis of interview data collected from teachers who have attempted to

build courses using the Moodle LMS, without companion training on the advanced tools available within the system, may provide insight into areas of need for future online course developers.

Professional Development

Teachers attempting to build online courses need professional development to prepare them for a process that includes a multifarious skill set (Barbour, Morrison, & Adelstein, 2014; Rice, 2012; Shepherd et al., 2016). Online learning options have increasingly become essential components of the K-12 curriculum, with classroom teachers commonly tasked with the development of those options (Shepherd et al. 2016). Often, teachers are not provided the necessary professional development to successfully transition their instruction to an online venue (Barbour et al., 2014). Subsequently, they take on the construction of online courses without the knowledge and skills necessary to perform the task properly and effectively (Jui-Long & Dazhi, 2015; Palloff & Pratt, 2011).

The literature I reviewed supported the provision of professional development for preparing teachers to design and facilitate online learning options for students. However, a wide variance in the focus of the professional development was revealed in the literature. Researchers identified a myriad of elements that should be included in teacher preparation programs for online course development and instruction (Baran & Correia, 2014; Barbour, 2012; Meyer, 2014; Rice, 2011; Shepherd et al., 2016). These elements are based on researchers' ideas of where professional development needs to be targeted to assure an effective transition from classroom teacher to online course developer. This

literature review presents differing points of view on which elements are most critical for teacher professional development related to online learning.

Rice (2011) discussed the interrelatedness between online course design and face-to-face teaching standards. An intertwining of instructional pedagogy and technical pedagogy drive the unique competencies required for online course design and, therefore, require some unique approaches to professional development. Teachers, according to Rice (2011), should be required to participate in continuing education related to online education, demonstrate proficiency in online pedagogy, and demonstrate proficiency in skills that correlate with the *ISTE Standards for Teachers* (2008). Moreover, Rice (2011) suggested that teachers who endeavor to develop online courses should not only complete appropriate academic preparation and attain required credentials, but that they should also be required to first experience the online learning environment as students. Having this experience provides teachers with a frame of reference for undertaking the development of online courses, themselves (Rice, 2011).

It is also, according to Barbour (2012), important to educate teachers as much as possible on technology tools that are available for incorporation into an online course. Learning to use technology to design the most comprehensive instruction possible is, as stated by Barbour (2012), a critical element of professional development. It is important to build a strong knowledge base around the use of technology tools to enhance the creative design of course content through the LMS and to have the ability to adapt to new technologies that are integrated into the LMS (Barbour, 2012). This, Barbour (2012) stressed, can only be accomplished through teamwork—establishing a professional

learning environment that includes continuous collaboration between teachers and web-developers, technology experts, and project managers. Although this particular research focused on higher education, it can equally apply to the development of online learning options in K-12 education, an area that Barbour (2012) asserted is in need of more research to investigate the process more definitively at that level.

Shepherd et al. (2016) recognized a need for prospective online teachers to participate in professional development focused on understanding online teaching pedagogy and on developing skills in the use of technology tools that can be applied to the development of online courses. This professional development should, according to Shepherd et al. (2016), be provided before teachers attempt to build online courses. Further, the extent to which participants in a professional development program need to become knowledgeable in various online course design competencies will vary according to the type of online program that is being developed. For example, a hybrid or blended learning program may focus mainly on designing and providing content and supplementary materials in the online component, if discussions, collaborative projects, and assessments continue to occur in the face-to-face component of the course. A fully online course, however, requires teachers to develop a much wider knowledge and skill base to effectively incorporate all elements of a quality online course (Shepherd et al., 2016).

After conducting an extensive review of literature related to research in online course development, Meyer (2014) likewise determined the skills necessary for a teacher to become a proficient online course developer are far-reaching. Teachers must be

cognizant of numerous learning theories as they relate to online teaching and learning, they must develop an extensive set of pedagogical skills related to course design and delivery, and they must possess a variety of technology proficiencies including instructional technologies and technologies related to the selected LMS (Meyer, 2014). Further, Meyer (2014) emphasized that each of these knowledge and skill sets takes time to master. Some can be acquired through workshops, while others may require repeated practice. Some may be learned independently, while others may be best learned through modeling and collaborative discourse. Finding a way to unravel so many intertwining components makes it difficult to develop an organized professional development program and even more difficult to evaluate the effectiveness of each of the components of a professional development program as they relate to the finished product (Meyer, 2014). This varied and multifarious set of professional development needs and delivery formats adds complexity to the business of creating an organized professional development program that targets the needs of each individual, relative to competencies that must be attained. Yet, assuring that teachers tasked with developing quality online courses are able to accomplish that undertaking successfully depends on the provision of comprehensive and differentiated professional development (Shepherd et al., 2016). Baran and Correia (2014) emphasized that understanding and addressing the "complex interplay among personal, pedagogical, contextual, and organizational factors" (p. 2) is critical for the creation of successful online teaching and learning. Schools will need to undergo a complete culture shift to adequately and appropriately support the integration of online learning options within their offerings (Baran & Corrreia, 2014).

The research cited in this literature review provided me with insight into the many competencies required, and professional development needs that must be met, to prepare teachers to build online courses. Through my research, I was able to determine professional development needs of high school teachers tasked with designing and developing online courses for the three-district online learning consortium. These needs were revealed as I explored teachers' perceptions of professional development needs related to designing and developing online courses, based on their previous experiences undertaking this task without corresponding professional development.

Implications

Once I completed my data collection and analysis, I was able to determine the final outcome of this research. The results of my research will be used to inform the consortium's steering committee regarding professional development needs of teachers who attempt to develop online courses. My research identified a clear need for teacher professional development related to all aspects of the design and development of online courses. The professional development solution that became the project associated with this research would be provided to high school teachers who are new to the task of developing online courses for high school students.

Summary

Gaining an understanding of the professional development needs of high school teachers tasked with designing and facilitating online courses for their students helped to inform the construct of a training program. This study revealed high school teachers'

perceptions of their professional development needs as they attempted to design and facilitate online courses without accompanying professional development. Professional literature described a myriad of competencies required for effective online course design and development, which mainly fell into the categories of content expertise, understanding instructional design, developing appropriate assessments for the online platform, instructional technology, providing support, and including a means to evaluate the student learning experience. The ability to construct an online course using the Moodle LMS was also noted as a critical competency. Finally, researchers (e.g., Barbour et al., 2014; Bigatel et al., 2012; Rice, 2011; Shepherd et al., 2016) determined that comprehensive professional development must be provided to ensure teachers who undertake the task of developing online courses are adequately prepared. Professional development aimed at cultivating competencies in online course development should be provided to teachers who are attempting to develop online courses for the first time.

In Section 2, I described the methodology I used for this study including the research design, the researcher's role and potential biases, the research participants, the method for collecting data, and the data analysis process. The findings of my research and associated outcomes follow the methodology description. Materials that were used to conduct this study are located in the appendixes at the end of this report.

Section 2: The Methodology

Introduction

I conducted this doctoral study using the qualitative methodology and case study research design. The qualitative methodology allowed me to gain an in-depth understanding of the perceived professional development needs of teachers who experienced the phenomenon of building and delivering online instruction while relying mostly on their existent knowledge base. The guiding research question was: What are high school teachers' experiences with, and perceptions of, designing and developing online courses without accompanying professional development? The research findings were inherently linked to designing a framework for effective professional development for high school classroom teachers who are transitioning to the development and delivery of online instruction.

This study was limited to an online learning consortium established in 2011 by three Pennsylvania public school districts, for the purpose developing and delivering online courses to high school students attending those districts. Accordingly, I used the case study qualitative research design. Following is an in-depth description of the research methodology including the approach with justifications, the research participants, data collection and analysis, and the research findings.

Qualitative Research Method

Qualitative research is an exploratory approach utilized to gain an insightful and meaningful understanding of a problem. Merriam (2015) described qualitative research as "understanding the meaning people have constructed" (p.13) of an experience or

experiences. Creswell (2010) further identified qualitative research as "an inquiry approach useful for exploring and understanding a central phenomenon" (p. 626) that includes gathering detailed descriptions from participants in a variety of forms such as discourse and visual artifacts, and then interpreting the meaning the data conveys. The inherent subjective nature of this type of data collection and analysis may invite some level of research bias, as researchers may be inclined to apply their own understandings or past experiences to the final report (Creswell, 2010). Yet, it is the human instrument—the researcher—who has the ability to develop meaning from non-quantifiable data (Yin, 2014). Close monitoring and revelation of inherent researcher bias is important as data are collected, analyzed, and presented. The deep knowledge and understanding that can be gained through qualitative data collection may eclipse stated researcher biases (Merriam, 2015).

The purpose of this research project was to gain an in-depth understanding of high school teachers' experiences with, and perceptions of, designing and developing online courses without accompanying professional development. I acquired this understanding by exploring the perceptions of high school teachers who experienced developing and facilitating online courses for the consortium without the benefit of corresponding professional development to prepare them for the task. Competencies required for designing quality online courses, and teachers' professional development needs for attaining those competencies, were the central focus of this investigation. Qualitative research is designed to yield thick, rich, descriptive data, which is what I needed to

adequately investigate teachers' perceptions of their professional development needs related to attaining the competencies required for developing quality online courses.

I rejected quantitative and mixed methods designs for this particular research because of their inability to provide the type of data that would adequately address the research question. The quantitative research methodology tests a hypothesis through experimentation and/or statistical analyses (Creswell, 2010). I had not developed a hypothesis, nor could I equate the types of data I collected with numerical values. The quantitative research methodology would not provide the depth of personal insight I hoped to gain with this study. Likewise, the mixed methods approach, described by Creswell (2010) as a combination of qualitative and quantitative methods in a single study, to further understand the research problem, would not have been suited to my research question. Again, my research was inductive; it gathered data that may be used to develop theories and concepts (Merriam, 2015). No part of my research question required me to prove or disprove a hypothesis through deductive tests. The objective of this research was to cultivate a deep understanding of high school teachers' perceptions of professional development needs based on their experiences with developing and facilitating online courses without accompanying professional development to guide them through the process. The qualitative research methodology provided the thick and rich descriptive data needed to answer my research question and sub-questions. Therefore, it was the appropriate methodology for this study.

Case Study Research Design

The design I used for this study was a critical incident single case study within a bounded system, including only teachers who participated in developing and facilitating online courses for the three-district consortium during the 4 years prior to my arrival as director. Yin (2014) recommended the case study approach when seeking to understand a phenomenon as it relates to a particular group or organization. My research focused on a particular local online learning consortium and the perceptions of the group of teachers involved with this consortium, related to their professional development needs. Yin (2014) pointed to the case study as the preferred research design to explore a variety of evidence connected to contemporary events where applicable research history has not yet been established.

High school teachers developing and facilitating fully online courses is a recent development in the field of education and would accordingly be considered a contemporary event, reinforcing the use of a case study research design. Bounded system case study research focuses on a specific program and/or a particular sample (Merriam, 2015). Thus, it was the best fit for investigating the three-district online learning consortium and the professional development needs of teachers involved with developing and facilitating courses for this particular program. Finally, I sought to determine action based on a unique situation, which further categorized this as a critical incident case study (Weatherbee, 2010). In this particular situation, three public school districts developed a consortium to pool resources to develop online courses for high school students. High school teachers were tasked with designing and developing these online

courses without companion professional development related to course design competencies.

I originally considered a number of alternate qualitative designs, but I ultimately dismissed them in light of aspects that rendered them less appropriate for this study. A phenomenological study was considered and could have been used to develop a deep understanding of teachers' experiences building and delivering online courses without accompanying professional development. In fact, my research did follow the phenomenological approach to a degree. However, I not only sought to understand the essence of these experiences, which is the main objective of phenomenological research (Merriam, 2015), but I also sought to ascribe those experiences, along with resulting teacher perceptions, to a defined set of criteria. In this case, the criteria I used was a defined set of competencies in online course development, thus deviating from collecting the purely emotional, affective, and interpretive qualities inherent in a phenomenological study.

Additionally, my participant group consisted of high school teachers who were involved in a unique situation: that of three school districts collaborating to develop and deliver an online learning program as a combined effort. I am familiar with no other high school teachers who currently share this particular circumstance. This unique condition comprised part of the participants' experience, making the case study more appropriate. The bounded system from which I obtained participants for the study also correlated more closely with the case study research design.

Because of the unique nature of the study group, I also decided against the grounded theory design. Grounded theory research, according to Merriam (2015), results in substantive theory that is transferrable, and is derived using the constant-comparative method of data analysis. Constant-comparative data analysis would have been impossible to perform with validity and reliability, given the nature of this study and the small participant group. I was not looking to build transferrable theory, at this point. Rather, I aimed to gain insight into the perceptions of this particular group of teachers who have experienced developing and facilitating online courses while relying mainly on their previous knowledge base.

A narrative analysis may have been a viable research design for this study if I had been a member of the group of teachers who participated in the consortium. Narrative analysis is composed of stories (narratives) and detailed first-person accounts of a particular human experience (Merriam, 2015). I was not an active member of the group of teachers involved with the consortium, which eliminated my consideration of the narrative analysis research design.

Limitations

There were some limitations to this case study research. First, the sample participant group was small, with eight possible participants, and the number of actual participants was even smaller: five participants. The research, as is typical with case study designs, was collected from one group of individuals with experience related to a particular project within a particular education entity. This limited the ability to generalize findings to other settings. When participants first engaged in online course

development, the year was 2011. Therefore, during the interviews it was, at times, difficult for them to recall specific details related to their early experiences. Additionally, since that time, all participants have completely revised the original versions of their courses. Hence, their interview dialogue was often interspersed with descriptions of what their courses look like now compared to when they began, after having eventually been provided with professional development on a number of course development competency areas that are discussed in this research.

Researcher Role

I was appointed director of the three-district online learning consortium in November 2014. In this role, I am responsible for continued development of the program including expanding course offerings, maintaining the Moodle learning management system in which the courses are developed and provided to students, developing marketing strategies, managing student enrollment, and providing the professional development necessary for current teachers and those new to the consortium. I have no supervisory authority over any of the teachers involved with the consortium; they remain under the direct supervision of their respective building principals. I do not evaluate the work of consortium teachers; evaluations are conducted by teachers' respective building principals, as specified in the Pennsylvania Department of Education's guidelines for educator effectiveness evaluations (PDE, 2014). My work with teachers involved with the consortium is performed in an instructional coaching capacity only. My instructional coaching extends only to advising teachers on the revision of previously developed online courses and to the development of new online courses for the consortium.

My current relationship with potential participants has been built on mutual openness and trust as we have been working collaboratively, as a team, to develop and deliver quality online courses. My intention in undertaking this research was to gain deeper insight into high school teachers' perceptions of professional development needs of new consortium course-developers, based on their own earlier experiences with designing and developing online courses without corresponding professional development. This research helped me to determine the direction of future professional development for teachers currently involved with the three-district online learning consortium and for teachers new to the consortium. The collegial and collaborative working relationship I have built with potential participants was beneficial when it came to collecting qualitative data. Because of the level of trust and comfort I share with teachers currently involved with the consortium, they were inclined to speak freely and honestly when revealing their thoughts and perceptions.

Before I took on the role of consortium director, I was not in any way affiliated with the three participating school districts. I had not previously met nor interacted in any way with any of the potential participants in this study. I was, however, involved with designing and facilitating online courses, both for students and for teacher professional development, in my previous positions.

In a neighboring county, I trained teachers in the development of online components, using the Moodle LMS, to accompany their face-to-face instruction as part of a hybrid learning initiative. I also developed and managed a full-time cyber-school program for 60-70 students at that district, using vendor-provided courses. I developed

and facilitated teacher professional development courses on a variety of topics. I am familiar with all aspects of online teaching and learning including developing online courses, facilitating online courses, managing a full-time cyber-school program, and taking on the role of student in an online education program. These previous experiences have allowed me to develop a deep understanding of the features of quality online courses.

I have established a positive working relationship with the participants through my work with them in a coaching capacity during the past 2 years. Because of that positive relationship with participants, they indicated they felt a comfort level conducive to their providing honest and insightful responses to my interview questions. A shared purpose, that of identifying future consortium teachers' needs, had already been formed between potential participants and me prior to the commencement of this research project.

Researcher Bias

My professional connection to the consortium, along with my previous experiences with online course development and facilitation, and with designing professional development on a variety of topics, could have increased my bias in conducting this research. Indeed it is common for researchers to study areas in which they have been heavily involved and have a history, increasing the likelihood of possessing some preconceived ideas or knowledge (Lodico, Spaulding, & Voetge, 2010). Moreover, Yin (2014) acknowledged that some bias is inherent in the case study design,

as a level of understanding about the topic being researched must be attained prior to conducting the research.

Although I undertook this research with some inherent knowledge, my knowledge and experience did not extend to this type of program, precisely. My professional background includes working in the business sector, teaching high school English, high school instructional coaching, educational research and development, building online courses for students and for professional development, and building an online learning program for a school district using vendor-provided courses. My knowledge of curriculum and instruction, of the Moodle LMS, of online teaching and learning, and my previous experience in the business sector comprise the professional background I bring to the position of director of the consortium. I have not, as yet, created a comprehensive professional development program for this type of endeavor. My goal was to determine the professional development needs of teachers, and then use this information to help build an effective online learning program. I am striving to build the best possible professional development program, and that goal encouraged me to set aside any preconceived notions and to collect data in a manner that would lead to the development of an informed understanding of the needs of the consortium from a professional development perspective. Yin (2014) argued that validity of case study research could be assured by "employing accepted case study protocol" (p. 45). Therefore, to limit any researcher bias I might have brought to the study and to further ensure the validity of my research, I adhered to established protocols for ensuring valid data collection and analysis. These protocols are explained in greater detail in sections that follow.

Participants

Selection Criteria and Sample

Participants for this study were selected using purposeful sampling. "Purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight, and therefore must select a sample from which the most can be learned" (Merriam, 2015, p. 77). Lodico et al. (2010) pointed to purposeful sampling as integral for collecting the rich, thick data necessary for answering the types of research questions inherent in qualitative studies. Merriam (2015) further described a purposeful sample as one that includes individuals involved with an atypical occurrence or phenomenon, which is generally the premise of case study research. The group of high school teachers participating in the three-district consortium, with the task of developing and facilitating online courses, constituted an atypical occurrence and, therefore, justified the purposeful sampling approach.

The target group for this study was the group of teachers who were involved with the consortium, as course developers and facilitators, since its inception in 2011. Only those teachers who met the criteria of having fully developed and subsequently facilitated an online course through the consortium were invited to participate in the study. Although 31 teachers were, at some point, involved with developing courses for the consortium, only eight of those teachers completed and facilitated their online courses. It was this group of eight teachers who were invited to participate in this study. My purpose in narrowing the participant group to include only those teachers who had completed and facilitated their online courses was to be able to gather in-depth comprehensive, reflective

data relating to their experiences in all aspects of developing an online course. Creswell (2012) stated that a small sample size is typical for qualitative research. A small sample enables the researcher to collect more detailed data and provides the ability to perform an in-depth analysis (Creswell, 2012).

Participant Access and Protection

Superintendents and an assistant superintendent from the three school districts that comprise the consortium granted me permission to conduct this research on-site with teachers who volunteered to participate. In preparation for this research project, I completed the required "Protecting Human Research Participants" online course provided by the National Institute of Health (NIH). This course advanced my understanding of the steps a researcher must take to ensure the protection of human research subjects from any type of negative consequences that may result from a research study. On September 14, 2016, I received notification from the Walden University Institutional Review Board (IRB) that my study was approved.

I sent an email invitation to volunteer for the study to each of the eight potential participants, through their respective school district email servers. Email addresses for staff members at all three school districts are available on their respective school district websites. To ensure adherence to ethical research protocol regarding informed consent, participants in my research were provided with the IRB-approved informed consent form, which stated expectations related to their participation in my research. The form also emphasized participants' option to withdraw their participation at any time without experiencing repercussion. Within the text of my email and the text of the consent

document, I stressed that participation in this research study was completely voluntary, and would in no way impact my current or future working relationships with individuals invited to participate. A copy of the consent form was attached to the email invitation, to give individuals an opportunity to preview it. Individuals interested in volunteering to participate in the research study were directed to respond to my email invitation, indicating their desire to participate. After I received initial confirmation from participants, I provided a hard copy of the informed consent document to each participant to review and sign prior to the commencement of their interview.

To ensure all participants' identities remained protected, I assigned alphabetic codes to them, rather than refer to them by name. For example, the first participant was assigned the code "Participant A" throughout the interview, while the second participant was identified as "Participant B," and so forth. I was careful to avoid divulging any personal information or indicators that might otherwise violate the confidentiality of participants in this study. Throughout my discussion of the research findings, I deliberately avoided attributing the pronouns "he" and "she" to participants, in consideration of their small number. I also avoided divulging any details that would associate a participant with a particular online course. These steps were taken to further protect the identities of participants.

I used my personal laptop computer to collect and store all raw data related to this research. My computer is password protected, and only I have access to my computer. My computer is kept in my home. My home is always locked when I am not there. All data collected and/or transcribed into hard copy format, including interview notes,

interview transcriptions, and audiotapes were locked in a secure filing cabinet at my private residence. Five years after the publication of this research, I will delete all raw data from my computer and I will destroy all hard copy data, documents, and audiotapes.

Data Collection and Analysis

Creswell (2012) described six steps for collecting and analyzing qualitative data: (1) data collection, (2) data preparation (e.g., transcription, notes), (3) initial review of data, (4) initial/preliminary coding, (5) descriptive coding, and (6) thematic or axial coding. In this section, I provided demographic information about the teachers who volunteered to participate in my study. This information demonstrates that I was able to obtain a representative sample. I described the process I used for collecting and transcribing data for this study. I described my data review process and my methods for ascertaining validity of the data. Finally, I described the procedure I used for coding the data I collected.

Participant Demographics

Five of the eight teachers who were invited to participate in this study agreed to do so. A mix of male and female participants comprised the group. Participants' years of experience in education ranged from 14 to 25 years. At least one teacher from each of the three school districts in the consortium participated in the study. Only one of the five participants had previous experience as an online student. None of the participants had ever been involved with developing a fully online course previous to becoming involved with the consortium. All participants were part of the original group of course developers at the inception of the consortium in 2011. Each participant worked on the development

of a different course, e.g., no two participants worked together on a common course. All participants completed (either individually or as part of a group) the development of a course and facilitated that same course at least once.

Interviews

Personal interviews were my primary method for collecting data. Yin (2014) stated that the interview is one of the most important sources of data in case study research. Conducting personal interviews with teachers who participated in the three-district consortium at its inception allowed me to gain in-depth insight into their perceptions, based on their prior experiences, of the professional development needs of teachers new to designing and developing quality online courses. I used a predetermined and consistent interview protocol to conduct each interview (see Appendix B).

I consulted the Online Teaching Self-Efficacy Inventory (OTSEI) created by Gosselin (2009) to develop the set of semi-structured questions that were posed during the interviews with participants. The OTSEI survey questions aligned with the competencies for online course development that framed this research. I requested and received written permission to utilize the OTSEI survey tool, with modifications for this research project, from its developer, Dr. Kevin Gosselin. The OTSEI survey questions were modified for use as interview questions, and a set of semi-structured interview questions was accordingly derived from the original inventory (see Appendix B). Creswell (2012) noted the importance of being prepared to stray from pre-developed interview questions if deeper insight can be gained by continuing a particular conversation thread. Therefore, this set of semi-structured questions served to guide the

interviews with the potential for variance depending upon participants' responses and possible occasions for following up with probing questions. Probing questions may provide deeper understandings of initial responses to preliminary questions (Creswell, 2012; Merriam, 2015). Examples of possible probing questions are included in Appendix G, directly following each semi-structured interview question. I asked a variety of follow-up questions subsequent to each interview question, to elicit thick, rich descriptions that led to the deeper understandings as described by Merriam (2015).

Interview Setting

Individual interviews were conducted either in my office or in the participant's classroom within his or her home school district. Each participant was asked to provide one interview. The location used for each interview was contingent on privacy and on convenience for the participant. I allocated one hour for each interview. Data was in the form of audio recordings of the interviews. Using the audio recording process ensured the accurate and detailed capture of participant responses to interview questions (Lodico et. al, 2010). Participants were advised of the audio-recording process in advance. I collected and transcribed all interview data, from all participants, within a period of 10 days. I transcribed each individual interview within 48 hours of the interview.

Narrative Reflection

Yin (2014) championed the use of multiple sources of data when engaging in case study research to ensure validity and quality. Narrative reflection, often referred to as memo writing, is a common practice when conducting qualitative research (Creswell, 2012; Yin, 2014). Immediately following each interview, I wrote a self-reflection memo

to record as many details about the interview as possible, along with my own thoughts and reactions. Sometimes referred to as researcher's position, this strategy can help lend credibility to a qualitative study (Merriam, 2015). Although Creswell (2012) promoted memo writing as traditionally related to the process of developing grounded theory, Yin (2014) included this practice as appropriate for helping to compile and organize themes that may emerge during case study research.

Data Analysis

Creswell (2012) described six steps for collecting and analyzing qualitative data: (1) data collection, (2) data preparation (e.g., transcription, notes), (3) initial review of data, (4) initial/preliminary coding, (5) descriptive coding, and (6) thematic or axial coding. I followed these same six steps to collect and analyze my data for this study.

I used the NVivo qualitative data analysis software to assist with the task of transcribing and coding audio recordings. NVivo is produced by QSR International. It is used by academic researchers, social sciences researchers, and others to assist with the analysis of qualitative data collected in a variety of formats (QSR, 2016; Yin, 2014). The NVivo software allows data to be imported from audio files, and it provides the user with an option to slow the speed of an audio file playback, thereby aiding with and expediting the transcription process. NVivo also provides the user with the ability to electronically code data from digital transcripts, and to organize coded data into electronic files, or *nodes*. This electronic organization of coded data allows the researcher to more easily access and analyze coded data in preparation for inclusion in the final research report.

After I transcribed each interview, I proofread the text for accuracy, paying particular attention to punctuation, to ensure I correctly interpreted participants' commentary. I then provided each participant a printed transcript of his or her interview to review, to ascertain that his or her thoughts and ideas were correctly captured. Participants were informed they had the option to edit any part of the interview that was not accurately captured on the transcript and to delete any commentary they did not want to be included. I followed this protocol to help establish the accuracy and validity of collected data and to ensure protection of research participants in accordance with IRB guidelines. None of the five participants requested changes of any type to their printed transcripts.

Coding

After I conducted all five interviews, transcribing them into text documents, and ensuring accuracy, I next began the initial coding process. The strategy for initial or preliminary coding depends upon the study type and purpose (Creswell, 2012; Yin, 2014).

For my initial analysis of interview transcripts, I coded for each of the groups of standards described in the iNACOL *National Standards for Quality Online Courses (v2)* (2011). Each of these a priori codes was defined as a node in the NVivo data analysis program, and any interview data corresponding to a particular category node was allocated to that node. This was a logical schema for my initial coding, as each of my interview questions correlated with particular standards described in the iNACOL (2011) framework. Through this process I was able to organize my data within the descriptive

categories of *content, instructional design, student assessment, technology,* and *course evaluation*, which correspond to the categories within the iNACOL *National Standards for Quality Online Courses (v2)* (2011). Yin (2014) endorsed the use of a priori coding when interview questions are formulated based on a pre-established framework. This was the situation in this study, as my interview questions aligned with standards listed in the iNACOL *National Standards for Quality Online Courses (v2)* (2011).

Significant overlap of categories became apparent as I allocated data from the interviews into the various descriptive categories or nodes. For example, when responding to questions aligning with the category of content, it was typical for participants to mention elements that also fell into the categories of instructional design and technology. Therefore, I allocated much of the interview data to more than one initial descriptive category.

After I organized all interview data within preliminary descriptive categories, I performed open coding of the data within each of the descriptive coding nodes. I re-read the data numerous times, looking for emergent concepts and ideas. Open, or initial, coding should be done with as little influence of prior ideas as possible (Charmaz, 2014). Using coding software, rather than hand coding interview transcripts, helped to eliminate preconceptions and thereby more easily allowed new ideas and themes to emerge. This, according to Charmaz (2014), can prompt the researcher to pursue revelations that may not have surfaced if coding was done without a completely open mind. I was able to identify consistent themes and/or patterns that surfaced as a result of the language used

by participants during the interview process. I labeled the concepts that emerged as *Category Elements* and created an NVivo node for each.

The themes that emerged as category elements provided the foundation for axial coding, or further disaggregating my data into more specific concepts and ideas (Charmaz, 2014; Creswell, 2012). I again had to re-read data numerous times to find connections within the collected data and to distinguish associated concepts. These associated concepts were derived from language used and ideas shared by participants when describing their experiences. After I identified concepts that emerged within each category element, I was able to easily aggregate, organize, and present my findings in a comprehensible structure.

Discrepant Data

Throughout my data collection and analysis, I deliberately searched for discrepant data, or rival explanations, which might have had the potential to influence my research findings in unexpected ways. This openness to "all plausible rival interpretations" (Yin, 2014, p. 168) increased the validity of my data analysis; it showed I considered all of the evidence, and not just evidence that supported any original hypothesis or expectation (Yin, 2014). Because of its highly interpretive nature, it is critical to identify and address discrepant data in case study research. Doing so helps to prevent the analysis of data from being brought into question as a result of evidence that may have been ignored (Yin, 2014).

Most of the data I collected from study participants contained responses that reflected similar experiences and perceptions. I did not identify any responses to

interview questions that were contrary to what I collected from the participant group in general. Therefore, I did not need to address discrepant data in this study.

Member Checking

Providing the opportunity for participants to review preliminary findings based on data collected is referred to as member checking (Merriam, 2015). Member checking is commonly used to ensure that the researcher, through the interview process, has accurately captured research participants' experiences and perspectives (Merriam, 2015). I asked participants to review a summary of my findings to ensure I accurately captured and interpreted their points-of-view, thoughts, and experiences. All participants agreed that the summary of findings I provided seemed to legitimately and holistically construe their experiences and perceptions related to developing online courses for high school students.

Data Analysis

Data for this case study was collected from five high school teachers who met the criteria of having developed and facilitated an online course through their participation with the three-district consortium. All of the participants completed the task of developing and facilitating their courses without having had prior knowledge of the iNACOL *National Standards for Quality Online Courses (v2)* (2011) or being provided with a structured professional development program to prepare them for the task. I categorized the findings of this research into sections that align with the five individual standards categories described in the iNACOL (2011) framework: "content, instructional design, student assessment, technology, and course evaluation" (pp. 7-19). Competencies

related to each of those standards were investigated through the interview data collected from the five teacher participants.

Category 1: Content

My first interview questions related to selecting and preparing content for the online learning platform. Participants were asked about their previous face-to-face experience teaching the content and their approaches to the process of determining how to provide content to the online learner. I included additional references to content that were made in subsequent parts of the interviews with this data, as well. Three main category elements emerged from participants' responses related to selecting and preparing content for online delivery. These category elements included: content expertise, selecting content for online course, and professional development needs. Within each element, I identified associated concepts that correlated with participant responses (see Table 1).

Table 1

Category 1 Content

Category Elements	Associated Concepts
Content expertise	High level of content expertise Taught course content in brick and mortar setting High level of comfort and proficiency teaching content in brick and mortar setting
Selecting content for online course	How and where to begin? Challenges of three districts – agreement Attempting to mirror brick and mortar content What constitutes online content? Copyright
Suggested professional development	Online delivery is different Course template/model Establishing focus and objectives

Content expertise. All participants claimed to be highly knowledgeable with regard to the subject matter of the courses they were tasked to develop. Most of them had many years of experience teaching the content in the brick and mortar classroom. One participant did have experience teaching the course content in a blended format in the brick and mortar classroom, but none of the participants had ever delivered the course content totally online.

Selecting content for online course. Although all participants considered themselves to be experts in the subject matter of their courses, many differences surfaced when I asked how they went about the process of selecting and preparing content for online delivery. Participant E described the approach as simply uploading documents and

files to the Moodle LMS, with the intent of duplicating the material and the sequence of material presented in the classroom. The documents uploaded were mostly worksheets that students were required to download, complete, and then submit. Much of the course developers' time, according to Participant E, was spent trying to figure out the best way for students to submit their completed worksheets. Participant C initially worked with a group of teachers representing all three school districts in the consortium, which proved to be both advantageous and problematic. The advantage was the sharing of ideas, which were collaboratively sketched out on a whiteboard to, in turn, develop into a scope and sequence for the course. However, among the three teachers, there was some dissention regarding what material was essential and what was not, as each district teacher vied to mirror the online course content with what was delivered in their own, individual brick and mortar classrooms. Likewise, Participant D worked as part of a group of teachers from the three districts. For their course content, they spent time attempting to locate open source (free online) materials to include, because none of the schools wanted to purchase additional materials for students who may not have had those materials available to them at their home school districts.

Copyright questions and limitations surfaced as teachers determined what materials they could use for their online courses. Some debate between teachers and technology coordinators related to the legal hosting of supplemental media on the Moodle server occurred. Participant C noted, "…our tech media department was very conservative when it came to copyright." Individuals involved with the online course development process tended to, at times, interpret copyright and fair use laws

contradictorily. Thus, some confusion resulted and course developers tended to remain unsure of what content sources were usable in their online courses.

Suggested professional development. I asked participants to describe what types of professional development in the area of content and selection of content might be advantageous to teachers new to online course development. All participants expressed a need for some sort of example or model of what an online course should look like, before they even begin to conceptualize the development of their own course. In the words of Participant C:

> I think whatever infrastructure is being used to develop [courses], there needs to be a consistency among all courses. So, when new teachers are brought on, they can be made aware of what other courses that have been developed look like. Not starting from scratch like we were. I think knowing what the expectations are, knowing what the standards are; I think the online standards are also very important in guiding it.

Participant B reflected on the fact that if any of the course developers had previous experience with online courses as students, that experience was likely at the college level. The way content is presented in a college level online course, Participant B stressed, is not necessarily going to be effective for the high school student. Several participants noted that gaining an understanding of the different ways content can be presented, and the effectiveness of those different approaches in a high school level course would constitute beneficial professional development for teachers new to developing online courses.

Determining a focus for the course was another area where some professional development would be helpful, according to several participants. Understanding how to first develop the online course objectives and then how to determine content to be included in the course based on those objectives was noted as critical and missing from some participants' early attempts at developing an online course, according to Participant E. Professional development emphasizing the creation of some sort of structure into which content would then be integrated was noted as integral to preparing to develop an online course.

Category 2: Instructional Design

I posed a number of interview questions directly related to participants' experiences with online course pedagogy including the design of instruction and related activities, and the structural design of their online courses. Subsequent questions throughout the interviews, that targeted participants' experiences with other online course development standards and competencies, often exposed experiences and ideas that additionally related to the design of instruction, and were accordingly included in the findings for this category. Hence, instructional design emerged in these findings as a central, overarching category of competencies required for the development of online courses. I derived four main category elements from participants' responses, along with numerous associated concepts (see Table 2).

Table 2

Category 2 Instructional Design

Category Elements	Associated Concepts
Types of learning activities	How to convey content online Understanding the Moodle LMS Student engagement Rigor
Course layout and design	Course structure Course navigation Understanding the LMS Pace of course
Communication	Conveying student expectations Providing explicit directions Email and Moodle messaging
Suggested professional development	Providing directions Creating sequential lessons in Moodle Moodle LMS capabilities Models/examples

Types of Learning Activities. Determining how to convey concepts that, in the brick and mortar classroom, require significant physical demonstration was a dilemma recounted by Participant B, who stated, "In an online class, you can't describe those things with words. If you try to describe those things with words, it just doesn't work." Participant A stated, "When I started, I didn't have any idea how I was going to deliver content." Participants discussed their experiences experimenting with a variety of multi-media and other technologies to assist with the delivery of content and with creating activities. Some technologies, particularly those external to the Moodle LMS, proved cumbersome or impossible to implement seamlessly, while others worked well for certain

activities. Finding the best strategies to use to engage students with the learning was cited by all participants as particularly challenging and deviated from how teachers were accustomed to designing their brick and mortar classroom instruction. Participant D underscored the problem of not having a full grasp of what types of instructional strategies could be used for online delivery of content by commenting, "Once again, it goes back to having limited knowledge. I mean, we were just basically [using] worksheets—read, submit a worksheet, move on to the next [activity], read, submit a worksheet." Similarly, Participant E shared:

> When I originally sat down to work to create this course, it was a lot of, how will the students submit assignments, rather than providing some type of teaching or content. I never learned that way, so it was jut sort of, here's how to submit assignments. That's why it [the course] looked the way it did!

Not having a full understanding of the capabilities of the Moodle LMS was a factor that all participants pointed to as problematic in terms of their ability to transition content to the online platform and to develop engaging learning activities. Participant A stated that when it came to delivery of content, "I had no knowledge of the Moodle tools. The only thing I had learned to do was to put a document into Moodle, when I started." Most participants stated that they came into the course development process with some knowledge of, and experience with, the Moodle LMS. However, that experience was limited to using the most basic tools within the LMS including uploading documents, inserting links to outside webpages, creating basic discussion activities, and opening assignment submission drop boxes. They had little to no experience with the more

advanced tools in Moodle—the activity tools that provide the user with the ability to add interactive delivery of content and to add variety to the types of activities and assessments that are provided. Participant A considered early experiences with the interactive lesson tool provided in the Moodle LMS by sharing:

> I knew nothing about the lesson tool. I knew that it was a way to make things flow together. That's what I knew about the lesson tool. I didn't know how to use it, and it seemed very confusing to me, and I was told I didn't have to use it if I didn't want to, so I didn't.

Participant B likewise stated:

> The lesson tool was something I didn't figure out, and I didn't figure out the importance of it. I didn't figure out why that was important as opposed to just having a big Word document or a page with information.

Instructional pedagogy related to discussion forum activities also surfaced as being inadequately understood. Some participants related they had a basic understanding of the use of a discussion forum, but did not understand, nor pay particular attention to, the varieties of discussion forums available in the Moodle LMS. They had little understanding of the reasons for using each of the forum formats, of ways to engage students more fully in online discussion, or how to incorporate high levels of rigor into discussion forum activities. Participant E shared that:

> We did have forums within the course, so there was the idea of sharing your work and being able to—a lot of is was like, 'Post yours and then comment on someone else's.' But again, we had some struggles with that because we had students who

> were self-paced, so there were students who were finished with that and waiting. They couldn't comment until someone else finished, so they would literally wait and wait and then the first person who put something up, they would comment on that. And they didn't really have anything to say about it, and so it was kind of like a forced … it wasn't … again, it wasn't meaningful.

The idea of incorporating rigor into an online course was interpreted in a variety of ways by course developers. Some participants indicated they had, from the start, incorporated activities and assessments that extended beyond knowledge and recall. One participant admitted to not really thinking about rigor at all; rather, the focus was on figuring out how to get content into the course, to get the course finished. Some participants shared that their initial process for incorporating rigor included simply adding more content and activities. In the words of Participant C:

> One of the things that we did, I remember this clearly, was that we wanted to make it challenging. We said, OK, here's how many hours they spend in the classroom, so here's how many hours they should be working on the course. And we factored not only the hours they would spend in the classroom, but also the hours they would spend doing homework. I think that course, if I remember correctly, was a bit overwhelming the first year for students. There was too much in it.

Course layout and design. Participants discussed the challenges they faced when determining how to structure their online courses. All participants indicated they used modules within the Moodle LMS to chronologically structure course content as either

units of study or as weekly requirements. This was an intuitive decision, according to Participant C. Most participants stated they experienced difficulty with students navigating the course content as they intended. This problem was generally attributed to either a lack of structure of material presented within the modules or units, and/or not including enough explicit direction for students. Often it was taken for granted that students would know to click onto each of the activities in the order they were presented in the course. But, that was often not the case. Students did not come into the online course with the level of preparedness as was assumed by course developers. Participant E recounted:

> I was getting emails 24 hours a day with questions like, "What am I supposed to do?" rather than questions about the content. So I found myself addressing more emails with giving directions than actually having meaningful conversation about something that was read or [content] that was misunderstood.

Through their experience facilitating their courses, participants found ways to help students navigate the course and to stay on-pace. Learning about and making use of more of the tools and settings available within the Moodle LMS was, according to participants, very helpful. This, they indicated, was, for the most part, a process of self-discovery. Some of tools and settings that participants discovered along the way included the ability to make visible to students only the module that is currently open, the ability to enter start and end dates for modules, populating course calendars, and inserting labels to announce due dates.

Communication. Within an online course, many types of communication occur, particularly written communication. Participants expressed that their understanding of the importance of superb communication skills for developing online courses emerged through the experience of facilitating the courses they developed. Providing detailed expectations of students with regard to online behavior, meeting deadlines, communicating with the instructor, and requesting help from the instructor, were all cited by participants as critical components of an online course. Most participants admitted they did not originally think to include any of this information in their courses. No one initially created and included a detailed course syllabus. Likewise, providing explicit instructions for every activity, and making sure those instructions will be understood fully and clearly is essential to the success of an online course. In the words of Participant C:

> You think you have the directions written clearly, and they're clear to you, but if there's a way for them to become unclear, students do a great job of finding that. Not because they're trying to be belligerent; it's because we encounter and perceive information differently.

Participants all agreed that providing explicit instructions was not emphasized as much as it should have been when they first developed their online courses, and that their original courses were at least somewhat lacking in the provision of explicit, understandable instructions that would have helped students to navigate through the courses and to complete activities as the instructors expected.

During our discussion about communication modes in their online courses, several participants talked about the methods they used to personally connect with students and with parents. Because they were not aware of some of the tools within the Moodle LMS that provide automated means of connecting, they were relying on communicating via email outside of the courseware. Participant A explained the process originally used for establishing contact with students:

> Initially, I didn't understand the [news] forum, and I had created a Gmail account specifically for the online course, and in one of my instructional videos at the beginning of the course, I encouraged students to email me, and that would open up our communication with one another. Then, sometimes I would send an email to a small group of students, or I would email individual students. So, most of my communication took place through individual emailing to students. I didn't understand that I could email them directly through Moodle. I didn't know that if I clicked on their name, that something would open up and they could see that. I thought I had to communicate with them all of the time through email.

Participant E shared a similar experience when initially attempting to establish contact with students and parents:

> When first running the course, it was through email, and everyone had a different email address, and we weren't using the school district email addresses, and so it meant leaving the page. If students were unclear about something, they would leave that page, and they would email us from a separate site, so it was a bit of a mess that way.

Not having a comprehensive understanding of how to set up and use some of the communication tools available in the Moodle LMS led to a cumbersome and often unreliable communication system, according to participants.

Suggested professional development. Participants shared similar insights and ideas when it came to describing their perceptions of professional development needs in the area of online instructional design. All participants stressed the need for better training on the capabilities of the Moodle LMS for delivery of content, design of activities, course management, and the built-in communication options. Participant A stated, "I think that it's important that we have all these things that we've talked about, before someone starts to actually develop a course." Learning to develop and deliver sequential content and formative assessment using the lesson tool in Moodle was noted as being a fundamental prerequisite for new online course developers. Participant A stressed:

> Definitely before you start to develop a course, I think that teachers need to understand the basics of the LMS we are learning which, of course, is Moodle, and how the basic components of that work. And, I also believe teachers brand new to online course development need instruction on how to construct and what types of assignments to create, but that has to be done before you start to develop, or concurrent with development, because it would be so much better than going about it blindly.

Professional development related to providing explicit directions was also cited as necessary. Two participants suggested having access to examples of well-written

directions, perhaps from a model course or courses that have been designed properly and that incorporate explicit directions for a variety of activities. Two other participants suggested a group training where developers would have the opportunity to work together to practice writing directions for activities and then scrutinize the results to find areas that might be unclear or misinterpreted by students.

Having had exposure to the iNACOL *National Standards for Quality Online Courses (v2)* (2011) would have been helpful when determining what elements are required for a well-designed online course, according to one participant. When asked about their previous knowledge of standards for online courses, none of the participants in the study indicated they had knowledge of any standards, including the iNACOL (2011) standards, when they initially developed their courses. Participant A offered this professional development suggestion:

> Since learning about the iNACOL standards and those things, I would definitely say, maybe you don't focus on everything at once, but key components like every course has to have these sorts of things in them, for the purpose of making everything look uniform, and making sure students understand that when they come to this course it works like all the other online courses. So, definitely focusing on iNACOL standards.

In terms of providing professional development for instructional design elements, Participant A added, "I think that seeing things, and making sure examples are from quality courses, is the best way of providing professional development."

Category 3: Student Assessment

Several interview questions directly related to participants' methods for assessing students in their online courses. All participants agreed that their assessment methods have evolved and improved since their earliest attempts at developing their online courses, when they did not have professional development in the area of online assessment strategies. Concepts related to assessment surfaced throughout the interviews, as was typical with all of the standards categories that were discussed. I discerned four main elements related to student assessment and numerous associated concepts (see Table 3).

Table 3

Category 3 Student Assessment

Category Elements	Associated Concepts
Assessment strategies	Incorporating formative assessment Maintaining rigor Assessment variety Demonstrating ability to apply learning
Alignment with objectives	Determining objectives Backward design Getting what you want from students
Feedback	How to provide feedback - tools Turnaround time
Suggested professional development	Developing quality rubrics Alignment of assessments with goals/objectives Modeling of rigorous online assessments Guidelines for good online assessments

Assessment strategies. When asked to describe the types of assessment they included in their online courses, participants offered a variety of examples of summative assessments including objective tests and quizzes, project-based assessments, written assignments, and opportunities to demonstrate application of knowledge. All participants indicated they have continued to work on either incorporating more rigorous application-based assessments into their courses, or enhancing the application-based assessments that are already in their courses. Participants are generally averse to developing online courses that contain only objective-type assessments, as it is felt those assessment types do not contain sufficient rigor. Formative assessment was not originally included, as participants did not understand how to provide that type of assessment in an online course. Participant B reflected:

> When we jumped into this program, it was a lot of just trying to figure things out on the fly, and if you needed something you had to ask, and hopefully the tech media department could help you. So, until we got a specialist, it was difficult to do assessments to the point you felt like you were doing them well and using all of the tools to your advantage.

Most participants indicated that since learning how to use the Moodle lesson tool for interactive content delivery and embedded assessment, they have endeavored to include more of this type of assessment within their online courses. As recounted by Participant E:

> That [lesson tool] was new to us. The idea that you could have different pages and you could stop them … students would read a page, then there was a question to

> see if the student understood what was on that page. And then the idea that if they didn't quite get it, it circles them back. So it's continuously looping, to make sure that they're understanding.

The Moodle lesson tool was previously discussed with regard to sequential delivery of content. Participants stressed that understanding the additional capabilities of the lesson tool with regard to incorporating formative and mastery-based assessment is paramount.

Alignment with objectives. I asked teachers how they initially measured the attainment of course objectives. Some participants began their development of assessments with the course objective(s) in mind, while others admitted they did not. All participants concluded that beginning the development of a course, and of individual lessons within a course, only after first determining final assessments or demonstration of learning, is a more effective approach. How to most effectively design assessments for demonstration of learning continues to be contemplated. Participant B maintained, "I don't think grades are good enough. I think application is more important. I think maybe in these classes—here's one way you measure it, that I do measure it, would be in that final project." Participants A and B's courses currently include a culminating project that students complete in segments at regular intervals throughout the courses.

Participant C described a series of application-based projects that students submit to a portfolio as they complete sections of the course. Within this portfolio, achievement is measured in terms of the levels of growth demonstrated by the student, based on continuous feedback from the instructor. Participant C added, "…if they've taken the

course seriously, we can definitely see that through the effort and time they've put into it [the portfolio]."

Participant E related a gradual transition from incorporating only objective questions in a quiz format, throughout the course, to including other types of assessments based on establishing definitive objectives at the outset. In Participant E's words:

> We now, with, and I think because it's years later, and just our experience with different styles of teaching, rather than every unit having a quiz halfway, and then a unit test, there's a lot more authentic assessment being used with students where they can create something online and submit it, rather than just answer some questions at the end.

This, according to Participant E, provides a variety of avenues for students to demonstrate learning.

Participant A additionally described incorporating "checkpoints" throughout the course, allowing the instructor to gauge students' understanding of concepts. Although this type of activity is not a part of the brick and mortar version of this particular course, Participant A expressed that in an online course, the instructor needs to find alternate methods of determining students' grasp of concepts, in lieu of the types of feedback one would receive in the physical classroom. This assessment method came about with experience, according to Participant A, who added, "…as I learned more about developing, I decided that they [students] should have a, I don't know if it's necessarily more rigorous, but a different way of showing their knowledge."

Feedback. Effectively providing feedback to students in the online environment was also a process that participants agreed evolved considerably over time. Understanding how to use tools provided within the Moodle LMS again surfaced as key to providing feedback on assignments and assessments in an organized fashion, in a common location. Two participants indicated they at first relied heavily on making personal contact with students who attended the building where they also teach their brick and mortar classes. However, this type of contact was impossible for their online students who attended other schools within the consortium. Feedback was often provided through email (outside of the Moodle LMS) and sometimes via telephone calls to parents, if there was a problem with a student's achievement or course progression. Once participants discovered and utilized additional tools provided by the Moodle LMS, they began to provide feedback on assignments and assessments within their courses, at designated locations, depending upon the activity/assessment. The expectations of students must, as emphasized by Participant B, be that they regularly look for the feedback that is provided in their course and read it.

Early professional development did not, according to participants, include training on what good online feedback should look like for various activities, particularly discussion forum activities. Added to that, most participants did not initially provide detailed rubrics for scoring student work, nor did they necessarily originally consider the importance of providing rubrics for all assessed activities within their courses. As a result, feedback often addressed confusion students were having with the course, often more so than how they performed on an assessment. Participant E confirmed, "…a lot of

it was addressing questions about, you know, 'What am I supposed to do?' Or, my comments would be, 'You did Part A, but you didn't do Parts B and C'."

Most participants agreed that by eventually providing a solid infrastructure to their courses, including explicit directions and rubrics for graded assignments, student achievement in the online courses has increased, with feedback more focused on performance rather than on extraneous issues.

Suggested Professional Development. Participants all provided similar suggestions for professional development related to student assessment. The importance of beginning the design of a course with clear objectives and a blueprint for what students should know and be able to do after taking the course is a fundamental proficiency that was described throughout these interviews. Participants discussed the importance of aligning course content, activities, and assessments with pre-established goals and objectives. Instruction, with examples, of how to create quality assessments and detailed rubrics for graded assignments were also commonly cited as imperative for individuals new to online course development. Participant A's ideas regarding professional development needs of new course developers reflect the collective perceptions expressed by study participants:

> I think modeling is good. I think we should have examples of the types of assessments that make really excellent online assessments that are rigorous, that have quality rubrics along with them, that really show teachers how students are asked to utilize information, to work with it, and to utilize that higher scale of—I mean, you might do some of those things in your traditional classroom, but to just

> ask students to write out answers or to write a paper, to me that doesn't seem to translate the same way into a rigorous online assignment. So, examples—guidelines for what a really rigorous, good online assessment should contain, are key.

Category 4: Technology

The integration of technology into online courses, like most categories within the iNACOL *National Standards for Quality Online Courses (v2)* (2011), was ubiquitous in participants' responses to questions throughout the interviews. I asked some questions directly related to technologies, technology integration, and the Moodle LMS. In addition, responses to interview questions that targeted other iNACOL standards categories routinely included references to technology components. Many of those references were previously addressed within the findings associated with the other standards categories. Through my analysis of all responses to questions related specifically to technology in online course development, I derived four main elements and a number of associated concepts (see Table 4).

Table 4

Category 4 Technology

Elements	Associated Concepts
Prior experience and comfort levels	What tools faculty were comfortable using Gaps in knowledge and experience
Selecting technologies	Criteria for selecting technologies
Moodle LMS	Prior knowledge and experience Lesson tool Communication tools
Suggested professional development	Moodle LMS Features and settings Models and examples

Prior experience and comfort levels. Participants indicated they approached the course development process with varying levels of comfort using technology tools. The tools with which they felt proficient depended upon their previous experiences using them in the face-to-face classroom. One participant acknowledged having basic technology proficiencies, which included creating PowerPoint slides, creating documents, and uploading documents into the Moodle LMS. Other participants shared a wider breadth of proficiencies that included creating and editing video and audio files; creating and annotating PDF files; podcasting; using various Web 2.0 tools, like Prezi; and using software applications, like Turnitin®. These individuals expressed a fairly high comfort level, and interest in, experimenting with new technologies. This, according to one participant, was what was attractive about becoming involved with the consortium and developing online courses. Yet, all participants indicated they at first struggled to

determine what technology applications to use to best convey course content, to build assessments, and to incorporate for student use in completing activities and assignments. Most participants related that they determined which technology tools were best suited for their purposes through trial and error. Participant A, for example, revealed a considerable reliance on PowerPoint and QuickTime movies in the beginning, but eventually replaced those methods of conveying content with VoiceThread (a Web 2.0 tool). This, according to Participant A, provided a more interactive venue for students to learn and apply concepts, which was critical for that particular course.

Participants reported that whether or not they went into the course development process with a strong knowledge base in instructional technologies, their experiences with designing instructionally sound technology-supported content delivery and activities was often challenging. As Participant A explained:

> I [initially] had no idea how to create a video, so I would create a video that was 30 minutes long, and then two years later I was like, yeah, no, they should be in 12-minute segments. So I went back and chopped things up, and I had better results with that. And then I changed it again to use VoiceThread, where you can stop and revisit things. A whole lesson [in VoiceThread] might be 40 minutes, but you can stop and go at different points.

Selecting technologies. Early in the course development process, participants said they became aware that incorporating technologies outside of the Moodle LMS posed unique challenges. The struggle with selecting the best technologies to incorporate in the online courses was not entirely related to instructional design or even expertise

with technologies. To a greater extent, these choices depended upon whether or not the applications were available to all students at all three districts, and whether or not they were compatible with the variety of electronic devices to which students had access. According to several participants, they quickly learned that course developers were limited with regard to the variety of technologies they could integrate into their online courses, outside of the Moodle LMS.

Moodle LMS. Every participant acknowledged they came into the course development process with only a rudimentary understanding of the Moodle LMS. This experience was mostly limited to: uploading documents, providing links to outside sources, uploading images and PDF files, providing submission drop-boxes, and creating discussion forums. Participants described finding it difficult to build a well-functioning online course and said they often felt frustration with the Moodle LMS as they thought it was difficult to use and that it did not provide the variety of features that were offered in other LMSs. Participants recounted that they often spent a lot of time trying to figure out, on their own, how the Moodle LMS and associated applications worked. No upfront formal training was available to participants to establish a level of proficiency in the use of all features of the LMS. As a result, most of the more advanced Moodle tools and features were not used. Participant D shared:

> We just didn't know what these tools were … It's just understanding the flow, because I don't think Moodle is very user-friendly until you figure it out. It's not something you want to guess with; it's not easy at all. But once you learn it, it makes sense. It's understanding the movement in the platform.

Participant D went on to describe the types of tools first used to deliver course content within the Moodle LMS:

> Early on, that was just the file! We gave a file or we inserted the basic URL. That's what we knew how to do. And the assignments drop box. There was nothing, nothing—it was very generic, and it was just what we knew.

All participants, at some point during their interviews, mentioned the Moodle lesson tool and the fact that they did not know how to use this feature when they were first developing their online courses. All participants acknowledged this gap in their expertise with the Moodle LMS as being detrimental. As they became more familiar with the features available in Moodle, through working with the consortium director, all participants found particular value in the lesson tool, which provides sequential and interactive content delivery capabilities along with embedded formative and summative assessment features that can be used to integrate content mastery requirements. It was through the discovery and use of the lesson tool, according to several participants, that they were able to reconstruct their courses to provide a more organized, easy to navigate, and instructionally sound learning experience for their students. Every participant mentioned the Moodle lesson tool as being an integral feature for content delivery for high school level students. When asked about familiarity with the features provided by Moodle, Participant E responded:

> Now, I'm very familiar, but early on, it was a mess. We didn't know about the lesson tool. Literally, it was open up a document. Here's the first page of material. Close that, and open up something else. Now here's the second page. Close that.

> Here's the third page. So early on, we did not have any familiarity. I think that just learning how to use the lesson tool properly was helpful.

Understanding the features of Moodle related to establishing and maintaining communication with students and with parents was cited by participants as an area of weakness when they were first developing their online courses. As was revealed earlier in this report, participants originally struggled with determining how to easily communicate with students. All participants commented that they relied mostly on emailing students and parents, and using applications outside of the Moodle LMS to do so. Not having an understanding of how to use the features available within the Moodle LMS that provide the ability to internally message students, to engage in real-time text "chat" with students, and to send email from within the Moodle LMS often made their original experiences with facilitating their courses awkward and more time-consuming than necessary.

Suggested professional development. All participants indicated a need for comprehensive professional development on the use of the Moodle LMS for individuals new to online course development. Participant A indicated, "definitely everything about Moodle should really be taught to them, from basics to advanced." Participant B stated:

> Now for someone who has absolutely no experience with Moodle at all, then I think you need some sort of hands-on training, and models of that. Some kind of—probably a model class. If someone is coming into this whole thing with no experience at all, then you probably need a day's training just trying to show what Moodle is completely capable of doing for different kinds of classes.

Participant A maintained, “I think there should be examples pulled in from existing online courses that give teachers ideas about different ways that you can present material or create assignments.” Participant C stated:

> I think any instruction on how to handle the [Moodle] grade book is always good. How to develop a lesson, because there’s a neat feature; there’s things you need to be aware of, and you need consistency between all of the courses, and if you’ve never learned how to do a lesson it can be kind of overwhelming just jumping into it. So the lesson feature is very, very important. If you’ve never run a forum, there are different ways to set up a forum. There are like three or four ways to be aware of.

Developing a comprehensive understanding of all of the features and settings available within the Moodle LMS was a central and overarching emphasis throughout the interviews I conducted with teachers. This underscores the fact that technology, particularly technologies related to the LMS, is as fundamental to online learning as are content and instruction. In the words of Participant B:

> The idea behind the first model of this program—getting a bunch of people together and hoping, and just working with Moodle, you really need the expertise. You need one point person who has expertise in this. Otherwise it’s going to be very, very difficult for new people—and for anyone.

Category 5: Course Evaluation

Data that correlated with this category was collected from responses to questions throughout the interviews. Within the original courses developed by participants, no

formal course evaluation processes or instruments were created. The idea of systematic course evaluation was not addressed or investigated during their early years of course development, according to participants. Some responses to interviews, however, did include mention of items that can be associated with course evaluation. I derived two category elements from those responses, and three associated concepts (see Table 5).

Table 5

Category 5 Course Evaluation

Category Elements	Associated Concepts
Evaluation instruments	Student struggles Teacher struggles Feedback from students Student achievement
Course modifications	Student driven / based on student experiences Based on trial and error Outside influences

Participants described numerous areas where they determined a need for modifications to their courses. Most of these needs surfaced as a result of problems experienced by both students and teachers. Participant C, for example, discussed challenges with meeting the objectives of course assignments because students often did not understand or properly follow directions that were provided. This led to continually making modifications to written instructions and being more specific with expectations. Similarly, Participant E related that most communications with students consisted of explaining what they needed to do and how to navigate through the course, rather than having rich discussions related to the content itself. Again, this led to making

modifications to course layout and written directions, according to Participant E. In addition, Participant E recounted students' superficial postings in discussion forum activities, which led to redesigning forum prompts to elicit more thoughtful, analytic responses. Several participants cited the pacing as needing adjustments based on students' experiences. Participant A described the decision to move from using PowerPoint presentations to deliver content, to using VoiceThread, based on the needs of students that became apparent as the course was facilitated. Changes in multimedia applications and availability of outside resources prompted adjustments to content and content delivery formats, according to two participants. Participant B noted a positive enhancement when Moodle began to host videos directly on the LMS, making it easier to provide more media based delivery of content. Most participants cited a lack of student engagement, and even numerous students who did not complete the courses at all, as problematic. These issues, as related by participants, prompted them to re-evaluate their courses entirely, but without guidance, they were uncertain how to remedy some of the issues they were dealing with. None of the participants included an end-of-course evaluation survey for students to complete, within their original courses.

Findings

The problem addressed in this case study research was that high school teachers who do not have previous experience or training in the development of online courses are being tasked with online course development. As a result, online courses that do not adhere to any sort of standards for quality online courses are being developed and provided to high school students. Often, students are not successful in these courses. The

purpose of this study was to gain insight into teachers' experiences developing online courses without companion professional development to prepare them for the task. The information I collected helped to determine professional development needs of teachers new to the task of online course development. From the data collected, I identified six primary areas of need for teachers beginning the task of online course development: (1) understanding the capabilities of the Moodle LMS, (2) targeted training on Moodle tools and features, (3) models of well-designed courses, (4) examples of pedagogically-sound online learning activities, (5) examples of effective communication, and (6) assessment strategies. Two overarching themes emerged from these six areas of need.

Theme 1: Understanding the Integrated Use of the Moodle LMS

Throughout the interviews, participants repeatedly alluded to not having an understanding of all of the capabilities of Moodle, and how the tools provided in the Moodle LMS could be used to add interactivity and variety to the learning experience. They did not understand how Moodle tools could be used to design a variety of formative and summative assessment types that could be automatically scored. They did not understand how to use the Moodle grade book and, instead, transferred individual scores into their respective school districts' student information systems. They did not understand how Moodle tools could assist with transforming face-to-face teaching pedagogy to the online learning environment. They did not understand how a completely online, interactive course should look and work. The extent of their prior use of the Moodle LMS was as a website or as a place to provide a list of downloadable documents. Their familiarity with Moodle did not extend beyond the basic Moodle tools. They had

little to no understanding of the advanced tools that are necessary to develop a fully online course.

Theme 2: Understanding Online Instructional Pedagogy

Another recurring motif was that teachers did not understand how to go about designing an online course that follows best practices for online instructional pedagogy. They did not know about iNACOL or the various sets of standards for online teaching and learning published by iNACOL. They were not familiar with any other organizations' published standards for online teaching and learning. Most participants in the study had never taken an online course. They had limited familiarity with the aesthetic and navigation elements of web design that promote student interest and success. Most were uncertain how to transform face-to-face instructional pedagogy to the online learning environment, thus they relied to a great extent on trial and error.

Relationship of Themes to the TPACK Framework

Research participants indicated they felt sufficiently knowledgeable in, and had a high level of expertise with, their content areas. They were confident in their ability to effectively provide instruction in the face-to-face classroom setting. However they felt they lacked knowledge in the areas of technology (particularly the Moodle LMS) and online instructional pedagogy. They were uncertain how to effectively mesh content, technology, and pedagogy to provide a quality online learning experience for students. Referring to the TPACK framework (Figure 1), these areas of weak understanding correlate with the TK (technology knowledge) and PK (pedagogical knowledge), and the overlapping areas of TPK (technological pedagogical knowledge), TCK (technological

content knowledge), and TPACK (technological, pedagogical, content knowledge). These areas represent most of the TPACK conceptual framework.

Findings from Research Question and Sub-Questions

My analysis of the interview data collected provided answers to the research questions posed for this study. Below is the guiding research question and companion sub-questions, with a summary of the responses that were collected from the interview data.

Research Question: What are high school teachers' experiences with, and perceptions of, designing and developing online courses without accompanying professional development?

The findings of this study indicated teachers were enthusiastic about the prospect of developing online courses when they first approached the task. The format of the initial development was a constructivist effort where teachers worked together to build courses using their combined knowledge and abilities. However, course developers eventually became confused and somewhat frustrated when faced with the challenges of transferring content and instructional delivery to the online learning setting. They felt adrift without the availability of professional development to assist with their understanding of what to do, and how to do it. Without direction from someone knowledgeable in all aspects of online course design and development, including the Moodle LMS, it was difficult, according to study participants, to develop courses that engaged students, that were well designed functionally and pedagogically, and that

promoted student success. Participants noted that it was equally cumbersome to facilitate their courses, the way they were originally constructed.

Sub-question 1: What competencies do high school teachers perceive as initially absent from their understanding of quality online course design and development?

Numerous and varied competencies surfaced as being notably absent from teachers' understanding of quality online course design and development. Teachers had no knowledge of the iNACOL *National Standards for Quality Online Courses (v2)* (2011), or of any other sets of standards for online course development. Within the category of content, some participants noted deficiencies in clearly determining and stating course goals and objectives. Some participants questioned the rigor of their initial courses along with the way they originally provided content. None of the participants provided a detailed course syllabus. Within the category of *instructional design*, all participants noted deficiencies in their understanding of course, unit, and lesson design; in online instructional strategies and designing engaging activities; and in establishing a communication protocol within the Moodle LMS. Within the category of *student assessment,* participants indicated gaps in their understanding of assessment strategies appropriate for online students, how to provide feedback within the Moodle LMS, and the importance of providing detailed grading rubrics for every graded activity. In the *technology* category, participants mainly pointed to a lack of expertise using the Moodle LMS and all of the tools and functions available within the LMS. In the *course evaluation and support* category, participants noted they did not establish a protocol for routinely evaluating the effectiveness of their courses in accordance with the iNACOL

National Standards for Quality Online Courses (v2) (2011), or any other sets of standards for online course development.

Sub-question 2: *What online course design and development competencies do high school teachers perceive as being the most difficult to grasp without ancillary training?*

Participants consistently referred to a need for comprehensive training on all of the Moodle LMS features and tools. I noted numerous times throughout the study findings, that participants experienced frustration with not being able to transfer content, instruction, and student assessments to the online learning environment in a manner that proved to be successful and pedagogically sound. All participants expressed a need for professional development on elements of online course design including methods for delivering content, designing rigorous assessments and activities, providing information, communicating with students, and providing clear and adequate directions for students.

Sub-question 3: *What online course design and development competencies do high school teachers perceive as requiring additional professional development to achieve proficiency?*

Throughout the study, participants spoke of the need for professional development on almost every aspect of online course design and development. In fact, the only area where participants claimed to already have a high level of comfort was their knowledge and expertise in the content that was to be delivered. They all had many years of experience instructing the content in the brick and mortar classroom and thus felt comfortable with instructional strategies for that learning environment. However, the

transference of content and instructional pedagogy to the online learning environment, along with developing expertise in the technology involved with providing online instruction—mainly the Moodle LMS—were all areas that proved especially challenging, according to participants. These are all areas that require comprehensive professional development, as expressed by participants and thus revealed in the findings of the study.

Outcomes

The problem addressed in this single incident qualitative case study was that high school teachers taking part in the development of online courses for a local online learning consortium have undertaken this task in the past without having had corresponding professional development in the design of quality online courses for high school students. The purpose of the study was to explore high school teachers' perceptions of the professional development needs of teachers new to developing online courses for the consortium. These perceptions were based on teachers' prior experiences building online courses without accompanying professional development to prepare them for the task.

Results of the research indicated that before endeavoring to develop a fully online course, teachers need the following:

1. a comprehensive understanding of the capabilities of the Moodle LMS
2. targeted training on Moodle tools and features
3. models of well-designed courses
4. examples of pedagogically-sound online learning activities
5. examples of effective communication within the online learning environment

6. an understanding of assessment strategies appropriate for the online learning environment and that contain rigor

These areas of need mirror elements of the TPACK framework along with the competencies outlined in the iNACOL *National Standards for Quality Online Courses (v2)* (2011). A 12-hour online course that introduces and models all of the identified areas of need for novice online course developers is the project that resulted from this qualitative case study research. The online professional development course, titled "Building Blocks of Online Course Development," is described in detail in Section 3 of this report.

Conclusion

This project study was conducted using the qualitative research method. The research design was a critical incident single case study within a bounded system. I collected data in the form of one-on-one interviews with individuals who elected to participate in this study. I analyzed interview data for emergent themes related to competencies required for online course development, and high school teachers' perceived professional development needs for building quality online courses.

I used research findings of the study to inform the development of the accompanying project, which is described in detail in Section 3 of this report.

Section 3: The Project

Introduction

Online learning in K-12 education institutions—high school, in particular—has become increasingly attractive to students and, often, their parents. Teachers whose experiences may, up to this point, have been confined to the traditional face-to-face classroom are increasingly recognizing advantages of incorporating online course development and facilitation into their professional practice. Similarly, K-12 education entities find it advantageous to offer online learning options, with some school administrators attempting to have their own teachers develop online courses in-house. Providing appropriate professional development to teachers who undertake the task of developing online courses can be challenging. Skill sets related to online instructional pedagogy, web design, and learning management system technologies must be identified, and appropriate methods for providing effective targeted professional development must be carefully considered. Roman, Kelsey, and Lin (2010) asserted that, "In order to develop and sustain successful online programs, institutions should address the needs of online instructors in a systematic and comprehensive manner and employ different mechanisms to support instructors when teaching online" (para. 31). The findings of this research study substantiated the need for comprehensive professional development germane to teachers endeavoring to develop online courses.

I undertook this qualitative case study to gain insight into the experiences of five high school teachers who endeavored to develop online courses for high school students, with little or no professional development related to quality online course design.

Participants' perceptions of professional development needs of teachers new to the task of online course development were also explored. Teachers who were interviewed indicated an evolving realization that online course development requires not only a multitude of specialized skills, but also a profound understanding of how to amalgamate content, instructional pedagogy, and multitudinous technologies to design and deliver valuable, attractive, and successful learning experiences for high school students who are learning online.

I also gathered the perceptions of interview participants, based on their previous experiences, of what might constitute beneficial professional development related to online course development for teachers who are new to developing online courses. The findings of my research revealed that teachers involved with developing online courses as part of the three-district consortium want and need initial comprehensive professional development in all areas of online course development except in the area of content expertise. This includes the transference of content to the online platform, online instructional design, the provision of models of well-designed courses, examples of well-designed course activities, and intensive training on the capabilities of the Moodle LMS.

In this section, I introduced and described the project that resulted from my research along with the rationale for the project. I provided the goals and objectives of the project and a literature review that describes and defends the project as an appropriate means for addressing the problem identified in my research. I also presented an implementation plan, a plan for evaluating the project's effectiveness, and implications for social change.

Project Description, Goals, and Objectives

A 12-hour, asynchronous online professional development course titled "Building Blocks of Online Course Development" is the project that resulted from my research. I created this course to provide a comprehensive framework and model for the design and development of quality online high school-level courses for the three-district online consortium. It serves to introduce novice online course developers to the competencies required for developing quality online courses, while exemplifying the design of a high school-level online course. The course provides course developers with the experience of being students in an online course that is delivered within the Moodle LMS and that is built in alignment with the iNACOL *National Standards for Quality Online Courses (v2)* (2011). Throughout the course, teachers are required to use learned concepts to begin the development of their own online courses in the Moodle LMS, using newly opened course shells provided to them prior to beginning the "Building Blocks of Online Course Development" course. The assigned course development tasks are designed to scaffold course development concepts that are introduced. Stopping at intervals to practice incorporating learned concepts into their courses provides course developers the opportunity to practice implementing elements of online course development, progressively, to exhibit their understanding.

Teachers who are new to developing courses for the three-district consortium will, if approved by their individual school district administrators, be enrolled in the "Building Blocks of Online Course Development" course as a prerequisite to developing online courses for this program. The course is designed to provide an introduction to the many

facets of online course development and to provide a visual representation of a well-developed online course that would be appropriate for high school-level students. The asynchronous online format of the course provides the added benefit of flexibility, in that teachers can complete the course outside of the physical school building and at any time during a predetermined completion period. After taking the course, teachers would need to engage in continued, targeted professional development as they proceed with subsequent development of their online courses.

The "Building Blocks of Online Course Development" course was designed to address and integrate the iNACOL *National Standards for Quality Online Courses (v2)* (2011). It also demonstrates the melding of technological, pedagogical, and content knowledge, which constitutes the TPACK conceptual framework. Many of the competencies associated with the iNACOL (2011) standards and with the TPACK framework are presented as topics of instruction, and many others are simply modeled throughout the course. In this respect, the course is presented as a model on which teachers can base the look and feel of the online courses they develop.

The "Building Blocks of Online Course Development" course was also designed to prepare teachers for the multi-faceted task of developing quality online courses for high school students. Through the content presented in this course, teachers new to developing online courses will gain foundational knowledge of the online course development process, of various online instructional and assessment strategies, and of Moodle LMS tools that can potentially be used in the design of their own courses. Teachers' having initial direction in the course development process can expedite the task

of developing online courses of their own. A detailed description of the content of the "Building Blocks of Online Course Development" course that includes images of each course module is located in Appendix A of this report.

The "Building Blocks of Online Course Development" course was built and is located on the consortium's Moodle server. Because the online course was built to reflect authentic and dynamic web-based instruction that is immersive and includes interactive components and sequential (but nonlinear) learning paths, it is not possible to adequately capture the content and the student experience in a print format for this report. Dynamic instructional modalities include multi-page lessons with embedded assessment questions linked to numerous feedback possibilities that depend upon answer choices. Some interactive lesson pages loop back to a home page, where the user can select learning options by clicking onto various buttons. The Moodle electronic book is used to house static information which is provided in chapters that are, in reality, links to content pages. Video-enhanced content delivery is incorporated into Moodle lessons, as is linkage to sources outside of the LMS. Audio narration is also provided for content delivery. Teachers will complete the culminating project for the course on individual Moodle course pages created and assigned to them. Those course pages will be located outside of the "Building Blocks of Online Course Development" course, on the consortium's Moodle server.

Goals of the Online Professional Development Course

Following are the goals of the "Building Blocks of Online Course Development" online professional development course:

1. Present professional development for new online course developers in a flexible, asynchronous format that is convenient for participants.
2. Provide new online course developers with an immersive experience in a well-designed interactive online course constructed within the Moodle LMS.
3. Inform new online course developers about online teaching and learning and to familiarize them with the standards and competencies required for quality online course development.
4. Provide a clear vision and model of the online course architecture expected for the consortium-provided courses.
5. Provide new online course developers with a conception of how to approach the development of their own online courses including: how to effectively deliver content, and how to design assessments and activities, and how to incorporate appropriate Moodle LMS tools.
6. Provide the foundation necessary for teachers to segue into a course development process that is organized and efficient, and to ensure that course development time provided to teachers is used effectively.

Evaluation of the attainment of these goals will be based on feedback collected via an end-of-course survey that teachers will be asked to complete, Moodle activity logs and reports, and teachers' demonstration of learned concepts as evidenced in their culminating course projects.

Objectives of the Online Professional Development Course

The objectives of the "Building Blocks of Online Course Development" online professional development course include:

1. Teachers will engage in a highly flexible means of obtaining preparatory professional development.
2. Teachers will have the experience of taking an online course in Moodle, as students.
3. Teachers will gain foundational knowledge needed for developing an online course that demonstrates the interrelationship of content, instructional pedagogy, and technology (TPACK).
4. Teachers will see active demonstrations of the advanced capabilities of the Moodle LMS.
5. Teachers will experience a model of a well-developed online course that demonstrates various methods of content delivery, examples of well-developed assignments and instructions for assignments, and adheres to the *iNACOL National Standards for Quality Online Courses (v2)* (2011).
6. Teachers will begin the process of building a course as they learn about online delivery of content, instructional pedagogy, and affiliated technologies.

Upon completing the *Building* "Building Blocks of Online Course Development" professional development course, teachers may be prepared with the foundational knowledge and skills they need to begin the process of developing their own courses. They will have begun to populate a course shell with items they practiced as part of the

professional development course requirements. Teachers will then be in a position to learn more advanced aspects of online course development and design as they continue to attend collaborative course development workshops and proceed with building their online courses.

Project Rationale

The results of my research informed the delivery method I chose for this professional development. The problem I investigated was that teachers are often tasked with developing online courses for students without the benefit of companion professional development to prepare them for the task. Previous research that I cited in the literature review in Section 1 indicated that the task of developing online courses requires a unique and multifaceted set of skills and knowledge. The results of this qualitative case study revealed that teachers involved with the three-district consortium were not, at the outset of their online course-building endeavor, fully familiar with the range of knowledge and skills they needed in order to produce quality online courses. This resulted in frustration, inefficient use of development time, and sub-par courses in which students had limited success. Participants in this study expressed a need for professional development for teachers new to the task of online course development, which, they stressed, should be provided before beginning the process of developing an online course. Participants repeatedly advocated for a course model, along with examples of well-developed course components, as professional development features that would be beneficial for new online course developers.

I chose to create an online professional development course to provide teachers the opportunity to experience, as students, an interactive online course built using the Moodle LMS. The course also introduces teachers to some of the myriad concepts and competencies related to online course development, that are included in the iNACOL *National Standards for Quality Online Courses* (v2) (2011). The course demonstrates the effective interrelated integration of the TPACK knowledge areas of content, pedagogy, and technology—foundational understandings teachers need to have before attempting to build their own online courses. Finally, the course serves as a model course that is designed to appeal to a high school level student.

Review of the Literature

I considered and incorporated a number of teaching and learning frameworks when designing the "Building Blocks of Online Course Development" professional development course. The interplay of knowledge areas illustrated in the TPACK Conceptual Framework (Mishra & Koehler, 2006) was fundamental in my design of the course. I developed the course in an online format to align with, and demonstrate, the TPACK training suggestions from the literature I reviewed and from the data that I collected during my research. The online format for this professional development effectively models many facets of online course design and development and provides the experiential learning opportunities that were revealed in the literature and in my research as being paramount for generating an understanding of the complex interplay of all elements of quality online course design.

For this literature review, I searched ERIC and Education Research Complete databases, using the following search terms and phrases: *TPACK, TPACK professional development, adult learning, online professional development, professional development, modeling, models, examples, immersive learning, experiential learning, situated learning, training, online course development, building online courses.*

The TPACK Conceptual Framework

The TPACK framework, developed by Mishra and Koehler (2006), is a visual conception of the interrelationships of knowledge and skill bases that must be ubiquitous in any technology driven learning environment, for it to be effective. Technology (TK), pedagogy (PK), and content knowledge (CK) are the three primary components of the TPACK conceptual framework. Teachers who were interviewed for this study indicated they were comfortable with their knowledge bases in these three separate areas, related to the traditional brick and mortar classroom setting. It is the areas where these primary knowledge bases overlap, as illustrated by the TPACK framework (see Figure 1), that represent the knowledge and skills needed for the efficacious transferal of traditional education components to a technology driven learning environment; in this case, online courses. The findings of this study indicated teachers need professional development in all aspects of transitioning their instruction to the online education environment.

Understanding how to best inform practitioners about the process of developing instruction that is in alignment with the TPACK framework continues to evolve (Chai, Koh, & Tsai, 2013). The framework itself is simple enough to understand; however, putting the framework into practice, particularly the areas where the three primary

knowledge components converge, can be extremely challenging (Chai et al., 2013). Disagreement about how to begin the process of TPACK integration coupled with the common practice of presenting the components of TPACK in separate trainings, as separate knowledge and skill sets, is problematic (Alsofyani, Aris, & Eynon, 2013; Chai et al., 2013; Jamani & Figg, 2013; Surry, Sefurak & Gray, 2011). Surry et al. (2011) asserted that educational technology continues to be perceived as separate, task-oriented tools rather than as an overarching force that impacts the way education is delivered. Thus, technology workshops are often offered separately from professional development that is related to other components of instruction (Jamani & Figg, 2013).

Alsofyani et al. (2013) noted the emergence of online courses for delivering professional development as a venue that could prove promising for modeling, and, hence, indirectly educating practitioners about, TPACK. Stover and Veres (2013) similarly observed that the best way for teachers to learn to integrate TPACK into their own instruction was for them to engage in professional development designed to model practices that align with the TPACK framework. Jamani and Figg (2013) likewise found success with providing a workshop where TPACK was modeled and teachers gained authentic experiences engaging in technology driven learning, rather than simply seeing a presentation or a demonstration of technology tools. According to Koehler et al. (2013), the complex interplay between technology, pedagogy, and content knowledge, and the ability to understand the dynamics of that interplay, requires experiencing it first-hand. Online training that includes both informational aspects of TPACK and active experience

with TPACK development promise to be most beneficial for teachers who are transitioning to a technology driven learning environment (Alsofyani et al., 2013).

Online Professional Development

The provision of online professional development opportunities for teachers is becoming increasingly commonplace within educational entities (Collins & Xin, 2015; Phu, Vien, Lan, & Cepero, 2014). Online training provides flexible learning options and new opportunities for authentic learning experiences (Alsofyani et al., 2013). Engaging in online professional development is essential for teachers who are preparing to instruct in technology-based education environments (Brown, 2014; Meyer & Murrell, 2014; Mujtaba, 2011). Brown (2014) further stressed the idea that it is necessary for teachers to have the experience of learning, using the same technology tools that they will ultimately be required to use in their own instructional practice. Keengwe, Georgina, and Wachira (2011) likewise emphasized the importance of online instructors developing their own technological literacy skills in order to appropriately and successfully assimilate teaching pedagogy into the online environment. Research conducted by Collins and Xin (2015) found that five features consistently determine the quality of online professional development: "(1) content relevancy, (2) online features and delivery quality, (3) online participation and duration, (4) transformational learning for instructional practices, and (5) adult learning theory" (p. 21). Online professional development is often employed to allow teachers to benefit from expertise not available through the local education agency or to provide training not currently available in a face-to-face format (Bates, Phalen, & Moran, 2016). Even so, online professional development is still often considered by a

large portion of faculty and administrators to be inferior to face-to-face venues (Kane, Shaw, Pang, Salley, & Snider, 2016). This skepticism mainly has to do with the quality of the online professional development (Allen & Seaman, 2013; Meyer & Murrell, 2014; Vaill & Testori, 2012).

To be successful, professional development in general, and online professional development in particular, must be based on the current needs of the teacher (Pic, 2015). A study by Terosky and Heasley (2014) similarly promoted the idea that professional development programs for faculty who are teaching in the online environment must be based on their unique needs, suggesting that education institutions need to work to bring their traditional programs into alignment with the needs of online teaching staff. Collins and Xin (2015) stressed the importance of providing online activities that reflect the TPACK framework and that are authentic in nature. Pic (2015) suggested that the design of engaging online professional development should include hands-on demonstration of learning and opportunities for continued personal connection. It is important to remember, according to Collins and Xin (2015), that teachers have an existent knowledge base and expertise; therefore, the design of online professional development should provide either scaffolding for current areas of learning, or the introduction of new concepts. Adult learners, according to Knowles, Holton, and Swanson (2011), desire professional learning opportunities that are practical, that take into consideration their existent knowledge base, and that allow them some self-direction to achieve their set goals.

In conjunction with quality design of the online professional development, the online course must be effectively facilitated. It should provide opportunities for human interaction, according to Pic (2015). Not providing a human presence could result in "an experience that is cold, mechanical, and unhelpful to the learner" (Pic, 2015, p. 14). Even if the course is of an asynchronous nature, there are still ways for the instructor to establish a presence within the course and keep learners motivated (Phu, Vien, Lan, & Cepero, 2014). Phu et al. (2014) further encouraged the provision of clear expectations for completion of the online professional development by school administrators, as essential to the success of this venue.

Interestingly, much of the research that has been conducted related to the efficacy and success of online professional development indicates at least some less-than-ideal outcomes. Research performed by Collins and Xin (2015) indicated that negative outcomes are closely related to inferior quality of the course content and/or course design. For example, teachers cited "text-heavy screens" (p. 22), boring modules, and "information overload" (p. 22) as negatively affecting their perceptions of, and success with, online professional development (Collins & Xin, 2015). Other negative outcomes are attributed to either lack of expectations, or the non-communication of expectations (Phu et al., 2014). Gusky (2014) stressed that successful professional development for adult learners must include proven designs for learning and clear communication of the goals of the professional development program.

When I constructed the online professional development course for my project, I considered all aspects of quality online course design. I incorporated all categories of the

iNACOL National Standards for Quality Online Course Design, v2 (2011). The TPACK instructional framework is reflected throughout the course, allowing teachers to experience the interrelatedness of technology, pedagogy, and content and to learn how to effectively incorporate TPACK as they construct their own online courses. The content presented in my course is based on needs identified by teachers as revealed in my research. I consulted the multi-media cognitive learning techniques championed by Mayer (2011) to inform the delivery methods of course content. My attention to proven design for quality online learning is intended to promote a successful learning experience for teachers and to limit the possibility of negative outcomes.

Modeling

Well-designed online courses are the foundation for effective online course facilitation and for student success (Crews & Wilkinson, 2014). The findings of my research included numerous references to the need for examples and models of well-developed courses and individual components of courses. Teachers indicated they would have been less confused and better prepared to engage in the process of online course development if they knew what they were supposed to be building—how it was supposed to look. Storandt et al. (2012) recommended that professional development for online teachers must be highly illustrative and provide models that can be followed to effectively deliver content and instruction in the online venue. Modeling complex activities or concepts assists individuals with understanding them and gives them a reference point for developing their own similar activities (Starr & Krajcik, 2013). Examples of various online communications and instructional strategies are also

necessary (Storandt et al., 2012). “When teachers have opportunities to see lessons or practices demonstrated, the experiences can have a positive and lasting impact on classroom instruction and teacher performance” (Ritichie, Phillips, & Gravitte-Garrett, 2016, p. 9). This idea can be related to the practice of developing instruction for the online learning environment, as well.

Ching and Hursh (2014) noted positive outcomes when providing models of exemplary online courses as they attempted to train teachers to use the Moodle LMS. When teachers were provided with access to previously developed online courses and activities, they more easily accomplished their own course development tasks in much less time, according to research conducted by Ching and Hursh (2014). Furthermore, teachers more readily accepted and adopted the Moodle LMS when they were presented with ideas and models for using it to design and develop online courses (Ching & Hursh, 2014). Schmidt, Hodge, and Tschia (2013) reported that only after a collection of examples was amassed did a group of university instructors, who were tasked with designing online versions of their courses, begin to understand how to structure a course. The idea of modeling is closely associated with experiential and immersive learning. These learning structures both focus on creating a meaningful and authentic learner experience.

Immersive/Experiential Learning

Just as providing a model can help to make a complex concept understandable, immersion in a system can bring about a practical understanding of the interrelationships between each element of the system (Calopareanu, 2012). Teachers need to experience,

as a student would, the shift from the traditional education setting and instructional pedagogy to technology-supported student-centered learning environments (Litoiu, 2014). This is especially important for those teachers who will be charged with designing new, technology-supported educational environments—specifically, online courses. The findings of my study indicated most teachers did not have the experience of actually being a student in an online course prior to attempting to develop online courses. Without prior experience in an online learning environment, teachers had no frame of reference for the task, which contributed to their initial confusion and frustration. This is the premise for my decision to design an online course, built on the Moodle LMS, as the delivery mechanism for introducing teachers to online course development. I wanted to provide teachers with the student experience, by immersing them in same type of online learning environment that they would ultimately be tasked to create.

Teachers are more easily able to transform their practice when knowledge and skills are acquired through models and authentic experiences (Beckem & Watkins, 2012; Ritichie, Phillips, & Gravitte-Garrett, 2016). Chandler, Park, Levin, and Morse (2013) stressed the importance of providing training opportunities where teachers experience the role of the student. Schmidt et al. (2013) found that faculty at the university level more easily understood the online learning experience, and could conceptualize a design for their own online courses, if they had previous experience as online students. Experiencing a phenomenon first-hand provides a deep level of understanding which, Beckem and Watkins (2012) argued, is more valuable than simply learning about the practice and associated theory. Immersive approaches to training are particularly valuable

for teachers who need to develop new knowledge, expertise, and skills for instructing in a technology driven learning environment (Beckem & Watkins, 2012; Tondeur, Forkosh-Baruch, Prestridge, Albion, & Edirisinghe, 2016).

Indeed, the shift to technology-driven education requires an expansion of authentic learning opportunities for teachers, and their students, in order to provide practice and to gain practicable understandings (Beckem & Watkins, 2012). Although through my exhaustive search of the literature I found no research contradicting the use of models or of providing immersive/experiential learning opportunities, there were some cautionary statements. Beckem and Watkins (2012) warned that, "delivering instructionally sound experiential learning is hard" (p. 61). Furthermore, "Providing authentic, 'real life' experiences can be time consuming" (Beckem & Watkins, 2012, p. 61). Much literature is devoted to exploring the needs of online instructors. However, scant research has been published regarding development and provision of specific models for online course development or of experiential learning opportunities that have been provided to teachers undertaking the task of designing online courses (Barbour, 2012). Yet, Storandt et al. (2012) argued that professional development that allows teachers to switch roles from instructor to student is most effective for developing and applying the skills needed for online instruction. Tondeur et al. (2016) contended that professional development must not be presented as an information session about instruction in the technology driven learning environment; rather, it needs to be provided within the technology driven learning environment. Immersion, according to Tondeur et al. (2016), is a superior venue for providing training on complex learning objectives.

Implementation

I will present the "Building Blocks of Online Course Development" course, along with the goals and objectives of the course, to the consortium steering committee. I will share the findings of the research I conducted and the influence of those findings on the design and delivery of the professional development course. I will also provide open access to the course to each member of the consortium steering committee. This will allow them the opportunity to peruse the content and to become familiar with the requirements of the course.

In the spring of each year, all grades 6-12 faculty members from the three consortium districts are invited by their respective school district superintendents to participate in the consortium during the upcoming school year and develop online courses. New online course development generally begins at the start of each new school year. I plan for the "Building Blocks of Online Course Development" course to be offered as a summer professional development opportunity for teachers interested in developing online courses for the three-district consortium. The summer is an appropriate time for teachers to take this course, as the "Building Blocks of Online Course Development" course would be a required prerequisite to the online course development process for teachers new to the consortium.

Potential Resources and Existing Supports

Consortium school districts support the continued development of new online courses. District administrators have already committed to providing staff development days during the summer for teachers who volunteer to develop online courses. Past

practice has been that teachers may choose to work independently or collaboratively with colleagues, and they may choose to work at the location of their choice. These development days would easily accommodate the completion of the "Building Blocks of Online Course Development" course. The online professional development course would easily fit into this already established practice. Teachers can choose to work through the course independently, or to work through the content collaboratively, with colleagues. Teachers may additionally choose where to complete the course—at school, at home, or somewhere else where Internet access is available.

Individuals in the school districts' technology departments will be available throughout the summer if course participants need technical assistance. I, as the consortium director and facilitator of the "Building Blocks of Online Course Development" course, will also be available throughout the summer, if teachers taking the course have questions, need help with understanding presented concepts or technology tools, or if they need assistance with completing associated activities.

Potential Barriers

The fact that this professional development is provided online and offers flexibility with regard to where and when it can be completed effectively removes most barriers to implementation. The flexible, asynchronous nature of the "Building Blocks of Online Course Development" course will provide the opportunity for interested individuals to complete the course within the compass of their own schedules. Teachers may protest being required to complete the course, or parts of the course, if they feel they already possess the knowledge and skills presented and demonstrated in the course.

However, the design of the course includes opportunities for differentiation, allowing teachers the ability to spend a greater portion of their time on actual course development (in the provided course shell) instead of on concepts that they already know and understand. For example, if the teacher is already expert on the Moodle lesson tool, which is explained in detail within the course, that teacher can simply spend more time developing a lesson or lessons using the tool, in lieu of working through the training activities and resources for that particular tool. Other barriers may include technology-related problems (hardware or Internet) while the teacher is attempting to complete the course, opportunities for procrastination, outside distractions that are common when working from home, and ineffective time management which could lead to not completing the course and culminating project by the stated deadline.

Proposal for Implementation and Timetable

The asynchronous nature of the "Building Blocks of Online Course Development" course, and the fact that it is provided in the online format, allows the course to be accessed and completed at any time within a specified date range. I foresee potential participants being asked to complete the course during the summer months, as a flexible professional development option, considering each new school year begins a new course development cycle. The "Building Blocks of Online Course Development" course will be a required prerequisite for teachers new to developing online courses. The estimated time required for teachers to complete the course and the culminating project is 12 hours. The course will be accessible 24 hours per day, seven days per week, and can be completed all at once or in segments over a longer period of time. If teachers would be

asked to complete the course during the summer months, a likely scenario is that the course would be made accessible in June and the deadline for completion would be set for the beginning of August. The August deadline would be necessary to allow the course facilitator to review participants' completion of activities and the quality of their culminating projects. New course development generally begins shortly after the start of the new school year, with collaborative workshops and course development time scheduled regularly throughout the year.

Roles and Responsibilities of Student and Others

In my role as the consortium director, I will be the facilitator of the "Building Blocks of Online Course Development" course, and I will report teachers' completion of the course to their respective supervisors. I will routinely compile course evaluation data to determine the need for any modifications to the course or to the content provided within the course. I will maintain the course, and I will perform the tasks of enrolling individuals into the course, providing participants with directions for completing the course, tracking and reporting completion, responding to questions and requests for assistance, and monitoring discussion forums and chats within the course. I will respond to all questions and requests for assistance within 24 hours.

School district administrators will be required to approve the enrollment of individuals into the course, and to specify expectations of individuals enrolling in the course. Expectations might include specifying the date range for course completion and teachers' submitting proof of completion to record-keepers at their respective school districts. Course participants will be expected to access and engage with all of the course

content and to complete all required activities. Although the course design allows participants to bypass some instruction, participants must demonstrate their expertise in all concepts that are presented in the course as they complete their culminating projects. Participants will be expected to contact the course facilitator with questions, or if help is needed. They will be required to complete the end-of-course survey and to notify the facilitator when they have completed everything in the course. They will be expected to put to use the knowledge and skills gained through this course as they continue the process of developing courses for the consortium.

Project Evaluation Plan

A course evaluation survey is embedded within the "Building Blocks of Online Course Development" course, at the end of the course. This summative evaluation, accessed and completed through Google Forms, is designed to collect feedback from teachers regarding their perceptions of the effectiveness of the professional development provided in the course. Responses to questions are in the form of a Likert scale with the option to provide more descriptive feedback to accompany the ratings. The purpose of this evaluation tool is to collect quantitative data on teachers' overall experiences with the online professional development and to determine if enhancements are needed. Including an end-of-course evaluation additionally demonstrates effective implementation of Standard E of the iNACOL *National Standards for Quality Online Courses (v2)* (2011). The evaluation questions are included with Appendix A.

The effectiveness of the online course can also be determined by observing teachers' performance on the construction tasks embedded throughout the "Building

Blocks of Online Course Development" course. The quality of items produced for the construction tasks will indicate how well teachers understood various concepts, and may reveal any gaps in knowledge and understanding, or problematic areas. This outcomes-based evaluation is vital for determining teachers' readiness to proceed with the development of an online course, and it will help to establish the extent to which the objectives of the online professional development course were met.

Finally, I will continue to engage in informal, formative evaluation of the effectiveness of the course. Continued mentoring of teachers, successive professional development, and conversations and observations related to teachers' course development progress, may provide additional insight into the effectiveness of the "Building Blocks of Online Course Development" online professional development course. This will be vital as I continue to evaluate the need for enhancements to the course and to determine the extent to which the goals and objectives of the course have been met.

These evaluations are crucial for providing feedback to school district administrators relative to the effectiveness of the professional development course. School district administrators, particularly building principals and superintendents, are the ones who must grant approval for teachers to engage in the 2-day online course. Teachers' decisions to develop online courses for the consortium will also be influenced by the quality of the corresponding professional development, particularly if it is a required prerequisite. Continual and multidimensional evaluation of the effectiveness of the "Building Blocks of Online Course Development" course is integral to the advancement of the consortium's online learning program.

Project Implications for Social Change

The data I gathered and analyzed through this research study was used to inform instructional practice linked to a significant pedagogical shift in education—online learning. This pedagogical shift is the result of technological advances that make it possible to provide organized, formal education to students outside of the physical classroom and outside of the traditional school day. Likewise, teachers' receiving professional development online is a contemporary idea, allowing attendance and completion flexibility within an organized professional development venue. The online learning environment itself is new, and well-designed online courses for students and for teachers learning to build the courses for students, are necessary to address the multifarious needs of diverse populations of learners. School administrators in districts opting to offer internally developed online courses must be able to assure all stakeholders that the quality of their online offerings for students is in alignment with recognized standards for quality online courses and that they are comparable alternatives to traditional brick and mortar instruction. This is true for local K-12 education entities and for K-12 education in general.

Conclusion

The project that resulted from my research is a 12-hour asynchronous online professional development course that provides an introduction to the knowledge and skills necessary for developing quality online courses. The overarching goal of the "Building Blocks of Online Course Development" online professional development course is to introduce high school teachers to the competencies needed to develop online

courses for high school students and that align with the iNACOL *National Standards of Quality Online Courses (v2)* (2011). The design of the professional development course draws upon the TPACK theoretical framework, which emphasizes the interrelatedness and overlap of technology, pedagogy, and content knowledge in technology driven education. Finally, through this immersive professional development, teachers will take on the student role and experience navigating an online course that is delivered using the Moodle LMS. As teachers progress through the course modules, they will be correspondingly building parts of their online courses as they learn concepts of course development. The course also ultimately serves as a model from which teachers can glean ideas for the design and development of their own courses, using the Moodle LMS.

Section 4: Reflections and Conclusions

Project Strengths

Through this project, I presented an organized structure for addressing the initial training needs of teachers who will be attempting to perform a complex task that requires a multi-faceted set of skills and a wide-ranging knowledge base. The "Building Blocks of Online Course Development" course is a methodical, immersive approach to understanding and developing the many competencies associated with the iNACOL *National Standards for Quality Online Courses (v2)* (2011). The presentation and delivery of this professional development course also reflects the TPACK framework: the interrelatedness of technology, pedagogy, and content knowledge, and the overlap of those elements that is inherent in a technology-driven learning environment. While the content of the course provides information and opportunities for participants to practice components of course development, the course simultaneously serves as a model for the design of a high school-level course built using the Moodle LMS. It also models the competencies and processes that teachers need to demonstrate as they assume the task of developing their own online courses. The scaffolding of concepts and technology tools used to convey those concepts is evident throughout the course. The asynchronous online format of the "Building Blocks of Online Course Development" course allows significant flexibility for individuals who elect to take the course.

The elements I included in the "Building Blocks of Online Course Development" course are intended to introduce teachers to the multiple and complex competencies required for the effective development of online courses ((Baran & Correia, 2014;

Barbour, 2012; Meyer, 2014; Rice, 2011; Shepherd et al., 2016). The course provides teachers with a foundational understanding of online teaching pedagogy prior to designing online courses of their own (Shepherd et al., 2016). It also provides practical experiences engaging with the advanced features of the learning management system, which is critical for teachers who are designing online courses (Meyer, 2014). Finally, the course brings all of the online instructional components—content, pedagogy, and technology—together to demonstrate effective integration of the TPACK framework. It gives teachers the opportunity to experience, as students, all components of a quality online course before embarking on the task of developing an online course (Rice, 2011).

I believe completion of the "Building Blocks of Online Course Development" course will provide a strong segue into the online course development process for teachers new to the task. I also believe that beginning the course development process with this initial training will greatly improve the outcomes of the in-house course development initiative.

Project Limitations

The "Building Blocks of Online Course Development" course was constructed using the Moodle LMS. Moodle is the LMS used by the consortium, and thus the necessary platform for modeling course structure and training on accompanying tools that will be encountered by staff involved with this particular consortium; the course would have to be modified for provision on a different LMS. The general concepts of the online course development model would be transferrable, but not the particular tools associated with the Moodle LMS. Someone who is an expert in the alternate LMS that is being used

would need to revamp all sections of the course that correlate solely with the use of the Moodle LMS.

The "Building Blocks of Online Course Development" course, and all successive training and professional development associated with the concepts introduced in the course, needs to be facilitated by someone who is highly knowledgeable in all areas of online course development. The educational entity providing this professional development must have a designated individual who is expert in online content delivery, online instructional design, and the Moodle LMS to serve as a mentor and a resource to teachers tasked with online course development. This will ensure that concepts introduced in the professional development course will be appropriately reflected in the finished products: the courses teachers develop.

The "Building Blocks of Online Course Development" course is simply an introduction to the many facets of online course development. Ongoing training will still need to be provided to teachers endeavoring to develop online courses. The learning institution must be willing to provide the time teachers need to engage in continued professional development. Administrators must support teachers taking the "Building Blocks of Online Course Development" course and provide opportunities for ongoing professional development for online faculty throughout the course development process.

Recommendations for Alternate Approaches

An alternate approach to addressing the professional development needs of teachers tasked with developing online courses could be to provide all training in a face-to-face venue. My research revealed that teachers perceive notable benefits from a variety

of training venues. Instruction could be delivered through a series of presentations related to each aspect of course development, with opportunities for teachers to engage in collaborative, hands-on practice of concepts and LMS tools. This would provide immediate feedback to the instructor regarding which aspects of course development require the most attention, for that particular group of teachers.

Another possible solution to the problem of providing professional development for teachers attempting to develop online courses might be to require teachers to enroll in an online course development training or certification program provided by an outside entity. The consortium's school districts in this case study were all located within close proximity to several universities that provide graduate level teacher preparation programs that include courses in online teaching and learning. Although this approach would not provide the level of customized training required for building online courses specifically for the consortium and for using the Moodle LMS, they may provide more extensive insight into the needs of online learners and the responsibilities of the online course facilitator.

A train-the-trainer or mentor program could eventually be established within the consortium districts. Teachers who have become well-versed and experienced with designing quality online courses, where student success is observed, could be asked to provide support to teachers who are new to developing online courses for the consortium. New teachers would benefit from the availability and collaborative working relationship of a designated mentor. Mentors could, in turn, participate in advanced trainings for

online course development that might be provided through workshops and conferences held outside of the school districts and bring new insights back to the consortium.

Scholarship

Upon reflecting on my journey completing this research study and project, I realized how much I have grown both as a researcher and as a practitioner. As a researcher, I have learned the importance and value of keeping an open mind, of putting my previous conceptions aside as I examined others' ideas, the findings of previous research, and the data I collected while doing my own research. I now routinely question everything I read, hear, and see. In particular, I am much more cognizant of methods that are often used to sway opinion or to present data in a way that supports the interests and objective(s) of individuals or organizations. This questioning has become part of my natural mental process, and I find that I am able discern valid research much more easily.

Project Development

In developing the project—"Building Blocks of Online Course Development" —I was required to put to use all of my knowledge and skills in online course development, both to build an online professional development course that demonstrates competencies in online course design and to effectively convey a wide variety of concepts to teachers taking the course. The course needed to demonstrate and convey the *iNACOL National Standards for Quality Online Courses (v2)* (2011) and the TPACK conceptual framework. This was not an easy task, even for someone with an extensive background in online instruction. It was important to construct this course in a way that accurately and fully demonstrates the course development concepts that new course developers need to

learn. Additionally, the "Building Blocks of Online Course Development" professional development course will serve to model the design of high school level online courses built using the Moodle LMS, so I needed to be attentive to every detail.

Leadership and Change

As director of the three-district consortium, I am expected to forge the path for the continuance of the in-house course development initiative. The results of this study and my recommendations based on the results will shape the direction of how professional development will be provided to new online course developers. The quality of the online courses that are developed will ultimately determine whether the program thrives or flounders.

Effective leaders are those who are open to change. Openness to change also means accepting being vulnerable, as those who are first to embrace change are also first to encounter any problems that might accompany the change. The leader must, in the midst of the spotlight, determine how best to address these issues and effectively clear a path for others to follow.

Three public school districts sharing resources and costs to develop and deliver online courses for students who are enrolled at all three schools is a unique endeavor. This collaborative effort represents a change in the way public schools in Pennsylvania generally function. The chief administrators from the three school districts that comprise the consortium are open to and supportive of this change. In my position, I must find solutions to any obstacles to the success of the program so it can continue to move forward. Determining how to best prepare teachers for the task of developing online

courses for the consortium initiative is one of my contributions to clearing the path for change.

Analysis of Self as a Scholar

Through my experience with this research study, I have developed a comfort level with conducting research and with producing scholarly writing. I plan to continue my research in online K-12 education, and possibly publish information related to this study and any additional research I conduct in the future. I feel confident that I can produce scholarship that will be valuable to others who are presently, or who may become, involved with the design, development, and delivery of online learning programs in K-12 education.

Analysis of Self as a Practitioner

As director of an online learning initiative, I want to be as informed as possible in all aspects of online learning, particularly regarding how online learning opportunities continue to evolve. Because my current position requires me to lead high school teachers through the process of developing online courses, I must have a deep understanding of how best to provide professional development to address their needs as they attempt this task. This requires a wide range of background knowledge in the areas of content, instructional pedagogy, and technology, (TPACK) and how to make all of those elements work together seamlessly to create an engaging and valuable online learning experience for students. This is not an easy process, as was revealed in this study, and despite all of my research on this topic and all of my experience developing online courses, I know I still have much to learn. That is the nature of education, especially technology driven

education. It is impossible to not be a lifelong learner when working in education. But, I embrace learning, I love to learn, and continuing to learn is my primary responsibility as a practitioner in the field of education.

Analysis of Self as a Project Developer

My strength lies in the design of professional development for educators. Developing the project to address the research problem of my study, and the research findings, was my favorite part of this capstone process. I have spent most of my career in education investigating new initiatives and creating professional development to accompany them. I know through this experience that I must be mindful of every detail when it comes to designing activities and programs for introduction to faculty and throughout the delivery and follow-up processes. Anything that may impede the success of the project must be anticipated and addressed. The development of this research study and accompanying project have challenged me to take my attention to detail to even higher levels—a valuable experience as I continue to develop new programs.

Reflection on the Importance of the Work

School districts and teachers are responsible for providing learning environments that adhere to standards of excellence. Whether the instruction is provided within the traditional bricks and mortar school building or in a virtual learning environment, students deserve the same quality of instruction, the same amount of support, and the same instructional elements that foster academic success. The work that I completed as a result of this research is important for fostering high quality online learning and for adequately supporting teachers who endeavor to design online courses. The online

professional development course I created will help teachers to better understand and develop the competencies required to design quality online courses. It may encourage them to seek additional opportunities to engage in online teaching and learning. It is a very challenging task to design an online course that considers and incorporates all elements of quality instruction, including technological components. It is my hope that teachers will gain an in-depth understanding of how to combine these myriad elements to develop and deliver instructionally sound, interesting, and rewarding online learning opportunities for students, and hence develop a broader conception of the far-ranging possibilities that technology-based education can provide.

Implications, Applications, and Directions for Future Research

The project I developed was in response to a need expressed by teachers for comprehensive training related to developing online courses for high school students. The "Building Blocks of Online Course Development" course that I created is unique; I know of no similar training venue for preparing teachers to develop online courses. This course could be used as a model for the continued creation of professional development for teachers transitioning their practice to the online education environment. Follow-up research that investigates the effectiveness of the professional development course will be a natural next step, and one that I intend to pursue. Future research could build on this project, and determine the best way to continue providing professional development for online course development, after teachers have completed the "Building Blocks of Online Course Development" initial professional development course. Additionally, research in the area of how to best provide professional development for effectively facilitating high

school-level online courses could be pursued. Finally, student performance in teacher-created online courses could also be the topic of future research stemming from this study.

Conclusion

The purpose of this qualitative case study was to explore the experiences of high school teachers who, as part of a multi-district consortium, attempted to develop online courses for high school students without the benefit of companion professional development to prepare them for the task. This reflects the prevalent problem of teachers commonly developing online courses for students without first understanding the competencies that need to be demonstrated in the construction of quality online courses. Through individual interviews, I explored the experiences of five teachers who were involved with this undertaking at the inception of the consortium's online course development initiative. Based on the findings of my research, I designed a 12-hour online professional development course that establishes a foundation of core knowledge and skills needed to begin the process of developing online courses for high school students. The contents of the online course are described in Appendix A. While the course was designed specifically for the consortium that is the subject of this case study, it can be a valuable resource for other education entities, particularly those that use the Moodle LMS for developing online and blended learning options. Providing teachers with appropriate and comprehensive professional development to accompany the process of developing online courses is critical. Understanding and practicing quality online course design

ensures students who enroll in these courses continue to receive valuable learning experiences when they are provided outside of the traditional brick and mortar classroom.

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Appendix A: The Project

Introduction

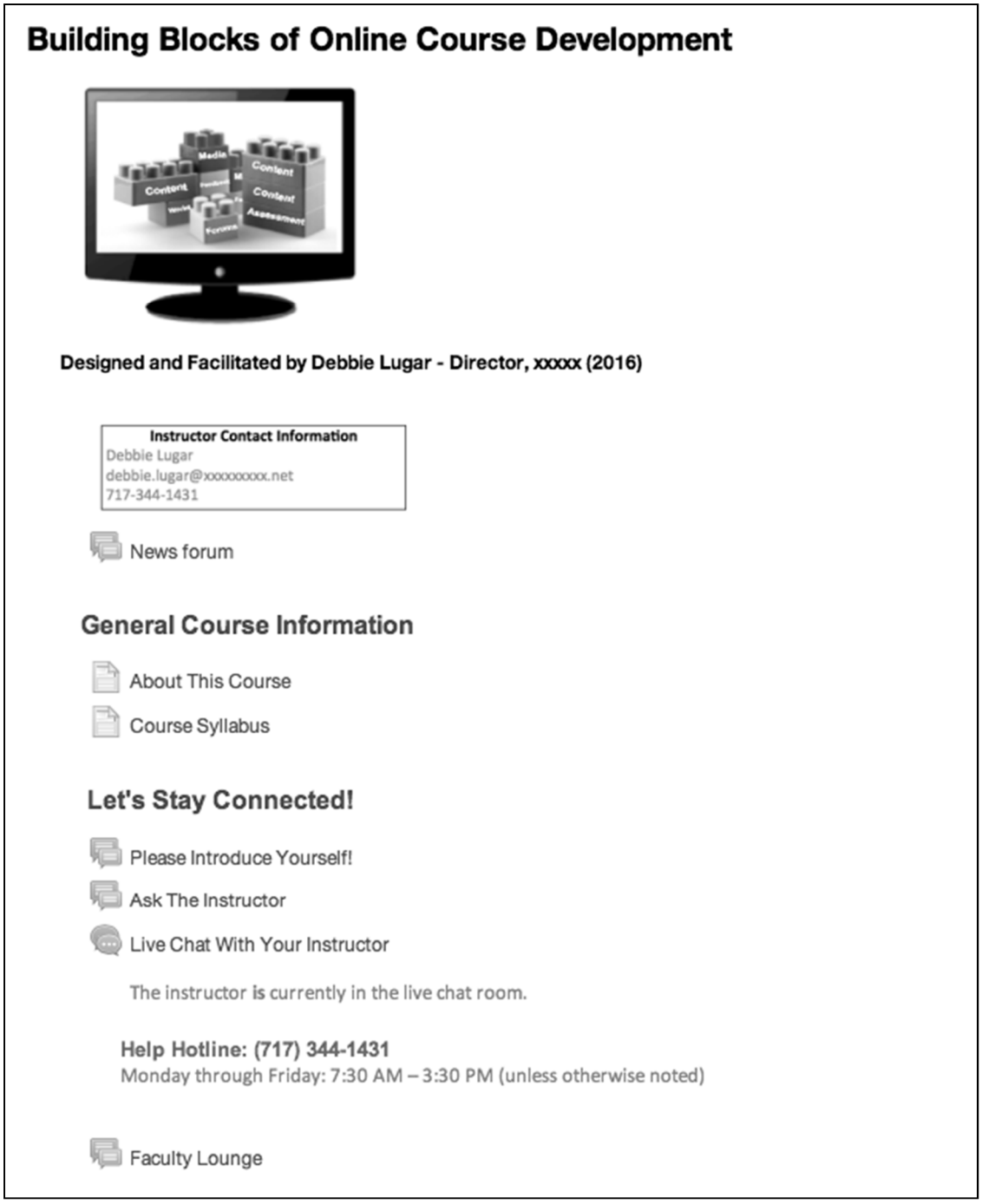
The problem addressed in this study is that teachers are often tasked with developing online courses without being provided adequate training in online course development. The purpose of this study was to identify the professional development needs of high school teachers who volunteer to develop online courses for high school students. Teachers who initially had the experience of developing online courses without the benefit of companion training, were interviewed. They shared their experiences and their perceptions of what would constitute beneficial training for teachers who are new to online course development. Findings of the study indicated a need for comprehensive professional development in all areas of online course design and development. The project that resulted from this study is an online professional development course titled "Building Blocks of Online Course Development." This course will introduce teachers to the myriad competencies and skills needed for developing an online course. It guides teachers through the early stages of knowledge acquisition and practice, and it incorporates modeling and the use of examples to promote understanding. The course is an immersive approach to conveying a complex interplay of content delivery, online learning pedagogy, and the ubiquitous integration of technology that is the essence of developing quality online learning experiences for high school students. Although this professional development course was intended to benefit teachers from the three school districts that comprise the consortium, it can be customized for teachers at other sites who require this same type of training.

Building Blocks of Online Course Development

Each module of this course is pictured and described separately. The module descriptions include:

- The module title
- A snapshot of the section of the course homepage where the module is located
- An overview describing the main focus of the module, including iNACOL *Standards for Quality Online Course (v2)* (2011) that are addressed and/or modeled in each component
- Module components
- Module objectives
- Module outcomes

Introduction and Course Resources



Overview

The course introduction and resources section is where the student is provided

with information about the course, including instructor contact information and the course syllabus. Various communication venues are included. This module provides information associated with, and models components of, the *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content.

Module Components

News Forum – A location where the instructor regularly provides updates, reminders, and critical information.

About This Course – Introduces students to the layout of the course, the components of the course, progress and completion monitoring, and how to make adjustments to the course display (on the computer).

Course Syllabus – Provides students with the formal course description, description of any required ancillary materials, hardware/software requirements, course structure, course access, availability of technical assistance, course objectives, student expectations, and grading methods.

Please Introduce Yourself! – A forum where students and instructor introduce themselves to the class and provide some information bits, to establish presence.

Ask the Instructor – A forum where students are encouraged to post questions or any problems related to the course, e.g., navigation, content, technology.

Live Chat With Your Instructor – Real time communication opportunities between instructor and student.

Faculty Lounge – A forum where teachers (students in this particular course) can communicate with one another to collaborate, ask questions, and share knowledge

and experience with particular concepts within the course.

Objectives

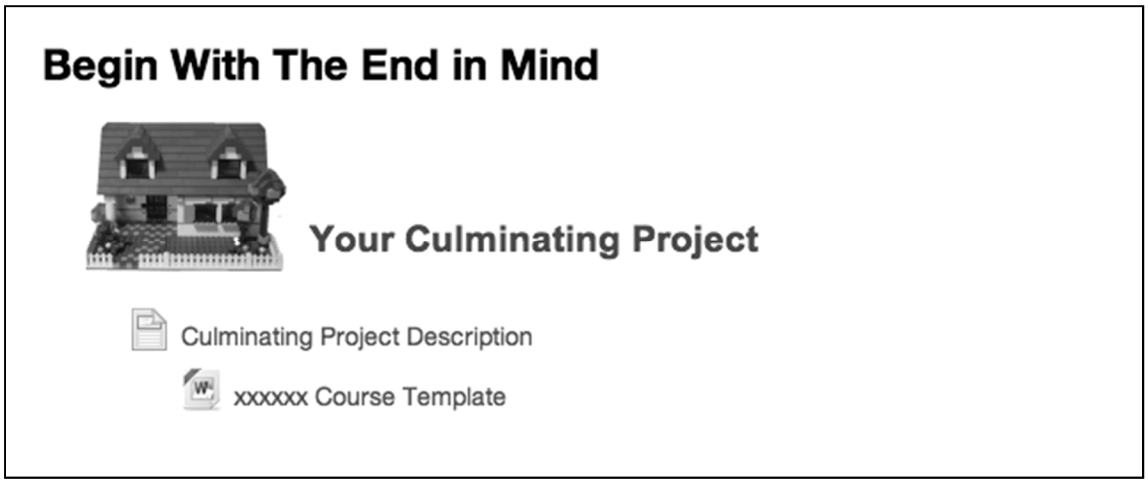
- Establish instructor presence
- Familiarize students with communication venues
- Open lines of communication
- Establish expectations
- Model the elements of a robust, interactive course introduction and resource area (for new course developers)

Outcomes

After engaging with the course facilitator and participating in associated activities, teachers who are students in the course will:

- Understand all of the resources that need to be provided in an online course
- Understand how to establish an instructor presence
- Understand how to create and offer a variety of communication venues

Introduction to the Culminating Project: Begin With the End in Mind



Overview

This is a project-based course. The culminating project for the course is described at the beginning. The hands-on project is completed in increments (labeled *Construction Tasks*) throughout the course and consists of students building small segments of course content to demonstrate their learning of concepts and Moodle LMS tools introduced in corresponding course modules. This module provides information associated with, and models components of, the *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; Section C: Student Assessment; and Section D: Technology.

Module Components

Culminating Project Description – This is a detailed description of the project which includes: an introduction to the project and how it fits with the course goals and objectives; directions for locating empty course shells created for each student in the course (to develop their individual courses); project expectations;

directions for accessing and consulting a general consortium course template; hints for building lessons; directions for indicating completion of the project to the *Building Blocks for Online Course Development* course facilitator.

xxxxx Course Template – The template, which includes general organization and structure, to be followed when constructing courses for the xxxxx consortium. This is used to maintain some consistency in the look and feel of all xxxxx consortium courses.

Objectives

- Provide the ability for students in this training course to demonstrate understanding of learned course development concepts.
- Provide the ability for students in this training course to demonstrate skill in the use of learned Moodle LMS tools.
- Models the design of a course that incorporates project-based assessment.

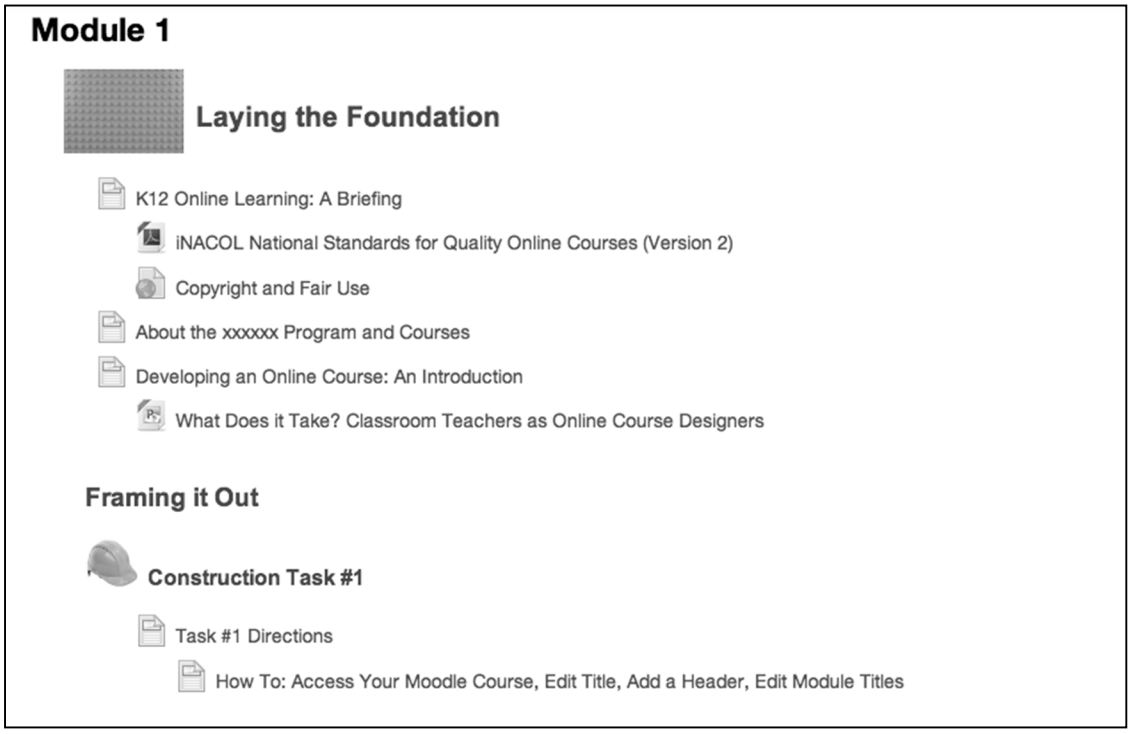
Outcomes

As they complete segments of the culminating project, teachers who are students in the course will demonstrate their ability to:

- Add a course header, edit the course title, add module titles
- Create labels with picture icons to designate modules or units of study
- Create an interactive lesson, using the Moodle Lesson tool, that includes at least three content pages and two **different** types of embedded assessment questions, with all items correctly linked
- Create a discussion prompt that encourages higher-order thinking

- Create objective assessment questions that are rigorous and are designed in accordance with guidelines for validity and reliability
- Add these discussion forums to courses: *Please Introduce Yourself, Ask the Instructor*
- Add instructor contact information to course resources area
- Begin an outline for a detailed course syllabus

Module 1: Laying the Foundation



Overview

As the module title suggests, a context for the consortium's online course development initiative is provided, along with an introduction to the multiple knowledge and skill sets needed for developing quality online courses for high school students. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content;

Section B: Instructional Design; and Section D: Technology.

Module Components

K12 Online Learning: A Briefing - An introduction to iNACOL and a 12-minute video where Susan Patrick (founder and CEO) discusses the state of K-12 online learning in the US.

iNACOL National Standards for Quality Online Courses (Version 2) - A downloadable copy of the 2011 version of the standards.

Copyright and Fair Use – A link to a website maintained by the University of Rhode Island university library, which provides detailed information and examples related copyright and fair use laws for online education venues.

About the xxxxxx Program and Courses – An informational page that discusses the nuances of the multi-district consortium, Moodle as the LMS of choice for the consortium, and the development of synchronous vs. asynchronous (definitions of terms provided) courses for the program.

Developing and Online Course: An Introduction – A page that describes online course development as a task requiring multitudinous skills and a wide knowledge base in online course design.

What Does it Take? Classroom Teachers as Online Course Designers – A narrated PowerPoint presentation that introduces the various skill sets and knowledge bases needed for developing quality online courses for high school students.

Construction Task #1

Task #1 Directions – Locate course shell, create and appropriately place a course header (with image), edit course title, insert module titles, begin to sketch out a course blueprint.

How To: Access Your Moodle Course, Edit Title, Add a Header, Edit Module Titles

Explicit directions, with images, for accomplishing items required for Construction Task #1.

Objectives

Provide a foundational knowledge of K-12 online learning

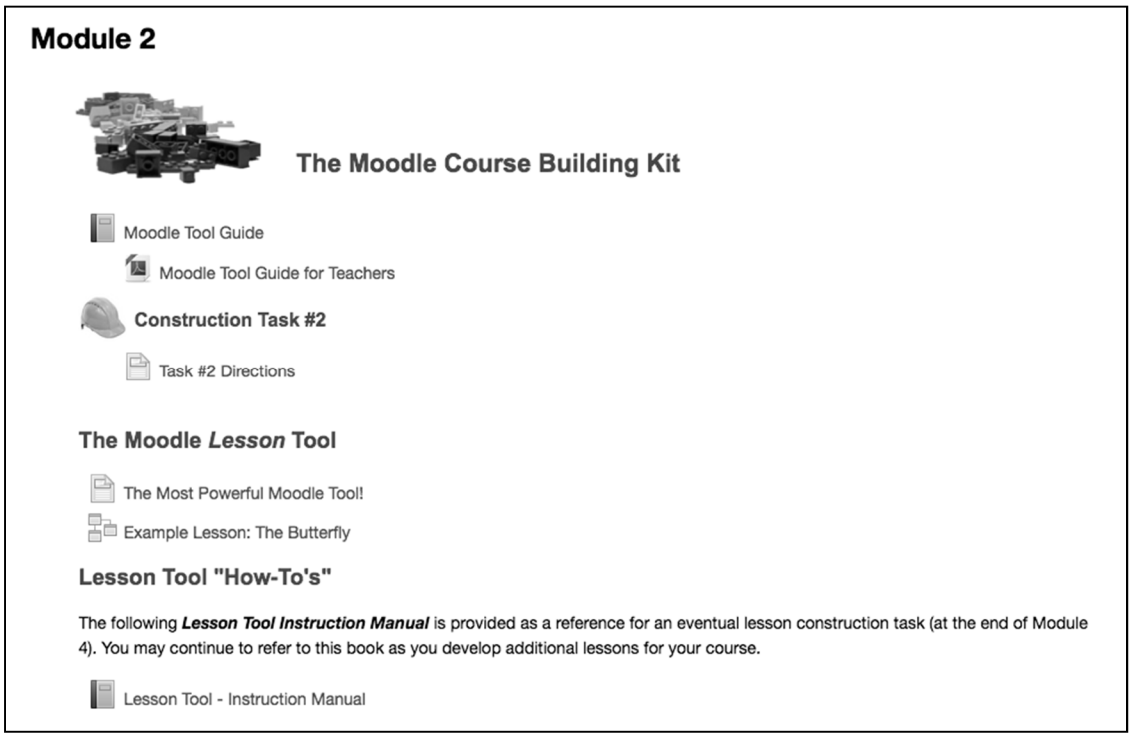
- Familiarize students with the *iNACOL National Standards for Quality Online Courses (Version 2)*
- Familiarize students with copyright and fair use laws for online courses
- Provide a foundational knowledge of the xxxxx consortium along with the vision and goals of the program
- Familiarize students with the knowledge and skill sets needed for quality online course development
- Provide the opportunity for students to begin framing out their individual online courses
- Model the provision of explicit directions
- Model various forms of course content delivery
- Model multimedia learning principles

Outcomes

After completing Module 1, teachers who are students in the course will:

- Have background knowledge of K-12 online learning at both the global and local levels
- Have familiarity with the *iNACOL National Standards for Quality Online Courses (Version 2)*
- Understand the multifarious knowledge and skill sets required for quality online course development
- Begin to construct their individual online courses
- See and experience a variety of content delivery methods
- See and experience explicit directions for completing activities

Module 2: The Moodle Course Building Kit



Overview

This module provides information related to pedagogically sound applications of Moodle LMS tools. A hands-on demonstration of the Moodle lesson tool as it is used to provide an interactive learning experience is included. "Books" containing directions for implementing Moodle tools are also provided. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; Section C: Student Assessment; and Section D: Technology.

Module Components

Moodle Tool Guide – A "how-to" guide for using a variety of Moodle tools to integrate resources and activities into a course.

Moodle Tool Guide for Teachers – A graphic representation of the ways each Moodle

tool can be utilized in the development and delivery of an online course.

Construction Task #2

Task #2 Directions – Students create two or more labels to denote sub-sections or sub-headings. A picture icon must be included with at least one of the labels.

The Most Powerful Moodle Tool – This page introduces the Moodle lesson tool and its ability to transform static information into an interactive learning experience.

Example Lesson: The Butterfly – This example lesson is a hands-on demonstration of an interactive lesson for young students, which includes a variety of embedded assessments.

Lesson Tool – Instruction Manual – This Moodle book includes explicit directions for building all components of a Moodle lesson.

Objectives

- Provide information about, and demonstrations of, a variety of Moodle LMS tools
- Demonstrate the appropriate chunking of material, according to the age of the student
- Demonstrate the alignment of writing style with the age of the student
- Demonstrate the use of text, outside sources, images, and video to interactively deliver content
- Demonstrate each type of assessment that can be embedded in a Moodle lesson
- Provide directions for using the Moodle tools that are demonstrated
- Model the Moodle lesson tool
- Model the use of the Moodle book tool

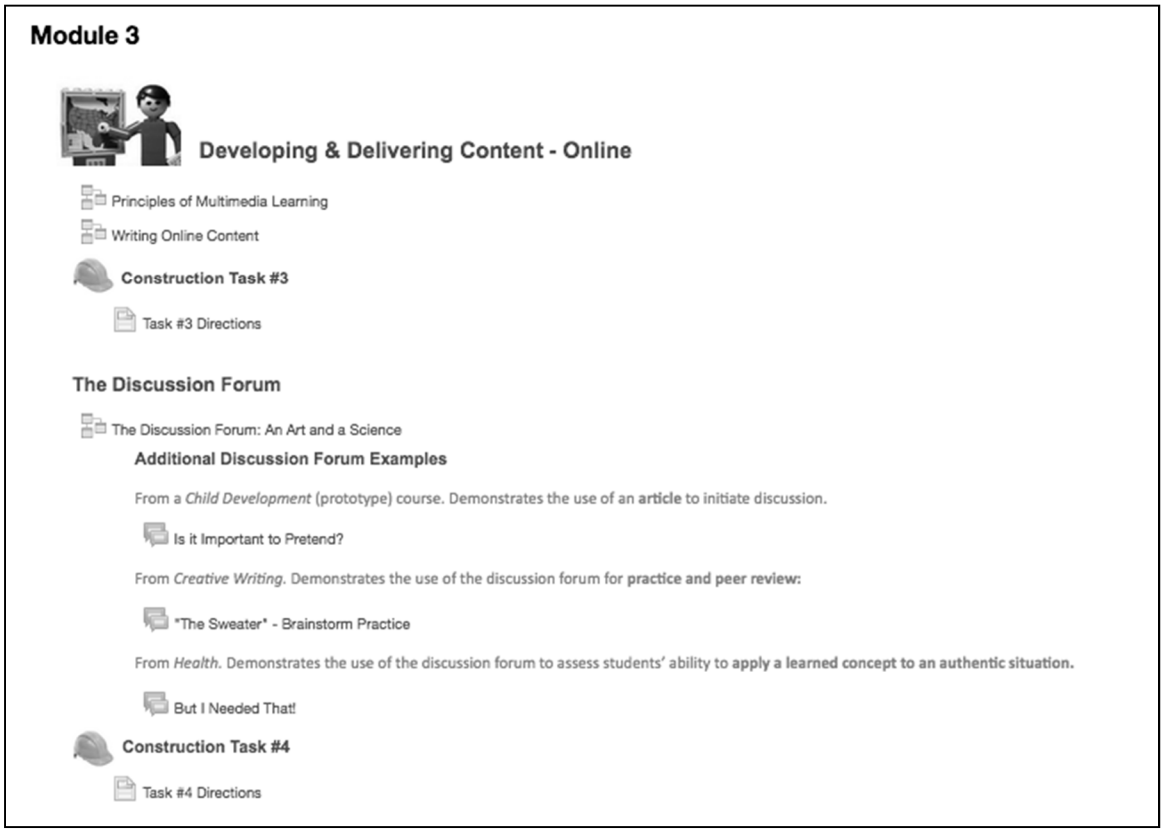
- Model the provision of explicit directions
- Model multimedia learning principles
- Provide the opportunity for teachers to continue building components of their individual online courses

Outcomes

After completing Module 2, teachers who are students in the course will:

- Have a deeper familiarity with many of the tools provided in the Moodle LMS
- See and experience using a variety Moodle LMS tools
- Understand the Moodle lesson tool and its value as a content delivery mechanism
- Understand the use of embedded assessments within a Moodle lesson for formative and summative assessment purposes
- Continue to see and experience explicit directions for completing activities
- Continue to construct their individual online courses

Module 3: Developing & Delivering Content – Online



Overview

In this module, teachers who are students in the course will continue to learn pedagogical aspects of online course development. This includes the activities themselves and best practices for the design and delivery of content and activities to elicit maximum student performance. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; Section C: Student Assessment; and Section D: Technology.

Module Components

Principals of Multimedia Learning – A lesson introducing Dr. Richard Mayer's 12

main principles for designing effective multi-media learning environments. Numerous short videos that demonstrate each principal in action are included within the lesson.

Writing Online Content – This lesson provides guidance and examples for writing engaging content at appropriate reading levels.

Construction Task #3

Task #3 Directions – Students develop a short lesson using the Moodle lesson tool and incorporating multi-media in a design that follows Mayer's principles of multi-media learning. The lesson must also include at least two different types of embedded assessments.

The Discussion Forum: An Art and a Science – This lesson takes teachers through the process of developing engaging, rigorous discussion forum prompts that require application of knowledge or concepts and that require higher-order thinking. Also, the necessity for explicit directions for participating in the discussion forum is investigated. Several discussion forum examples are shared.

Construction Task #4

Task #4 Directions – Students must create a rigorous discussion forum prompt along with detailed directions and expectations.

Objectives

- Provide information about, and demonstrations of, Dr. Richard Mayer's Principles of Multimedia Learning
- Describe and demonstrate effective online writing skills

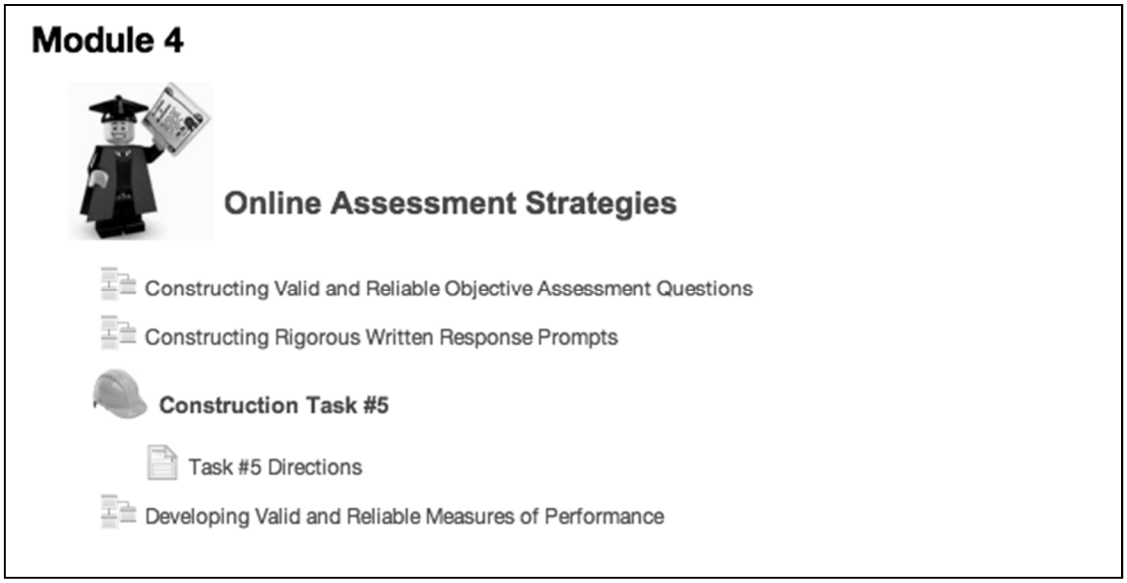
- Provide the opportunity for students to practice building an interactive lesson, with embedded assessments, using the Moodle lesson tool
- Describe and demonstrate the development of rigorous and engaging online discussion forums
- Provide the opportunity for students to develop a rigorous and engaging online discussion forum along with explicit directions and completion expectations
- Continue to model the use of the Moodle lesson tool
- Continue to model the provision of explicit directions
- Model multimedia learning principles

Outcomes

After completing Module 3, teachers who are students in the course will:

- Know and put into practice the principles of multimedia learning
- Understand and practice the elements of well-written online course content
- Understand and practice the development of engaging and rigorous discussion forums
- Continue to see and experience explicit directions for completing activities
- Continue to experience learning concepts that are delivered through interactive Moodle lessons
- Continue to construct their individual online courses

Module 4: Online Assessment Strategies



Overview

In this module, teachers who are students in the course learn how to add rigor and validity to objective assessment questions and to written response prompts. Developing valid and reliable assessment rubrics is also addressed. Teachers continue to develop components of their individual online courses. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; Section C: Student Assessment; and Section D: Technology.

Module Components

Constructing Rigorous, Valid, and Reliable Objective Assessment Questions – In this lesson, students learn to develop rigorous objective assessment questions. The design of objective assessment questions is also investigated as it relates to interpretation, visual and mental cognition, meaningfulness, valid distractors, and the effective use of language. Many examples and tips are provided.

Constructing Rigorous Written Response Prompts – This lesson continues the theme of rigorous development of assessment, this time for writing prompts. The student is provided with direction within the lesson as well as from websites that are linked to from the lesson. Numerous examples are provided.

Construction Task #5

Task #5 Directions – Students review the assessment questions created for Task #3 and make any needed revisions to reflect validity, reliability, and rigor.

Developing Valid and Reliable Measures of Performance – The construction of rubrics is the topic of this lesson, with instruction provided on validity, attributes, determining point values, and weighting of scores. Examples are provided.

Objectives

- Provide direction on the development of rigorous, valid, and reliable objective assessment questions
- Provide direction on the development of rigorous and valid written response prompts
- Provide direction on the development of valid and reliable rubrics for scored activities and assessments
- Provide teachers with the opportunity to evaluate previously constructed assessment questions for rigor, validity, and reliability
- Continue to model use of the Moodle lesson tool
- Continue to model the provision of explicit directions
- Continue to model multimedia learning principles

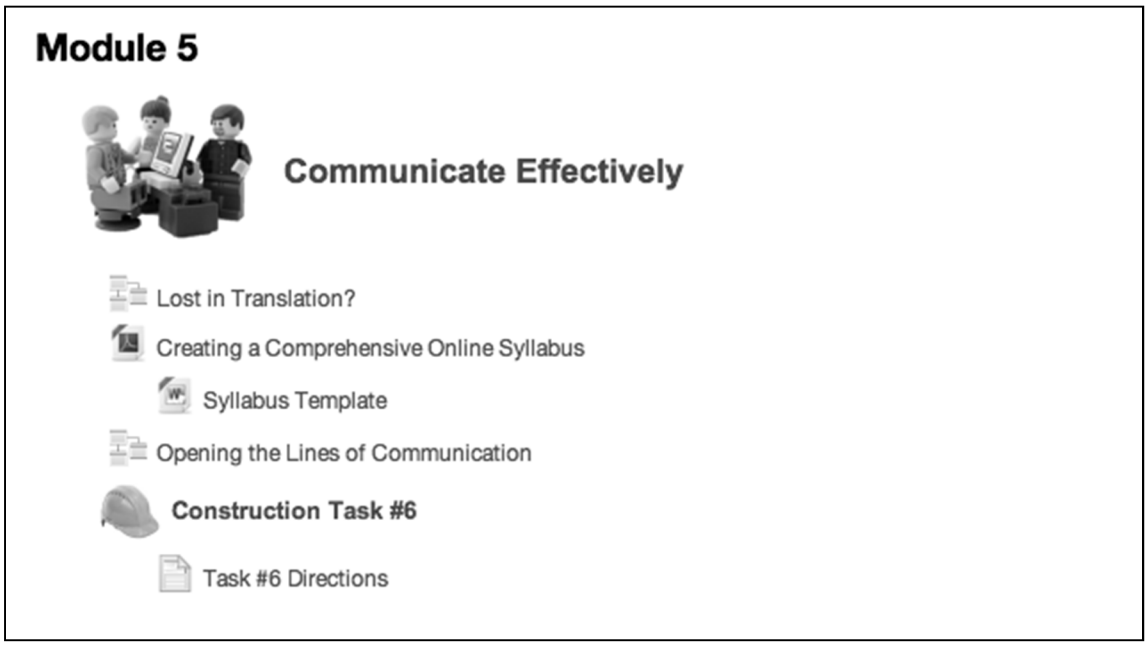
- Continue to model various methods of content delivery

Outcomes

After completing Module 4, teachers who are students in the course will be able to:

- Identify and incorporate components of rigorous, valid, and reliable objective question design
- Identify and incorporate components of rigorous and valid written response prompts
- Understand elements of a quality rubric that reflects valid and reliable scoring methods.
- Demonstrate their understanding of rigorous, valid, and reliable assessment questions as they continue to construct their individual online courses
- Continue to construct their individual online courses

Module 5: Communicate Effectively



Overview

This module provides demonstrations of, and direction for, developing opportunities for student-student and instructor-student communication. Teachers who are students in the course are required practice the creation of forums used in the course resource area, for the purpose of communication. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; and Section D: Technology.

Module Components

Lost in Translation? – In this interactive lesson, teachers learn the importance of providing explicit directions, conveying appropriate **tone** in their writing/communication, and how to resolve conflict between students, that could arise in online discussions.

Creating a Comprehensive Online Syllabus – A PDF document that provides direction on creating an online syllabus.

Syllabus Template – A downloadable syllabus template to be used for xxxxx courses.

Opening the Lines of Communication – This lesson describes the importance of providing multiple venues for communication, particularly in the introductory or "resources" section of the course. How to establish an instructor presence is also described.

Construction Task #6

Task #6 Directions – Students create *Please Introduce Yourself* and *Ask the Instructor* forums for their individual course resource areas.

Objectives

- Provide direction on the development of explicit written directions for online activities and assessments
- Provide direction in engaging in and promoting lively, thought-provoking online discussion with students
- Provide direction, with examples, for appropriately addressing student conflict or inappropriate behavior in online discussions
- Provide direction on the portrayal of appropriate tone in communications
- Provide direction on establishing a presence in the course
- Provide direction on the development of a comprehensive course syllabus
- Continue to model use of the Moodle lesson tool
- Continue to model multimedia learning principles

- Continue to model various methods of content delivery

Outcomes

After completing Module 5, teachers who are students in the course will know that they must:

- Write explicit directions for online activities
- Use language and tone to communicate effectively with students
- Use Moodle communication tools to establish a presence in the course and to promote dialogue
- Appropriately address conflict or inappropriate behavior in online discussions
- Develop a comprehensive course syllabus

Module 6: Consider Curb Appeal

Overview

For this module, teachers who are students in the course are required to view the recording of a 60-minute webinar. Throughout this webinar, the facilitator discusses topics related to visual appeal, navigation, and accessibility in the construction of online

courses using the Moodle LMS. Through a discussion forum, teachers share their previous experiences making some of the design mistakes highlighted in the webinar. *iNACOL National Standards for Quality Online Courses (v2)*, Section A: Content; Section B: Instructional Design; and Section D: Technology.

Module Components

Webinar: "Moodle Design Disasters – Repaired" – A recording of a 60-minute webinar that addresses online course design issues including: item placement, font, color, navigation, readability, and compliance with the Americans With Disabilities Act (ADA).

Feedback – Moodle Design Disasters Webinar – A discussion forum provided for teachers to share their previous experiences making any of the design mistakes highlighted in the webinar.

Objectives

- Provide direction in the area of design elements for online courses, particularly when using the Moodle LMS
- Continue to model various methods of content delivery
- Provide an end-of-course opportunity for teachers to reflect upon online course design

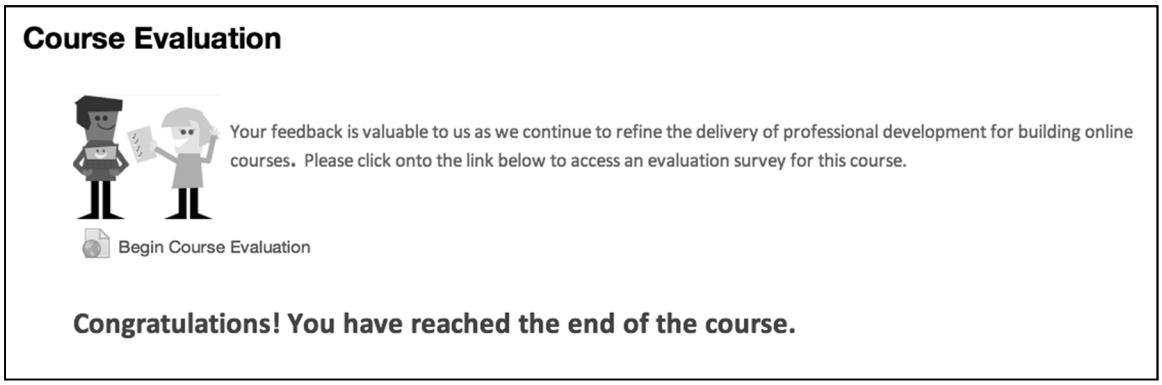
Outcomes

After completing Module 6, teachers who are students in the course will be able to:

- Identify a variety of mistakes made when designing an online course, and avoid making those mistakes when developing their own courses

- Understand accessibility issues and to use tools provided in the Moodle LMS to ensure their courses are accessible to individuals with disabilities

Course Evaluation



In accordance with the iNACOL *Standards for Quality Online Courses (Version 2),* Section E: Evaluation, teachers who are students in the course will complete an evaluation survey to provide feedback on the effectiveness of the course. The course evaluation survey will be provided using the Google Forms application. This allows for easy access for students, within the online course, Google Forms provides several ways for the administrator of the survey to look at the results. A link to the Google Form will be provided at the end of the course. The survey questions that appear in the in the course evaluation are provided below:

1. I found this course to be an appropriate introduction to developing an online course.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

2. Add any feedback or comments related to the previous question.

3. I found the timeframe for completing the course and associated project (12 hours) to be sufficient.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

4. Add any feedback or comments related to the previous question.

5. How did you go about completing the course and corresponding project?

   ☐ All at once (12 hours straight)
   ☐ Over a period of 2 consecutive days
   ☐ 2 full days, but not consecutive
   ☐ Various smaller time intervals throughout the summer

6. Add any feedback or comments related to the previous question.

7. I found the course content to be delivered in appropriate and interesting formats.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

8. Add any feedback related to the previous question.

9. The information and activities in this course expanded my understanding of the individual topics presented.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

10. Add any feedback or comments related to the previous question.

11. The information and activities in this course encouraged me to look at online course development from new perspectives.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

12. Add any feedback or comments related to the previous question.

13. The information and activities presented in this course increased my understanding of K-12 online course design.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

14. Add any feedback or comments related to the previous question.

15. The level of difficulty of this course was, for me-

Low: Way too easy!	1	2	3	4	5	High: Very difficult!

16. Add any feedback or comments related to the previous question.

17. The look of the course is attractive and the layout is easy to navigate.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

18. Add any feedback or comments related to the previous question.

19. Course expectations including due dates and completion criteria were adequately stated.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

20. Add any feedback or comments related to the previous question.

21. Overall, how would you rate this course?

Lowest Rating	1	2	3	4	5	Highest Rating

22. Why did you give the course this rating?

23. Optional Question: Overall, the course . . .

24. Optional Question: One thing I really liked about this course was . . .

25. Optional Question: One thing I disliked about this course was . . .

26. Optional Question: What was the most interesting or significant thing you learned in this course?

27. Optional Question: Please share any ideas you have for improving this course.

Appendix B: Interview Protocol

Questions Modified from the OTSEI Survey Tool

Research Question:

Based on their prior experiences designing and developing online courses without corresponding professional development, what are high school teachers' perceptions of the professional development needs of new teachers undertaking this task?

Time of Interview:

Date:

Interviewee alphabetic code:

Introductory Script:

Thank you for taking the time to allow me to interview you for this study. The purpose of the study is to identify the professional development needs of high school teachers tasked with online course design and development. To protect your identity, I will not refer to you by name during the interview. So that I may obtain a record of our conversation for subsequent transcription, I will be recording this interview. Do you have any questions before we get started? (Pause and answer questions posed by interviewee.) Please let me know when you are ready for me to begin recording. (When prompted by interviewee, begin to record the interview.)

Background Questions

Script: I would like to begin our interview by obtaining some background information.

1. How long have you been a classroom teacher?

2. Describe how you became involved with Open Campus PA.

   Additional Probes:

   a. How long have you been involved with Open Campus PA?

   b. What were the required qualifications for developing courses for Open Campus PA, when you joined the consortium as a course developer?

   c. Describe your familiarity with standards (iNACOL or other) for quality

online courses, when you first endeavored to develop your course.

3. What course(s) have you developed so far?

   Additional Probe:

   a. How many times have you facilitated the course(s)?

4. What previous experience did you have as an online learner?

   Additional Probe:

   a. How might that previous experience have shaped your approach to developing your own online course?

Online Course Content Development

Script: For the following questions, I'm looking for your earliest experiences with online course development for the Open Campus PA consortium.

1. Describe your familiarity with the content/subject matter of the course(s) you were tasked to develop.

   Additional Probe:

   a. Describe your previous experience teaching this topic in the face-to-face classroom.

2. How did you begin the process of preparing content and teaching materials for online delivery?

   Additional Probe:

   b. What, if any, help or advice did you receive, and from where did that come?

3. How did you go about incorporating rigor into your online course content?

Additional Probe:

a. What is an example (or examples) of rigor that you incorporated into your online course?

4. What types of assessments did you originally include in your online course?

Additional Probe:

a. What is an example of an assessment you designed specifically for your online course?

5. What (if any) professional development, specifically in the area of content development (content, rigor, assessment), should, in your opinion, be provided to future course developers?

Additional Probe:

a. What is your perception regarding the best way for teachers to engage in suggested professional development?

Online Course Pedagogy

1. What course design elements did you incorporate into your course to ensure consistent structure, ease of navigation, and accessibility?

Additional Probe:

a. Where did you learn about these design elements?

b. In your opinion, what course design elements warrant targeted professional development for individuals new to developing an online course?

c. What is your perception regarding the best way for teachers to engage in

suggested professional development?

2. What types of written instructions did you provide within your course, to help facilitate student engagement and completion of course activities?

   Additional Probes:

   a. When did you determine the necessity for incorporating explicit written instructions?

   b. What is your perception of professional development needs for writing and incorporating instructions, in an online course?

   c. What is your perception regarding the best way for teachers to engage in suggested professional development?

3. How did you maintain communication with students?

   Additional Probe:

   a. How and how often did you provide feedback on student work?

   b. What did you do to establish a presence in your online course?

   c. What did you do to encourage students to communicate with one-another?

4. How did you manage the pace of your online course, including keeping students on-track and expeditiously grading and returning submitted assignments?

   Additional Probes:

   a. At what point did you become fully aware of the particular tasks involved With managing an online course?

   b. In your opinion, what (if any) professional development related to online course management should be provided to teachers new to the task of

online course development? Explain.

c. What is your perception regarding the best way for teachers to engage in suggested professional development?

5. How did you present and measure the attainment of the objectives and goals of your online course?

Additional Probes:

a. What, if any, modifications have you since made to the way you measure attainment of course objectives and goals?

b. Why did you make these modifications?

c. How did you determine that you didn't need to make any changes?

c. What do you perceive to be professional development needs for teachers new to online course development, in the area of presenting and measuring the attainment of course objectives and goals?

d. What do you perceive is the best way for teachers to engage in suggested professional development?

Online Course Technologies

1. Describe your level of expertise in employing digital media (PowerPoint, digital images, video, etc.) to effectively deliver course content and supporting materials?

Additional Probes:

a. What types of digital media were you previously comfortable with using, when you first began to develop your online course?

b. What types of digital media did you incorporate into your online course?

c. What types of digital media did you need to learn, specifically to include in your online course?

2. How did you determine which software and/or technology tools to use to convey your course content?

Additional Probes:

a. What is an example of a software or technology tool that you found was a good fit for conveying or helping to convey your course content?

b. What software or technology tools did you need to learn, specifically for developing your online course?

c. Describe your familiarity with all of the tools provided by the Moodle® LMS for delivery of content.

b. What Moodle® LMS tools did you generally use for content delivery, and why did you choose those tools?

3. In your opinion, what (if any) professional development related to technology tools, software, and the Moodle® LMS should be provided to new course developers?

Additional Probe:

a. What are your perceptions on the best way for teachers to engage in any suggested professional development?

Additional Insights

Is there anything you would like to add regarding your perceptions of professional development needs of teachers new to online course development, based on your previous experience?

Concluding Script:

Thank you so much for taking the time to thoughtfully answer these questions. Again, please know that your responses will remain confidential. Once this interview is transcribed, I will set up a time to review the transcript with you to make sure I have accurately captured your responses and the thoughts you intended to convey.