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Redesigning The Inacol Standards For K-12 Online Course Design

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REDESIGNING THE INACOL STANDARDS FOR K-12 ONLINE COURSE DESIGN

by

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CHAPTER 1 INTRODUCTION TO THE STUDY

Introduction

For over a century, distance learning has been a factor in the world of education. Distance education has changed with the technology of the times, shifting from postal mail to telephones to email. At the turn of the century, distance learning transformed yet again, moving the classroom into a virtual setting online. Currently, all 50 states offer some form of an online or blended distance learning opportunity in K-12 (Watson, Pape, Murin, Gemin, & Vashaw, 2014), with an estimated 4.5 million enrollments in online supplemental courses students (Gemin, Pape, Vashaw, & Watson, 2015). K-12 school districts continue to grow out their offerings. Both parents and student perceptions on the benefits are continually increasing, resulting in a higher demand for more programs (Project Tomorrow, 2013). This has led to an expansion of credit recovery, dual enrollment, and advanced placement courses (International Association for K-12 Online Learning [iNACOL], 2013).

When online courses were still in their infancy during the early 1990s, modifying design was not a major concern for adaptors, with little actual research completed in the area of K-12 online learning course design (Barbour, 2013; Barbour & Adelstein, 2013b). The research originally completed was limited in scope, focusing on specific programs, such as the Electronic Classroom of Tomorrow, Virtual High School Collaborative (VHS) (Zucker & Kozma, 2003) or the Centre for Distance Learning and Innovation (CDLI) (Barbour, 2005a, 2005b; Barbour 2007a). Many standards in design have come to the forefront. Larger online schools like the VHS have developed their own standards for course design. Smaller schools end up relying on the work of educational organizations such as the Southern Regional Education Board (SREB), Quality Matters (QM), the National Educational Association (NEA), the International Society for

Technology and Education (ISTE), iNACOL and others. Notably, QM and VHS have at least minimal research published testing the validity (QM, 2005; Zucker & Kozma, 2003). The QM standards, however, are proprietary, which is why educational institutions lean towards publically available standards, such as those provided by iNACOL. The main drawback is that iNACOL does not have published research regarding reliability and validity.

K-12 Online Course Design Standards

Standards related to K-12 online course design are relatively new, and there is limited amounts of academic literature that only focus on only a handful of the different sets of standards. For example, one of the first attempts to create standards comes from the VHS collaborative. Twenty-nine Internet courses or 'netcourses' were offered through 27 schools across 10 states for the 1997-98 school year (Kozma, Zucker, Espinoza, Young, Valdes, & Schools, 1998). The VHS teachers were also responsible for the design of the course, which is why staff was required to attend the Teachers Learning Conference. The 25-week graduate level course helped set standards and expectations for all instructors in course design (Zucker & Kozma, 2003). To help enforce standards further, the NetCourse Evaluation Board (NCEB) was established in 1998. Thirty instructional standards grouped in six distinct areas were set to guide design. Finally, an external expert panel was created to review the content of each course. This expert panel, consisting of six individuals with a variety of educational expertise, spent nearly half a year rewriting the final review standards (Yamashiro & Zucker, 1999). These 19 course quality standards were created in 1999, which were based on the original NCEB standards from the year before (Espinoza, Dove, Zucker, & Kozma, 1999).

The MarylandOnline (MOL) consortium was established in 1999 to help higher education online programs work collaboratively with like-minded institutions. In 2003, MOL

was awarded a three year grant from the U.S. Department of Education to create a rubric for quality online course design, dubbed QM. In 2005, QM released the first draft of their post-secondary standards supported by available research literature (QM, 2005). These standards accompanied a design rubric that consisted of eight general standard areas, which included:

1. course overview and introduction,
2. learning objectives,
3. assessment and measurement,
4. resources and materials,
5. learner engagement,
6. course technology,
7. learner support, and
8. accessibility (Legon & Runyon, 2007).

Since its inception, updated standards have been continuously compared against both current literature and the Council for Higher Literature Education Accreditation standards for distance learning (Legon, 2006; QM, 2005). In 2010, QM, working with the FLVS, created their 6-12 rubric – that was later revised in 2013 as the *QM K-12 Secondary Rubric* (Barbour, Clark, DeBruler, & Bruno, 2014). The K-12-specific standards borrow from those promoted by iNACOL, the Partnership for 21st Century Skills, and the SREB (QM, 2016a). Regardless if the course is in the K-12 or higher education environment, after creation of an online course, there was a peer review process using the QM rubric that is carried out by certified QM experts. The QM program continues to this day with nearly 4,000 courses certified through their rubric and review system (QM, 2014).

The SREB was originally formed in 1948 by a joint group of multiple southern states. Their goal of advancing public education began to focus on the online environment in 2006 with the *Standards for Quality Online Courses* report. Working with experts from the 16 SREB states, the standards were created to give guidance in the areas of course content, instructional design, student assessment, technology, and course evaluation and management (SREB, 2006a). Each standard included multiple elements with possible indicators. This coincided with the *Checklist for Evaluating Online Courses* (SREB, 2006b). The checklist used a basic three-point scale (i.e., 1 = meets criteria, 2 = partially meets criteria, and 3 = does not meet criteria) to determine if the course met each element. These two documents would become the basis for the next major non-proprietary set of standards.

The iNACOL *National Standards for Quality Online Courses* are one of the most popular standards currently in use today (Barbour et al., 2014). First released in 2007, iNACOL and their team of experts based their own standards off the SREB standards from 2006 – with an addition due to iNACOL's involvement with the Partnership for Twenty-First Century Skills initiative (NACOL, 2007). Taking feedback and reviews into account from multiple organizations, including the California Learning Resource Network and the Texas Agency's Texas Virtual School Network (Smith, Bridges, & Lewis, 2013), iNACOL eventually updated the standards in 2011 (iNACOL, 2011a). The standards were used to create a four-point rating scale (i.e., absent, unsatisfactory, somewhat satisfactory, satisfactory, and very satisfactory) rubric in five areas of content (i.e., instructional design, student assessment, technology, and course evaluation and support). The current standards are being adopted by a variety of jurisdictions across the country. For example, the State of Michigan uses the standards to review courses offered in a statewide virtual schooling catalogue (Michigan Virtual University, 2016). In a similar fashion, the

California Learning Resource Network has used the iNACOL standards as a part of their online course review to determine whether courses meet specific requirements for the University of California (Barbour et al., 2014).

The four organizations described above are certainly not the only players when it comes to online course design standards, allowing designers a choice in how they proceed. However, as described briefly above, not all standards are created equal. Both the VHS *Course Standards Rubric (Revised)* and the QM standards were developed using various research processes to ensure the validity and reliability of their standards. Further, the QM standards are proprietary – meaning there would be a monetary cost and required formal training if an online course designer wished to use their material. It is therefore not surprising to see K-12 online course designers, schools, districts, and even states look towards the free, non-proprietary standards of iNACOL when considering the adoption of standards for online course design. At present, this list of jurisdictions that have adopted the iNACOL *National Standards for Quality Online Courses* include Florida, Ohio, Texas, Michigan, and California (Barbour et al., 2014). Yet even with the popularity of the current iNACOL standards, to date there has been no research published that has examined the validity and/or reliability of the standards, or the associated rubric connected to those standards.

Methodology

When looking to examine the validity and reliability of instruments used to review standards, a variety of studies have generally followed a multi-step approach that consisted of a literature review, expert review, and field test in real world situations (Stellmack, Konhein-Kalkstein, Manor, Massey, & Schmitz, 2009; Thaler, Kazemi, & Huscher, 2009). For example, Aladwani and Palvia (2002) began with a review of literature, followed by an expert review of

the rubric elements to test the content validity of their instrument to measure user-perceived quality of web-based interfaces and applications. In this example, the authors were interested in measuring construct validity and reliability during the field test of the rubric in step two, and finally concluded using a multitrait-multimethod matrix approach by comparing different rubric user groups. Additionally, Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, and Marczynski (2011) used a similar method for testing their survey instrument to assess a student's readiness to learning in an online environment. The instrument was initially based off of a review of the literature to test content validity. Next, a survey was given to a panel of experts for review to test content and face validity of the instrument. It was further field tested by participants on both a small and large scale to test translation and criterion-referenced validity. In another example, Walker and Fraser's (2005) development of an instrument to assess distance education learning environments in higher education also utilized a literature review, expert panel and field testing.

As suggested above, the type of validity and reliability tested varied by study. For example, when examining the validity of the *International Quality of Life Assessment* (*IQOLA*), numerous tests were implemented (Gandek & Ware, 1998). These tests included reviewing content validity by testing the *IQOLA* against previous standards, construct validity using convergent and discriminant validity in a multitrait-multimethod approach, and criterion validity by comparing the *IQOLA* against a previously validated instrument that studied the same concepts. To review the *Online Educator Self-Efficacy Scale*, Yang, Hung, and Blomeyer (2013) examined the content validity (i.e., research-based creation of the tool), construct validity (i.e., use of the principle components analysis), concurrent validity (i.e., correlating with other proven instruments) and reliability (i.e., internal consistency). The common theme amongst the studies

mentioned was a need to test for validity and reliability. The type just depended on what route made sense to the researchers.

My dissertation was conducted in three phases consisting of a literature review, expert review, and a field test of the revised rubric. Phase one tested the content validity of the iNACOL *National Standards for Quality Online Courses* by comparing each element to current literature. The process was completed through a basic literature review, a process that Ferdig, Cavanaugh, DiPietro, Black, and Dawson (2009) undertook with the iNACOL (2011b) *National Standards for Quality Online Teaching*. Phase two included three rounds of expert review to further test the content validity of the revised rubric. McNamara (1996) suggested that experts should be used to develop, determine and test the rubric (as cited by Allen & Knight, 2000). Phase three saw a rubric based on the revised standards field tested with current online K-12 courses to determine its reliability. As Fowler (2009) noted, "reliability ensures that an instrument provides consistent results across comparable situations" (as cited by Dray et al., 2011, p. 32). While each phase was able to successfully test for appropriate validity and reliability, there were issues during the study that needed to be overcome.

Due to a variety of constraints (i.e., a small time frame, just one researcher), my dissertation followed the general steps of the larger studies mentioned above, but on a significantly smaller scale. For example, when testing for validity I only examined the content validity. It was important in both phases to review how the elements of each standards reflected the content it was designed to measure. Constraints of the study did not allow to test the construct through convergent and discriminant validity. The dissertation study did examine the inter-rater reliability of the instrument in phase three. The use of multiple raters, especially those who had been trained to use the rubric, should relay an accurate test of reliability (Penny,

Johnson, & Gordon, 2000). As my pool of reviewers was limited, I had to scale down testing reliability to a more a realistic level (as more reviewers would give a stronger indication of reliability).

Dissertation Overview

This dissertation follows the manuscript format. Manuscript one is a literature review that compares the original iNACOL *National Standards for Quality Online Courses* to the existing literature and research. Manuscript two discusses the three rounds of expert review to create the revised rubric for K-12 online course design. Manuscript three covers the field test to measure the inter-rater reliability of the revised rubric using current K-12 online courses. Manuscript four is an overview of the entire dissertation process written for a practitioner publication. Each of the manuscripts is described in the following sub-sections. The four manuscripts are followed by a general discussion of the complete dissertation process.

Building Better Courses: Examining the Content Validity of the iNACOL National Standards for Quality Online Courses

Chapter two contains the first manuscript, which described the process and results of the literature review that examined content validity of the iNACOL *National Standards for Quality Online Courses*. Using the Wayne State University's library and subscribed databases, over a year was spent compiling contemporary research. The manuscript was broken into the five main sections of the iNACOL standards, with each of the 52 elements from all subsections listed and compared to the existing research and literature. While K-12 literature was primarily used, higher education and other relevant literature were also applied when K-12 online learning literature did not exist.

The results of the literature review showed that the elements were either fully or partially supported by research and literature. Sections B through E were mainly supported by K-12

literature, while Section A was supported by a mixture of K-12 and higher education literature. Based on the review of the literature, it appeared that there was an omission from the standards by not taking student motivation into account. One limitation of the first manuscript was examining each element in the depth required due to traditional journal length constraints. The manuscript was published in the online, open access *Journal of Online Research* (see Adelstein & Barbour, 2016).

Improving the K-12 Online Course Design Review Process: Experts Weigh in on iNACOL National Standards for Quality Online Courses

Chapter three contains the second manuscript, which details the second phase of testing content validity through expert review. Eight experts in various areas of online education were selected. These individuals made up two separate panels, each of which consisted of a researcher, administrator, designer and teacher – all of whom were directly involved with K-12 online learning. The expert reviews took place over three rounds. The first round presented the results of phase one and suggestions in rubric form via e-mail. Experts rated each element and phase one suggestion on a 1-3 Likert scale as it pertained to course design. The experts also wrote comments or suggestions of their own. Round two showed the experts their average rating, as well as their comments and suggestions. For the elements that were rated poorly during the first round, experts were asked to mark as (K)eep, (D)elete, (C)ombine, or (R)evise. The third round of expert review was conducted via *Google Hangouts* with both expert panels. During this round all of the experts' suggestions, comments and ratings were discussed on elements that had not reached consensus. Finally, the comments and suggestions from the experts were used to create a newly revised rubric specifically for K-12 online course design.

Sections A through D were accepted as a whole by the experts, with some revisions and few minor deletions. Section E saw the most revision from the experts, with the group agreeing

that the elements simply did not pertain to K-12 online course design. While the process helped narrow the scope of the broad iNACOL *National Standards for Quality Online Courses*, there is room for additional work in this area. For example, the expert panel was limited to just eight members, which could have been broadened to allow for more input. It was also recommended to increase the amount of face-to-face discussion as opposed to e-mail communication, as much of the actual refinement of the existing standards occurred during the real-time session. The manuscript was submitted to the online, open access *International Review of Research in Open and Distance Learning*.

Redesigning Design: Field Testing a Revised Design Rubric Based off iNACOL Quality Course Standards

Chapter four contains article three which discussed the final phase of testing the inter-rater reliability of the revised rubric. Four pairs of K-12 online educators were recruited to review the rubric against current K-12 online courses. A sample course and examples were sent to each reviewer. *Google Hangouts* were conducted with the pairs to discuss their sample course rubric ratings and to give reviewers a better sense of direction. Each pair was then assigned five online courses from two different content providers, which were reviewed individually. If results showed a significant level of agreement, then the rubric would be considered well-designed.

The results of exact matches across all reviewers was at 62.9%, which is below the acceptable percentage for reliability (Neuendorf, 2002). Still, there were lessons to take away. This was a first field test for a newly revised rubric on a rather small scale. There were individual elements that could be considered reliable, with others that can be improved upon. Overall, the elements that had an exact match or were only off by one score (i.e., 25%) outweighed elements that differed by two (i.e., 12.1%). The manuscript was submitted to the online, open access *International Journal of E-Learning & Distance Education*.

Redesigning Design: Streamlining K-12 Online Course Creation

Research often has a difficult time reaching classroom teachers for a variety of reasons. While isolation in the class or lack of time are significant factors, it also comes down to the presentation of the material (Parish, 2005). When done in a negative manner or in a way that doesn't promote the advantages, teachers tend not to act on or adopt research-based practices. However, as Reeves (1995, 1997) noted, researchers at publicly funded institutions have a social responsibility to conduct research into issues that could improve the quality of life or education for individuals. One of the ways in which researchers can seek to ensure their research is socially responsible is to communicate the results of their research directly to practitioners.

Chapter five contains the final article, which summarized the entire process as well as discussing the lessons learned throughout. As with the first article, the space constraints added to the challenge of writing an in-depth review. The manuscript was submitted to the *MACUL Journal* for publication, with the intention of appealing directly to classroom teachers.

Dissertation Summary

Chapter six offers recommendations and suggestions for future research. While each of the individual manuscripts provides a summary of the results of that phase of the study, as well as implications for practice and suggestions for future research based on the outcomes of that phase, it is also important to consider these aspects from the perspective of the overall dissertation study. The overall dissertation summary will examine all the phases as a single study, describing the entire process. Furthermore, the implications of this dissertation study will be discussed. While the overall findings for the final phase were not found to be reliable, there were individual elements within the rubric that were reliable based on the field test. These elements could be a suitable starting point for a further revision, which may include the

consideration or inclusion of other standards in addition to the iNACOL *National Standards for Quality Online Courses*. The chapter will conclude with suggestions for future research.

CHAPTER 2 BUILDING BETTER COURSES: EXAMINING THE CONTENT VALIDITY OF THE INACOL NATIONAL STANDARDS FOR QUALITY ONLINE COURSES[1]

Abstract

In 2011 iNACOL released the second iteration of the *National Standards for Quality Online Courses*. These standards have been used by numerous institutions and states around the country to help design and create K-12 online courses. However, there has been no reported research on the validity of the standards or the accompanying rubric. This study compares all elements under the five main standards to contemporary K-12 or higher education online course literature. The research concludes with suggested changes and additions, as well as an explanation as to how the research connects to a larger study on K-12 online course design.

Introduction

There are a variety of popular standards that designers can look to when creating an online course. The Virtual High School (VHS) collaborative, for example, created the NetCourse Evaluation Board in 1998 to reinforce the designs coming out of their 25-week graduate level course (Kozma, 1998). In 2003, work began on the original Quality Matters (QM) rubric, which used a peer-review process carried out by certified QM experts (QM, 2014). The Southern Regional Education Board (SREB) unveiled standards in 2006, although the release of these standards did not describe any specific process on how the standards were developed (SREB, 2006). One year later, The International Association for K-12 Online Learning (iNACOL) released their own standards, largely based on the SREB rubric, as well as the organization's involvement with the Partnership for 21st Century Skills initiative (North American Council for Online Learning, 2007).

[1] Published in the *Journal of Online Learning Research* as Adelstein & Barbour (2016).

This article focuses on the first stage in a larger effort to validate the iNACOL *National Standards for Quality Online Courses* in regards to online course design. The individual standards – as well as the processes behind their development – were all considered as the basis for this study. However, it was decided that this research should be based on popular, current, and non-proprietary standards to allow for the greatest impact on the field. In this article we examine the initial development of the iNACOL standards. This examination is followed by a systematic discussion of each aspect of the iNACOL standards and whether there is research literature in the field of K-12 online learning, and to a lesser extent the larger field of online learning. Finally, suggestions are provided with the goal of improving the standards.

Literature Review

The most recent and some of the most widely used national standards on course design in K-12 online learning are those from iNACOL (Barbour & Adelstein, 2013a). Originally released in 2007 the standards were used to create a 0-4 point scale rubric in five areas (i.e., content, instructional design, student assessment, technology, and course evaluation and support). Each of these five sections is further divided into multiple subsections. Under each subsection, the rubric provides specific elements to answer the overlying question, "To what extent does the course meet the criteria in this area?" (iNACOL, 2011a, p. 8). The iNACOL *National Standards for Quality Online Courses* are a widely used design instrument currently implemented around the country (Barbour, Clark, DeBruler, & Bruno, 2014). For example, California, Michigan and Texas have selected the iNACOL standards for their statewide online initiatives (iNACOL, 2015; Michigan Department of Education & Michigan Virtual University, 2015). State law in Michigan (i.e., section 21f) allows K-12 students to enroll in online courses, and online courses

deposited in the statewide catalog provided by Michigan districts must be reviewed against the current iNACOL standards (Michigan Virtual University, 2016).

Following the release of their quality online course design standards in 2007, iNACOL began the process of updating this initial effort by utilizing feedback from different organizations on the original standards (iNACOL, 2011a). Updates continued from a process of review work completed by the California Learning Resource Network and the Texas Agency's Texas Virtual School Network as they utilized the original standards to evaluate online course content (Smith, Bridges, & Lewis, 2013). In addition to these efforts, iNACOL also reconvened an expert panel in the areas of course development, instructional design, professional development, research, education, and administration (iNACOL, 2011a). The original standards were eventually updated in 2011 based on feedback from these various efforts, although it should be noted that there were no details of the results of these processes ever publicly released or published.

Despite the popularity of the current iNACOL *National Standards for Quality Online Courses*, there has been no research published that reports the validity of the standards or the published rubric that measures those standards (Barbour, 2013). The validation process is often begun through a basic literature review to examine the support the standards enjoy in the research, work that Ferdig, Cavanaugh, DiPietro, Black, and Dawson (2009) undertook with the iNACOL *National Standards for Quality Online Teaching*. However, as noted by Ferdig and his colleagues, the literature available was limited due to the fact that most research was about traditional classrooms and not online courses. Further, Barbour and Reeves (2009) indicated that there was a much greater base of literature focused on adult populations, as opposed to the K-12 environment.

To date, one of the only research-based initiatives examining the quality of online course content has been the QM program. The original QM standards, which focused on higher education and included 40 specific standards grouped under eight general standards (Legon & Runyon, 2007), were developed through a U.S. Department of Education's Fund for the Improvement of Postsecondary Education grant (Shattuck, 2007). These higher education standards have been supported by a full review of the published research literature in post-secondary education (Shattuck, 2013).[2] The rubric associated with these standards has been utilized in hundreds of thousands of instances, and have been tested for reliability and validity (Shattuck, 2015a; Shattuck, Zimmerman, & Adair, 2014). In 2010 QM partnered with the Florida Virtual School to develop and begin testing for reliability and validity a K-12 version of their standards and rubric (QM, 2016a), which included its relationship to K-12 research (Shattuck, 2015b) and the existing iNACOL standards (QM, 2015). While QM's annual subscription fee is beyond the fiscal resources of many K-12 programs, the process that they have undertaken to validate their standards has not be replicated by any other set of online learning standards. All of this begs the question, are the iNACOL *National Standards for Quality Online Course* supported by existing research?

Methodology

The current study examines the construct validity of the iNACOL (2011a) *National Standards for Quality Online Courses* using contemporary research. Validity attempts to answer the question, "Does the assessment measure what it was intended to measure?" (Jonsson & Svingby, 2007, p. 136). More specifically, content validity attempts to show how elements of an assessment are relevant and representative to the construct being measured (Haynes, Richard, &

[2] See https://www.qmprogram.org/qmresources/research/ for a complete listing of research related to each individual standard.

Kubany, 1995). It has been argued that content validity can be determined in a variety of ways, such as a logical study of content or the use of quantitative scores (Fitzpatrick, 1983). In this instance, contemporary research is compared to the rubric associated with the iNACOL standards to determine if support for each of the standard elements exists within the research literature.

Contemporary research was collected through Wayne State University's library and connected databases, including *Education Resources Information Center, EdITLib Digital Library*, *ProQuest*, and *Google Scholar*. Wayne State University faculty and other recommended scholars were also consulted to identify relevant and related literature. Numerous search terms were used that included, but were not limited to: K-12, online learning, online design, virtual school, course design standards, and e-learning. As research regarding K-12 online course design has been somewhat limited over the years (Barbour, 2013), often with a focus on individual programs, the search included K-12 online learning literature that was both research-based and also not based on research. In some instances, the search was expanded to include online learning with adult populations when there was a lack of K-12 research available (this was often with a specific focus on the individual element). Given the number of elements contained in the iNACOL *National Standards for Quality Online Courses*, the goals were to find 1) two to three supporting pieces of K-12 online learning research, 2) two to three supporting pieces of K-12 online learning literature, 3) two to three supporting pieces of online learning research, or 4) some combination of the previous items.

Results

To answer the guiding question of validity, each of the standards from five areas of the iNACOL rubric were reviewed using the same format. Each section begins with a brief overview

of the standard. Immediately following is a table that lists the subsections with their individual elements linked to the associated citation(s). Following the table, each of the elements are discussed in relation to the contemporary research.

Section A: Content

"The course provides online learners with multiple ways of engaging with learning experiences that promote their mastery of content and are aligned with state or national content standards" (iNACOL, 2011a, p. 8).

Section A of the iNACOL course design standards contained four sub-sections, which included 13 elements.

Table 2.1.

Academic Content Standards and Assessments	
The goals and objectives clearly state what the participants will know or be able to do at the end of the course. The goals and objectives are measurable in multiple ways	
K-12 Literature	*Adult Population Literature*
Barbour (2007a) Morris (2002) Yamashiro & Zucker (1999)	
The course content and assignments are aligned with the state's content standards, common core curriculum, or other accepted content standards set for Advanced Placement courses, technology, computer science, or other courses whose content is not included in the state standards.	
K-12 Literature	*Adult Population Literature*

Fulton (2002) Porter, McMaken, Hwang, & Yang (2011)	
The course content and assignments are of sufficient rigor, depth and breadth to teach the standards being addressed.	
K-12 Literature	*Adult Population Literature*
Thomson (2010)	Anderson (2004)
Information literacy and communication skills are incorporated and taught as an integral part of the curriculum.	
K-12 Literature	*Adult Population Literature*
Morris (2002)	American Management Association (2012)
Multiple learning resources and materials to increase student success are available to students before the course begins.	
K-12 Literature	*Adult Population Literature*
Elbaum, McIntyre, & Smith (2002)	McKenzie, Perini, Rohlf, Toukhsati, Conduit, & Sanson (2013)
Course Overview and Introduction	
A clear, complete course overview and syllabus are included in the course.	
K-12 Literature	*Adult Population Literature*
Barbour (2007a) Zucker & Kozma (2003)	

Course requirements are consistent with course goals, are representative of the scope of the course and are clearly stated.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Zucker & Kozma (2003)	
Information is provided to students, parents and mentors on how to communicate with the online instructor and course provider.	
K-12 Literature	*Adult Population Literature*
DiPietro, Ferdig, Black, & Preston (2008) Fulton (2002) Morris (2002)	
Legal and Acceptable Use Policies	
The course reflects multi-cultural education, and the content is accurate, current and free of bias or advertising.	
K-12 Literature	*Adult Population Literature*
Fulton (2002) Hernandez (2005)	
Expectations for academic integrity, use of copyrighted materials, plagiarism and netiquette (Internet etiquette) regarding lesson activities, discussions, and e-mail communications are clearly stated.	
K-12 Literature	*Adult Population Literature*

DiPietro et al. (2008) Elbaum et al. (2002)	King, Guyette, & Piotrowski (2009)
Privacy policies are clearly stated.	
K-12 Literature	*Adult Population Literature*
Children's Online Privacy Protection Act (1998) Family Educational Rights and Privacy Act (2011) Micheti, Burkell, & Steeves (2010)	
Instructor Resources	
Online instructor resources and notes are included.	
K-12 Literature	*Adult Population Literature*
Davis (2003) Morris (2002) Zucker & Kozma (2003)	
Assessment and assignment answers and explanations are included.	
K-12 Literature	*Adult Population Literature*
Zucker & Kozma (2003)	Roby, Ashe, Singh, & Clark (2013)

Subsection: Content Standards and Assessments. Section A began with clearly stated goals and objectives, noting that both should be well-defined with multiple means of measurement. This was consistent with the advice from several studies into K-12 and secondary

distance education. For example, in his book discussing the design of Wichita public schools online program, Morris (2002) advised that, to start, every teacher should create an orientation video that discusses assignments, due dates, expectations, and many additional items. The information was posted and available to students throughout their time in the course. Similarly, Yamashiro & Zucker (1999) reported a panel review of online courses delivered by the VHS, which focused on ensuring that "benchmarks and models of performance [were] provided and made up front" (p. 13). Barbour's (2007a) interviews with course developers from the Center for Distance Learning and Innovation (CDLI) reinforced the importance of clear instructions and expectations for the students by naming the concept as one of his seven principles of creating effective web-based content.

The goals and objectives should also be aligned to state and common core standards, as well as other relevant sets of standards not necessarily included by the states, such as Advanced Placement and technology classes. Fulton (2002) suggested that alignment with state standards is one of a handful of traditional indicators that could help policymakers evaluate the quality of online courses. There are also other reasons to consider standards alignment. For example, the introduction of Common Core State Standards, as explained by Porter et al. (2011), could bring K-12 schools shared expectations for all students, a greater focus on core areas as seen in international curriculum, allow states to focus on other areas in local education, and, possibly, improve the quality of common assessments.

After alignment, the rigor, depth, and breadth of assignments are reviewed. There does not have to be a drastic shift from what works in traditional classrooms. Teachers interviewed by Thomson (2010) believed online and traditional setting content could be similar, but it was how students interacted with the material that would differ, specifically noting self-motivation as a

barrier. This was further enforced by Anderson (2004), who theorized that interaction was what needed to be considered to ensure depth of learning, noting that "sufficient levels of deep and meaningful learning can be developed as long as one of the three forms of interaction (student–teacher; student-student; student-content) is at very high levels" (p. 66).

High levels of interaction directly tie into the importance of communication and information literacy skills. This notion is not necessarily new, as Morris (2002) required the inclusion of a communication area for the Wichita online program, noting it was important for both the student and teacher to understand expected communication responsibilities. This element also had strong support not just in K-12 education, but in the business world as well. For example, the American Management Association (2012) was a strong advocate for communication and information literacy skills being taught in the classroom. Companies surveyed noted that critical thinking, communication, collaboration, and creativity were required of graduates entering the workforce.

The first subsection concluded with discussing student access to resources before the course even begins, a notion with support in both K-12 and higher education research. Advanced information, however, can come in a variety of formats, all with their own unique advantages. For an online course, it is appropriate to share out hardware requirements, resources, dates, times, and policies (Elbaum et al., 2002). It would also be beneficial to offer pre-class activities, allowing for a grasp of the topic before it is even discussed (McKenzie et al., 2013), which can lead to a deeper understanding.

Subsection: Course Overview and Introduction. Successful designers understand the importance of a clear syllabus and clearly defined course requirements that are in line with course goals. The VHS review board took this position, as it considered the syllabus a

characteristic of a 'high quality' rated course (Zucker & Kozma, 2003). Elbaum et al. (2002) recommended the designer first list course objectives and then follow with activities and learning cycles built around the objectives. This method would guarantee the syllabus to line up with course goals so students know what is coming their way. This specific method of design neatly falls in line with the first of Barbour's (2007a) seven principles of creating effective web-based content for adolescent learners, which were developed based on interviews with asynchronous course content designers.

Keeping with delivering information, a course should indicate how communication between the students, parents, instructor, mentors, and course provider is managed. A strong push for clearly defined communication can be found at the K-12 level (DiPietro et al., 2008; Fulton, 2002; Morris, 2002). For example, the teachers interviewed by DiPietro et al. (2008) mentioned the importance of not just communication, but making use of a variety of channels (e.g., phone calls, email, and instant messaging). It was important for the teachers to have multiple ways for the students to connect with them and provide support when needed.

Subsection: Legal and Acceptable Use Policies. The third subsection considered a handful of issues that revolve around legislative regulations that would impact an online course, beginning with equality in the classroom. A successful online course will respect multicultural education, allowing for equal learning opportunities while keeping the content up to date and free of bias. This element has two distinct parts, the first of which is making sure that all students have access to the same learning opportunities. As noted by Fulton (2002), "any virtual school – public or private – that accepts public funding must guarantee that it does not discriminate by race, ethnicity, gender, disability, religion, or other categories protected by law" (p. 24). This can come in the form of state or federal regulations regarding educational equality (Hernandez,

2005). The second part of this element dealt with bias in the classroom, an important topic for designers to keep in mind. The very nature of an online course means geographical boundaries can become inconsequential, allowing for students with a variety of backgrounds to partake in the class.

The next element called for a code of conduct for the class. It should touch upon netiquette, plagiarism, and overall academic integrity. While the benefits of sending out policies to the students have been previously mentioned (Elbaum et al., 2002), teachers from the DiPietro et al. (2008) study specifically noted including a code of conduct and continuous monitoring of online behaviors. A specific code that outlines the boundaries of academic integrity can help in setting a proper tone for the course (King et al., 2009).

Related to a code of conduct, privacy policies should also be posted for students. Laws such as the Children's Online Privacy Protection of 1998 and the Family Educational Rights and Privacy Act of 2011 were designed to protect student information, and online courses need to adhere to these guidelines. However, it can be difficult to explain this to a young student, as policies written at advanced reading levels hinder the student from understanding their rights. It is no surprise, then, that children and teenagers prefer policies to be short, simple, and concise (Micheti et al., 2010). This is certainly not to say that privacy policies cannot be detailed; they just need to be clear, listing out the topics in a logical order.

Subsection: Instructor Resources. The final subsection of Section A looked to assure that the instructor had access to resources to help with the learning management system (LMS), as well as built-in course assessments, answers, and explanations. Unsurprisingly, support for courses in the form of design and material are important to educators in general (Roby et al., 2013), therefore, becoming a high priority in many K-12 online programs (Davis, 2003; Morris,

2002; Zucker & Kozma, 2003). Specific training within the LMS itself has helped Michigan Virtual School (MVS) and VHS educators gain a practical knowledge about their online space, allowing for opportunities to create resources educators will come to depend on (i.e., assessments and answers – Davis, 2003; Zucker & Kozma, 2003). For example, this was the rationale for the process of resource creation that was actually mandated as part of the Teachers Learning Conference, a required course for all VHS educators (Zucker & Kozma, 2003).

Section B: Instructional Design

"The course uses learning activities that engage students in active learning; provides students with multiple learning paths to master; the content is based on student needs; and provides ample opportunities for interaction and communication — student to student, student to instructor and instructor to student" (iNACOL, 2011a, p.11).

Section B of the iNACOL course design standards contained five subsections, which included 11 elements.

Table 2.2.

Instructional and Audience Analysis	
Course design reflects a clear understanding of all students' needs and incorporates varied ways to learn and master the curriculum.	
K-12 Literature	*Adult Population Literature*
DiPietro et al. (2008) Kapitzke & Pendergast (2005) Looi, Zhang, Chen, Seow, Chia, Norris, & Soloway (2011) Simpson & Park (2013)	

Course, Unit and Lesson Design	
The course is organized by units and lessons that fall into a logical sequence. Each unit and lesson includes an overview describing objectives, activities, assignments, and resources to provide multiple learning opportunities for students to master the content.	
K-12 Literature	*Adult Population Literature*
Barbour (2007a) Barbour & Adelstein (2013b) DiPietro et al. (2008)	
Instructional Strategies and Activities	
The course instruction includes activities that engage students in active learning.	
K-12 Literature	*Adult Population Literature*
Barbour & Adelstein (2013b) Selco, Bruno, & Chan (2012)	Chen, Lambert, & Guidry (2010) Hoic-Bozic, Mornar, & Boticki (2009)
The course and course instructor provide students with multiple learning paths, based on student needs that engage students in a variety of ways.	
K-12 Literature	*Adult Population Literature*
Christensen, Horn, & Johnson (2011) Horn & Stalker (2015) Packard (2013) Vander Ark (2012)	
The course provides opportunities for students to engage in higher-order thinking, critical reasoning activities and thinking in increasingly complex ways.	
K-12 Literature	*Adult Population Literature*

Murphy, Rowe, Ramani, & Silverman (2014)	
The course provides options for the instructor to adapt learning activities to accommodate students' needs.	
K-12 Literature	*Adult Population Literature*
Christensen, Horn, & Johnson (2011) Horn & Stalker (2015) Mastropieri, Scruggs, Norland, Berkeley, McDuffie, Tornquist, & Connors (2006) Packard (2013) Vander Ark (2012)	
Readability levels, written language assignments and mathematical requirements are appropriate for the course content and grade-level expectations.	
K-12 Literature	*Adult Population Literature*
Barbour (2007a) DiPietro et al. (2008)	
Communication and Interaction	
The course design provides opportunities for appropriate instructor-student interaction, including opportunities for timely and frequent feedback about student progress.	
K-12 Literature	*Adult Population Literature*
DiPietro et al. (2008) Reeves, Vangalis, Vevera, Jensen, & Gillan (2007)	
The course design includes explicit communication/activities (both before and during the first	

week of the course) that confirms whether students are engaged and are progressing through the course. The instructor will follow program guidelines to address non-responsive students.	
K-12 Literature	
Johnston & Barbour (2013)	
The course provides opportunities for appropriate instructor-student and student-student interaction to foster mastery and application of the material.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Rice (2012)	
Resources and Materials	
Students have access to resources that enrich the course content.	
K-12 Literature	*Adult Population Literature*
Cavanaugh (2013) Elbaum et al. (2002) Rice (2012)	

Subsection: Instructional and Audience Analysis. The first subsection of B focused on understanding the needs of your students and incorporating a variety of ways to learn the curriculum. Individualized instruction and differentiating are not new concepts in education. The ideas can be readily found in the K-12 online environment (DiPietro et al. 2008; Kapitzke & Pendergast, 2005; Looi et al., 2011; Simpson & Park, 2013). The challenge was trying to discover strengths and weaknesses of each participant in a student-centered environment where interaction from the instructor was minimal. Success has been found when the teachers consistently monitor the class, which is what occurred with Michigan virtual educators (DiPietro

et al., 2008). By reviewing students, the educators were able to discover learning styles and gaps, which was considered a best practice.

Subsection: Course, Unit and Lesson Design. The second subsection looked at the logical order of units, a posted overview outlining objectives, activities, and assignments, and the resources to allow multiple pathways for student success. While there was only one element mentioned in the second subsection, it contained individual requirements that should be reviewed separately. To start, course sequencing was beneficial to both the student and the designer, which is why it has been viewed as a vital pedagogical strategy for online education (DiPietro et al., 2008). It is also an area that was previously discussed in Section A (see "Subsection: Course Overview and Introduction).

Creating an overview or summary of the lessons can be helpful for students, especially those in nontraditional online courses, where asking a teacher to clarify can be a drawn out process (Barbour & Adelstein, 2013b). When Barbour (2007a) discussed the seven principles of online course design, one teacher in particular noted that he created notes and examples because a lot of his students "…were isolated, and knowing that they didn't have access to a [content-area] teacher readily whenever they wanted… so I tried to make the websites… compensate for that as much as I possibly could" (p. 103).

Subsection: Instructional Strategies and Activities. The first element suggested active learning should be considered as the course is designed. Active learning can be an important factor for student success, as it gives them a connection to the concepts being taught, which in turn allows for student-created content (Barbour & Adelstein, 2013b). Students involved with active-learning courses have readily shown higher scores on statewide exams (Selco et al., 2012). Active learning has also worked in higher education settings (Chen et al., 2010; Hoic-Bozic et

al., 2009), showing a connection to higher order and critical thinking skills, which tied directly into the third element.

Allowing for higher order and critical thinking is not a new concept in education. The concern is that engagement in critical thinking is minimal when adolescents are left to their own devices. However, if the classroom environment is set up to reinforce such behaviors, it can be promoted with the students (Murphy et al., 2014).

Both elements two and four shared similar ideas, discussing multiple pathways and adaptive activities, all based on students' individual needs. The concept of individualization was discussed above, which showed strong support in K-12 online learning). Differentiating lessons can yield powerful results (Christensen et al., 2011; Horn & Stalker, 2015; Packard, 2013; Vander Ark, 2012). For example, Mastropieri et al. (2006) showed that eighth grade science classes had comparatively higher scores on both unit and state exams than classes who stuck with traditional lecture and lab activities.

Finally, it is important to note that adapting can be more than just differentiating. The learner's skills are taken into consideration. Understanding students and designing appropriate lessons that target average or below average students (DiPietro et al., 2008) – with extension activities for those on the higher end (Barbour, 2007a) – will help curb confusion with the materials.

Subsection: Communication and Interaction. A key to success for online courses is communication. Without the advantage of face-to-face interactions, the course design must provide different opportunities for instructor-student discussion. Frequent and prompt feedback is supported in K-12 literature, noting that teachers should respond within a 48-hour period from submission of the assignment (Reeves et al., 2007). Not only does feedback keep motivation

levels high, but a long waiting period has the potential of lowering student engagement (DiPietro et al., 2008). This is important to consider, as keeping students engaged for an online course can be challenging. Even with high quality materials, the ability to have face-to-face debates, discussions, and role playing are seen as more attractive to students (Johnson & Barbour, 2013).

While teachers should be involved, it is important to let the students lead the conversation and for teachers to not take over discussion threads (Elbaum et al., 2002). This ultimately can help to form an online community. Working towards a strong community will naturally lead to collaboration activities, such as blogs, video conferencing, simulations, group projects, and jigsaw sharing (Rice, 2012).

Subsection: Resources and Materials. Proper resources will also help students foster mastery of a subject. The use of virtual manipulatives, for example, has garnered higher performance results in algebra courses that took advantage of this unique resource (Cavanaugh, 2013). This does not mean that traditional resources should be ignored, as hard copy materials can have a positive impact as well (Elbaum et al., 2002).

Resources can originate from multiple sources, which can be overwhelming for educators and designers not knowing where to even begin. Trusted sites, such as PBS or Scholastic, are an excellent place to begin the search (Rice, 2013). Educators should also search out teacher specific sites that link directly to appropriate media, simulations, and gaming that are readily available.

Section C: Student Assessment

"The course uses multiple strategies and activities to assess student readiness for and progress in course content and provides students with feedback on their progress" (iNACOL 2011a, p.14).

Section C of the iNACOL course design standards contained three sub-sections, which included seven areas of measurement.

Table 2.3.

Evaluation Strategies	
Student evaluation strategies are consistent with course goals and objectives, are representative of the scope of the course and are clearly stated.	
K-12 Literature	*Adult Population Literature*
DiPietro (2010) Zucker & Kozma (2003)	
The course structure includes adequate and appropriate methods and procedures to assess students' mastery of content.	
K-12 Literature	*Adult Population Literature*
Naidu (2013)	Palmer & Devitt (2014)
Feedback	
Ongoing, varied, and frequent assessments are conducted throughout the course to inform instruction.	
K-12 Literature	*Adult Population Literature*
Cavanaugh, Barbour, & Clark (2009)	
Assessment strategies and tools make the student continuously aware of his/her progress in class and mastery of the content.	
K-12 Literature	*Adult Population Literature*

Naidu (2013) Rice (2012)	
Assessment Resources and Materials	
Assessment materials provide the instructor with the flexibility to assess students in a variety of ways.	
K-12 Literature	*Adult Population Literature*
Morris (2002)	
Grading rubrics are provided to the instructor and may be shared with students.	
K-12 Literature	*Adult Population Literature*
Hall & Salmon (2003) Rice (2012)	
The grading policy and practices are easy to understand.	
K-12 Literature	*Adult Population Literature*
Rice (2012)	

Subsection: Evaluation Strategies. Successful online courses include student evaluation strategies that align with course objectives and are consistent with goals. Educators who use multiple and appropriate means of assessment do this for more than just keeping tabs on students. It helps engage students with the content (DiPietro, 2010), keeping them in lock step with the goals. This should all be clearly stated to the student, possibly outlined in the syllabus (Zucker et al., 2003), as was previously mentioned in Section A.

Evaluation strategies are only as good as the methods and procedures used, which have to be able to assess mastery of content. The open progression of online courses can make this difficult, but designers need to implement assessments that are valid, reliable, equitable, and secure (Naidu, 2013). When implemented within online higher education courses, multiple means of formative and summative assessments helped students show significant improvement in mastery of the material (Palmer & Devitt, 2014).

Subsection: Feedback. Evaluations should not necessarily be a simple snapshot in time. The feedback itself can also come from both the student and the teacher. Prior research in K-12 online courses, for example, showed high value in using student feedback (Cavanaugh et al., 2009).

Students are also generally enthusiastic to hear feedback and advice on how to achieve mastery (Naidu, 2013), and should be a high priority for educators. The feedback should be meaningful to the understanding, as well as given in a timely manner (Rice, 2002). Much like the methods used, the feedback itself should be clear to the students and easily accessible.

Subsection: Assessment Resources. Evaluation materials should be varied, allowing for multiple means of assessment. There are similar methods that can be shared between online and traditional settings. These would include preparation materials, rubrics, and any other resources required for course, state and district assessments (Morris, 2002).

It can be argued that students should see course rubrics, as it allows them to see what exactly the instructor expects (Rice, 2002). Since rubrics are presented in a matrix format, students can make note of their own strengths and weaknesses (Hall & Salmon, 2003). Regardless of the assessment the teacher selects and their decision to share that with students,

Rice commented that the grading policy should be specifically outlined in the course syllabus or frequently asked questions (FAQ), and readily available to the students.

Section D: Technology

"The course takes full advantage of a variety of technology tools, has a user-friendly interface and meets accessibility standards for interoperability and access for learners with special needs" (iNACOL, 2011a, p. 15).

Section D of the iNACOL course design standards contained five subheadings, which included 11 elements.

Table 2.4.

Course Architecture	
The course architecture permits the online instructor to add content, activities and assessments to extend learning opportunities.	
K-12 Literature	*Adult Population Literature*
Barbour, Morrison, & Adelstein (2014) Rice (2012)	
The course accommodates multiple school calendars; e.g., block, 4x4 and traditional schedules.	
K-12 Literature	*Adult Population Literature*
Wicks (2010)	
User Interface	
Clear and consistent navigation is present throughout the course.	
K-12 Literature	*Adult Population Literature*

Barbour (2007a) Barbour, Morrison, & Adelstein (2014) Morris (2002)	
Rich media are provided in multiple formats for ease of use and access in order to address diverse student needs.	
K-12 Literature	*Adult Population Literature*
Barbour (2007a) Cavanaugh (2013) Keeler, Richter, Anderson-Inman, Horney, & Ditson (2007)	
Technology Requirements and Interoperability	
All technology requirements (including hardware, browser, software, etc…) are specified.	
K-12 Literature	*Adult Population Literature*
DiPietro et al. (2008) Elbaum et al. (2002)	
Prerequisite skills in the use of technology are identified.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Rice (2012)	
The course uses content-specific tools and software appropriately.	
K-12 Literature	*Adult Population Literature*

DiPietro et al. (2008)	
The course is designed to meet internationally recognized interoperability standards.	
K-12 Literature	*Adult Population Literature*
Watson & Watson (2007)	Coates, James, & Baldwin (2005)
Copyright and licensing status, including permission to share where applicable, is clearly stated. and easily found.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Halme & Somervouri (2012) Tonks, Westin, Wiley, & Barbour (2013)	
Accessibility	
Course materials and activities are designed to provide appropriate access to all students. The course, developed with universal design principles in mind, conforms to the U.S. Section 504 and Section 508 provisions for electronic and information technology as well as the W3C's Web Content Accessibility Guidelines (WCAG 2.0).	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Rose, Smith, Johnson, & Glick (2015)	
Data Security	
Student information remains confidential, as required by the Family Educational Rights and Privacy Act (FERPA).	

K-12 Literature	*Adult Population Literature*
Barbour & Plough (2012) Waters (2011)	Cantrell (2013)

Subsection: Course Architecture. When teaching an online course, the instructor needs to be able to add content, activities, and assessments through the LMS. The LMS is an integral part of the virtual classroom, so it is of high importance to select the most effective architecture for the course (Rice, 2012). It should be a priority of the teacher to learn what the LMS can accomplish and to look elsewhere if elements required are missing (Barbour, Morrison, & Adelstein, 2014).

The LMS and the course itself should also be able to adjust for multiple calendars, such as year-round, block, and traditional. Considering the very nature of online learning, flexibility is a major selling point for online courses, giving students the opportunity to work around scheduling conflicts (Wicks, 2010). This can be extrapolated out to the school district, allowing the flexibility to work within their calendar model.

Subsection: User Interface. The user should be able to easily move around the online course, with a clear and consistent navigation present. Some successful online courses, such as those featured from the Wichita catalogue, offered navigational forms in the course information area (Morris, 2002). These forms outlined how to find specific items within the course. Regardless of how the information is rolled out, the navigation should be kept simple and consistent for the students (Barbour, 2007a). This can be accomplished by using a template as the course is initially designed (Barbour, Morrison, & Adelstein, 2014).

Besides navigation, multimedia should also offer ease of use, with multiple formats available to help address student needs. This measurement is supported for multiple reasons.

When working in a unique and unfamiliar environment, having a variety of media can be helpful in supporting student understanding (Barbour, 2007a; Cavanaugh, 2013). Multiple formats can possibly make the content easier to access for students with complications. Both legislation and Internet watchdog groups have offered recommendations for teachers looking to maximize media for their students (Keeler et al., 2007).

Subsection: Technology Requirements and Interoperability. Although seemingly obvious, a review of the technology and interoperability of the course must take place. Teachers should consider all aspects of student access for the course during the design process (DiPietro et al., 2008). As the course rolls out, Elbaum et al. (2002) recommended to specify both the technology and the skill requirements to the students. Even basic general overviews and procedures, such as how to access a web browser, need to be shared before the course begins so there are no surprises for incoming students. A student orientation and transition period to allow students without the proper skillset to gain guidance and support is recommended (Rice, 2012).

Before sharing the tools and software used, it should be understood that the technology in place is appropriate for the course and that it meets interoperability standards. Teachers should not simply use the technology just because it is available to them, but instead they should make instructional technology decisions based on the nature of the content and their pedagogical strategies (DiPietro et al., 2008). These decisions should all be done through an LMS that can communicate with other systems within the institution to share data collected (Coates et al., 2005; Watson & Watson, 2007).

Designers and teachers alike must also be aware of copyright issues and understand the importance of licensing information. While it is possible to obtain copyright permissions (Elbaum et al., 2002), there are very few other options to legally use digital media. There is also,

however, a push for free use under the creative commons license and that open access can be a viable solution (Halme & Somervouri, 2011; Tonks et al., 2013).

Subsection: Accessibility. In the previous sections, there were numerous measurements reviewing multiple means of media, resource, and course access. The reason was to guarantee that the course adhered to the law, ensuring universal access for all. This can seem daunting at first, but there are free sites that can help identify problems with accessibility (Elbaum et al., 2002).

Accessibility is not something to lightly gloss over, however, as the law can and will be put in effect. In 2007, for example, a school district denied special needs students from online courses (Rose et al., 2015). The district noted that these students were not allowed to access the course due to a difficulty in completing work independently, as well as having low reading and writing abilities. The district was eventually cited by the U.S. Department of Education's Office for Civil Rights and was forced to reverse their policy.

Subsection: Data Security. The area of measurement for Section D required that the course follow the law assuring that student information is confidential. Originally created in 1974, FERPA must be adhered to by most higher education and K-12 education institutions. As Cantrell (2013) pointed out, FERPA protects the student from public disclosure of private and educational records. However, new rules complicate the law. Institutions are allowed to use student records in the database for various audits, such as evaluating student training. Students can opt out, but it appears to be an all or nothing (Cantrell, 2013). A student who opts out of being used in audits under FERPA also could not be highlighted in a public newsletter for receiving an award. The rules are complicated, and instructors must be aware of the law, especially as it applies to each student.

The issue of data security is particularly difficult when it comes to online courses trying to leverage the power of popular social media sites (e.g., *Facebook*, *Twitter*, etc.). As noted by Waters (2011), *Facebook* does not have a separate area for education, so students are required to enter in personal information. Like other aspects of the Internet, social media can be susceptible to numerous threats. Educators should consider social media sites that cater to K-12 (e.g., *Edmodo, Google Apps for Education*, etc.). These sites do not require students to enter their private information, are run by the teacher, and are designed specifically for classroom use – allowing for a safer online environment. Social networks that can provide a protected environment can provide numerous curricular, co-curricular, and extracurricular opportunities for K-12 online learning (Barbour & Plough, 2012).

Section E: Course Evaluation and Support

"The course is evaluated regularly for effectiveness, using a variety of assessment strategies, and the findings are used as a basis for improvement. The course is kept up to date, both in content and in the application of new research on course design and technologies. Online instructors and their students are prepared to teach and learn in an online environment and are provided support during the course" (iNACOL, 2011a, p. 18).

Section E of the iNACOL course design standards contained four subheadings, which included 10 elements.

Table 2.5.

Accessing Course Effectiveness	
The course provider uses multiple ways of assessing course effectiveness.	
K-12 Literature	*Adult Population Literature*

Fulton (2002) Morris (2002)	
The course is evaluated using a continuous improvement cycle for effectiveness and the findings used as a basis for improvement.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Zucker & Kozma (2003)	
Course Updates	
The course is updated periodically to ensure that the content is current.	
K-12 Literature	*Adult Population Literature*
Ebert & Powell (2015)	
Certification	
Course instructors, whether face-to-face or virtual, are certificated and "highly qualified." The online course teacher possesses a teaching credential from a state-licensing agency and is "highly-qualified" as defined under ESEA.	
K-12 Literature	*Adult Population Literature*
Yang & Rice (2015)	
Instructor and Student Support	
Professional development about the online course delivery system is offered by the provider to assure effective use of the courseware and various instructional media available.	

K-12 Literature	*Adult Population Literature*
Barbour, Morrison, & Adelstein (2014) Cavanaugh (2013) Zucker & Kozma (2003)	
The course provider offers technical support and course management assistance to students, the course instructor, and the school coordinator.	
K-12 Literature	*Adult Population Literature*
Barbour, Kinsella, Wicks, & Toker (2009) Elbaum et al. (2002)	
Course instructors, whether face-to-face or virtual, have been provided professional development in the behavioral, social and when necessary, emotional aspects of the learning environment.	
K-12 Literature	*Adult Population Literature*
DiPietro et al. (2008)	Roman, Kelsey, & Lin (2010)
Course instructors, whether face-to-face or virtual, receive instructor professional development, which includes the support and use of a variety of communication modes to stimulate student engagement online.	
K-12 Literature	*Adult Population Literature*
DiPietro et al. (2008)	
The provider assures that course instructors, whether face-to-face or virtual, are provided support, as needed, to ensure their effectiveness and success in meeting the needs of online	

students.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Morris (2002)	
Students are offered an orientation to taking an online course before starting the coursework.	
K-12 Literature	*Adult Population Literature*
Elbaum et al. (2002) Rice (2012)	

Subsection: Accessing Course Effectiveness. To properly assess effectiveness, the design should allow for multiple means of evaluation of the course itself, be it peer review, student feedback, or course evaluations. While students and families can be part of the evaluation process, teachers should also discuss their courses together, which will allow for unique peer feedback (Morris, 2002). Evaluations should look similar to traditional classrooms for some aspects (i.e., achievement, completion rates), but also have parts unique to online (e.g., effectiveness of technology, course design interactivity) (Fulton, 2002).

However, evaluation process should not be a one-time event. A continuous improvement cycle should be used for effectiveness and improvements (Barbour, 2005a). Successful virtual schools use continuous internal and external evaluations to make sure a high standard is maintained (Zucker & Kozma, 2003). Post-course, anonymous feedback from the students, as well as peers, should be taken into consideration at the end of every course (Elbaum et al., 2002).

Subsection: Course Updates. Once the evaluations have been completed, the course should be updated periodically to keep content current. This can be challenging if the educator is

working with an inflexible or an out-of-date infrastructure. The Clark County School District (CCSD) VHS, which has more than 100,000 students enrolled in blended and online courses, understood the importance of updating for their massive population, and ended up providing an excellent example for others to follow (Ebert & Powell, 2015). The CCSD VHS overcame challenges with updating by ensuring all digital content was in HTML code. This allowed the design team to easily evaluate and change content when required. Continuously updating policies, content and professional development became a part of the school's best practices for student and school success.

Subsection: Certification. The subsection of certification checks that the instructor is both certified and highly qualified, as noted in the Elementary Secondary Education Act (ESEA) of 2001. Numerous states, such as Idaho, take qualification a step further by offering a K-12 online teaching endorsement (Yang & Rice, 2015). For example, Boise State University's program took the K-12 online teaching standards set forth by iNACOL, the International Society for Technology Education, and the National Education Association, as well as the highly qualified teacher standards, and created a competency-based program specifically for educators teaching in an online environment. Partnering with virtual schools and the state's online supplemental program, educators gain a unique hands-on experience.

Subsection: Instructor and Student Support. The final subsection of the iNACOL rubric included six areas of measurement focused on instructor and student support. It is imperative that professional development take place for teachers (Barbour, Morrison, & Adelstein, 2014), as online courses require unique skills not found in traditional settings (Cavanaugh, 2013). The VHS program, for example, used a required 26-week online

professional development and design course. Teachers work exclusively in the LMS to train and build their own course (Zucker & Kozma, 2003).

After the professional development, continuous support is needed (Barbour et al., 2009). Support should be available in a variety of formats for both teachers and students alike. Support should also be specific to the unique online environment. Technical and course management help, for instance, can come through training, system administration, and just taking the time to play within the LMS itself (Elbaum et al., 2002).

Other aspects to consider are preparation for behavioral, social, and emotional challenges of an online setting, communicating to stimulate engagement, as well as succeeding in the online environment. Successful teachers should be active in their own course to identify students in need and know the proper actions to take, as well as modeling and encouraging proper communication that is both content and non-content related (DiPietro et al., 2008). While some teachers are naturally adept with these techniques, these items can be included in teacher preparation courses. The Preparing Online Instructors program, for example, is a six-week online training course for online instructors (Roman et al., 2010). A survey conducted of 40 instructors who went through the training showed that the vast majority felt that the training was necessary to increase their technological skills, as well as their pedagogical orientations for online instruction. The Wichita online public schools program also created training for online instructors, which had teachers working in the LMS designing, as well as collaborating, with their peers (Morris, 2002). While support continued on after the training program, teachers felt proficient enough to carry on independently. Finally, a strong administrative team should be in place to offer support in numerous areas (i.e., registration, policies, training) to help ensure success (Elbaum et al., 2002).

The last area of measurement promoted students being offered an orientation for taking an online course before the class began. As mentioned earlier, Rice (2012) specifically mentioned an orientation for all students to get them acclimated using online instruction. The need for orientations were also previously noted by Elbaum et al. (2002), who recommended an orientation that included a welcome letter and an information packet.

Discussion

While the 2011 update to the iNACOL standards has support among contemporary research, one area of concern was potential omissions from the standards. Support, assessment, and instruction were all covered by the standards. It should be noted that the iNACOL standards are described as 'national standards for quality online courses,' and not specifically quality online course design. The omission of the term 'design' indicated that a quality online course might include elements that went beyond strict online course design issues. For example, 'Section E: Course Evaluation and Support' contained several elements that were inconsistent with a strict focus on online course design:

- E4: Course instructors, whether face-to-face or virtual, are certificated and "highly qualified." The online course teacher possesses a teaching credential from a state-licensing agency and is "highly-qualified" as defined under ESEA
- E5: Professional development about the online course delivery system is offered by the provider to assure effective use of the courseware and various instructional media available.
- E7: Course instructors, whether face-to-face or virtual, have been provided professional development in the behavior, social and when necessary, emotional aspects of the learning environment.

- E8: Course instructors, whether face-to-face or virtual, receive instructor professional development, which includes the support and use of a variety of communication modes to stimulate student engagement online.
- E9: The provider assures that course instructors, whether face-to-face or virtual, are provided support, as needed, to ensure their effectiveness and success in meeting the needs of online students.
- E10: Students are offered an orientation to taking an online course before starting the coursework.

With this in mind, it is important to note that the standards did not directly address any elements that may be included in 'quality online courses' related to the concept of student motivation.

McCombs and Vakili (2005) discussed the 14 *Learner-Centered Psychological Principles* (American Psychological Association, 1997), which were grouped into four factors: cognitive and metacognitive factors, developmental and social factors, individual-differences factors, and motivational and affective factors. The motivational and affective domain included three principles:

"Principle 7: Motivational and emotional influences on learning

- What and how much is learned is influenced by the learner's motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests and goals, and habits of thinking.

Principle 8: Intrinsic motivation to learn

- The learner's creativity, higher order thinking, and natural curiosity all contribute to motivation to learn. Intrinsic motivation is stimulated by tasks of optimal

novelty and difficulty, relevant to personal interests, and providing for personal choice and control.

Principle 9: Effects of motivation on effort

- Acquisition of complex knowledge and skills requires extended learner effort and guided practice. Without learners' motivation to learn, the willingness to exert this effort is unlikely without coercion," (p. 1585).

Tying these principles to K-12 online education, the authors recognized the connection between online learning and self-directed learners, a connection that is made through motivational strategies.

This was further supported by Cheng and Jang (2010), who mentioned in their research that motivation was an integral part of education. Using a self-determination theory as a way to view motivation, their study highlighted that the perceived satisfaction in autonomy, relatedness, and competency directly affected student motivation. The study also suggested understanding why a student was taking the course and to use the information for motivation. Once again, the perceived interactions were important to student satisfaction. Further, Kim, Park, and Cozart (2014) also found a connection between self-efficacy, emotions, and motivation in their study of 72 online high school students in a mathematics course. Results showed how different emotions of the students impacted overall learning, with anger, boredom, and enjoyment significant predictors of achievement. If the iNACOL *National Standards for Quality Online Courses* go beyond a strict focus on online course design, elements related to student motivation are conspicuously absent.

Conclusions and Implications

The five sections of the iNACOL *National Standards for Quality Online Courses* were reviewed in detail. The elements were aligned to current literature in an attempt to begin the process of validating these standards – a process that has never been undertaken, even though the standards have been widely adopted by schools, districts, and even several states. The results indicated the elements did align. For example, 'Section A: Content' as a whole aligned with current literature. While the subsection 'Course Overview' and 'Introduction' aligned with solely K-12 literature, 'Academic Content Standards and Assessments,' 'Legal and Acceptable Use Policies,' and 'Instructor Resources' were supplemented with adult population literature.

'Section B: Instructional Design' found connections to K-12 literature at a more consistent pace than Section A. Subsections 'Instructional and Audience Analysis,' 'Course, Unit,' and 'Lesson Design,' 'Communication and Interaction,' and 'Resources and Materials' were all strongly supported by K-12 literature. Only the subsection related to 'Instructional Strategies and Activities' required the use of adult population literature for additional support of specific elements. 'Section C: Student Assessment' contained three subsections, all of which were strongly supported by K-12 literature. The subsections on 'Feedback' and 'Assessment Resources and Materials' solely used K-12 material in relation to the elements. Only the first subsection (i.e., Evaluation Strategies) relied on adult population literature for supplemental support.

'Section D: Technology' was supported mainly by K-12 literature. However, subsections on 'Technology Requirements and Interoperability' and 'Data Security' did require supplemental adult population literature for support. The other subsections were all fully supported by K-12 literature for each element. Finally, 'Section E: Course Evaluation and Support' was supported by K-12 literature, with the exception of one element from the subsection related to 'Instructor

and Student Support.' While the literature into K-12 online learning course design is still developing, most elements were supported or supported somewhat by K-12 online learning literature, although not necessarily K-12 online learning research. Those elements only somewhat supported found additional alignment with broader online learning literature related to adult populations.

As noted above one of the main limitations of this attempt to achieve the content validity of the iNACOL *National Standards for Quality Online Courses* was the lack of literature, and in particular the lack of research, related to K-12 online course design (Barbour & Reeves, 2009). When attempting to supplement with adult population literature, the challenge was trying to locate appropriate higher education literature with a search focused primarily on K-12. This, in turn, limited the scope of higher education research used. A final issue was that of length of the manuscript. Even when the editors of the *Journal of Online Learning Research* graciously allow for a greater word limit utilizing their online format, the authors still needed to take overall length into consideration when describing the literature support for each element. The iNACOL standards contain 52 total elements, which only allowed for a cursory review to be presented in this manuscript.

However, in the process of examining standards in relation to the literature there appeared to be some redundancy in the elements. It also became clear that certain elements could be considered for consolidation as this literature review occurred. Further, the literature indicated that student motivation was directly tied to student support and satisfaction. However, while the current standards implied a need for motivational elements (e.g., satisfaction), there was not a clearly identified standard to examine criteria for motivation.

The 2011 iNACOL *National Standards for Quality Online Courses* cover a wide breadth of topics for K-12 online courses. The literature review and accompanying suggestions were an important first step, but further research is required. For example, a more comprehensive review of the standards through the lens of K-12 online literature would be useful given the constraints of length. The review of each element is much briefer than what could have been done without space considerations. Within this large scope of elements lies an opportunity to review and revise the standards even further, specifically with regard to a more direct focus on course design. The next phase in this on-going study of the iNACOL *National Standards for Quality Online Courses* will be to examine the content validity of the standards by having experts from various aspects of the field of K-12 online learning to provide systematic feedback on the standards themselves, as well as the findings from this first phase of validation.

CHAPTER 3 IMPROVING THE K-12 ONLINE COURSE DESIGN REVIEW PROCESS: EXPERTS WEIGH IN ON INACOL NATIONAL STANDARDS FOR QUALITY ONLINE COURSES[3]

Abstract

Within the K-12 online learning environment there are a variety of standards that designers can utilize when creating online courses. To date the only research-based standards available are proprietary in manner. As such many states have begun adopting online course design standards from the leading advocacy organization, which that have yet to be validated from a research perspective. This article reports on the second phase of a three-stage study designed to examine the validity and reliability of the iNACOL *National Standards for Quality Online Courses*. Phase two utilizes two panels of expert reviewers to examine and provide feedback with goal of further refining these standards (after the standards had been scrutinized through the lens of the available K-12 online learning literature).

Introduction

K-12 online course designers have numerous options when contemplating standards to guide their development of asynchronous course content. However, not all standards are freely accessible. Some institutions, such as the Virtual High School (VHS), have their own publicly available, in-house process (Kozma, Zucker, & Espinoza, 1998). But there are other standards, like Quality Matters (QM), that are part of a proprietary system used by certified experts (QM, 2014). In 2007, later updated in 2011, the International Association for K-12 Online Learning (iNACOL) released their *National Standards for Quality Online Courses*. These standards were largely based on standards that had been released earlier by the Southern Region Education Board (SREB), with some additions due to iNACOL's involvement in the Partnership for 21st

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Century Skills initiative (NACOL, 2007). The iNACOL standards used a rubric that covered five different areas (i.e., content, instructional design, student assessment, technology, and course evaluation and support) to review the overall quality of a course (iNACOL, 2011a). Since its initial release, the standards have been implemented in a variety of jurisdictions, including for use in states such as Michigan and Texas (iNACOL, 2015; Michigan Department of Education & Michigan Virtual University, 2015). However, even as the standards remain popular with legislators and policymakers, there has been no research published on the validity of the standards or a review as to how they relate specifically to online course design.

The study reported in this article follows an earlier phase in the validation of the iNACOL standards (see Adelstein & Barbour, 2016). Phase one of this larger research initiative reviewed the construct validity of the iNACOL standards (Drost, 2011). Using contemporary research, each of the 52 elements found in the iNACOL standards were reviewed to determine the level of support each standard had within the research literature. Each standard was compared to research into K-12 online learning, as well as the broader field of online learning and course design. The following article describes phase two of this validation process, which consisted of three rounds of expert review over the revised iNACOL standards from the first phase. The authors will begin by briefly discussing the current state of K-12 online course design literature. The three phases of the expert review will be outlined, detailing the process and results. Finally, the revised K-12 online course design rubric will be discussed.

Literature Review

Virtual schooling is not a new concept. Prior to the widespread use of the World Wide Web, students and instructors would be able to connect via telephone or correspond through the postal service (Clark, 2013). As the opportunity for virtual schooling increased, it should not be

surprising that many courses were designed using the same principles that designers applied to these legacy distance models, as well as to face-to-face courses (Barbour & Adelstein, 2013a; Barbour, Morrison, & Adelstein, 2014). Instead of telephones and the postal service, chat rooms and email were utilized (Perrin & Mayhew, 2000). As websites and learning management systems (LMS) came into existence, courses began to take and copy from traditional face-to-face courses (Barbour, 2007a). However, it became apparent that there were widening differences between the two environments. Effective online educators, for example, had to utilize skillsets better suited for virtual environments (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007). As educators had to shift their way of thinking, the demand for an overhaul in course design began to form.

Research specifically about course design has been limited (Barbour, 2013; Barbour & Adelstein, 2013b). There have been studies conducted that focus on specific programs, such as VHS or the Florida Virtual Schools (FLVS) (Kozma, Zucker, & Espinoza, 1998; Zucker, 2005). In both instances, the design of the course is strongly considered along with other aspects. VHS requires its educators to take a mandatory graduate level course that has a focus on design within the LMS (Zucker & Kozma, 2003). The FLVS utilizes a team approach consisting of subject matter experts, project managers, instructional designers and web developers (Johnston, 2004). The team process has proven successful for FLVS, but it is a very unique system (Barbour & Reeves, 2009).

As online education has continued to mature and evolve, best practice standards that include aspects of course design have also been released (iNACOL, 2011a; QM, 2014). Some of these standards are proprietary, such as those found in the QM system. Beginning as a three year Fund for the Improvement of Postsecondary Education grant in 2003 (Legon & Runyon, 2007),

the first QM rubric was formed in 2004. QM gradually became an entire process for online course review (Shattuck, 2007). The current rubric utilizes eight general standards (i.e. course overview and introduction, learning objectives, assessment and measurement, instructional materials, learner interaction and engagement, course technology, learner support, and accessibility), while the program offers to train staff for peer reviews, course design, and more (MarylandOnline, 2013). However, even thought they have never been tested for validity, the iNACOL (2011a) standards are an easy place for designers to begin because the standards and rubric are publically available and non-proprietary.

Methodology

Upon completion of the construct validity phase of this research initiative (see Adelstein & Barbour, 2016), the next stage was the content validity of the revised rubric. The purpose was to test the design of the new rubric through expert review. It was recommended to involve content-area experts, as content validity is a result of their verification that the rubric meets the standards as outlined in phase one (Roblyer & Wiencke 2003; Taggart, Phifer, Nixon, & Wood, 2001). Roblyer et al. (2003) denoted that a properly designed rubric used in educational technology is a meaningful way to both assess and guide practitioners. It should not be surprising to see a leader in the field, such as QM, used a rubric for their proprietary design standards during the creation process (Hixon, Barczyk, Buckenmeyer, & Feldman, 2011).

Eight experts, who were divided into two groups, reviewed the standards over the course of three rounds, examining each standard from a course design perspective. The experts were selected based on their background and experience in K-12 online education (see Table 1).

Table 3.1.

Description of the Two Expert Review Panels

Group A	Group B
Ron (all names are pseudonyms) • Researcher with approximately 20 years experience in K-12 online learning	Jason • Educator with experience in K-12 online curriculum and assessment design
Louise • Administrator with over 20 years experience in K-12 online learning	Amanda • Administrative responsibilities in online education for 8 years, 15 years overall in education
Joanne • Educator with over 20 years in both online and traditional K-12 and higher education	Kim • Educator for 16 years, half of which in K-12 online learning
Connor • Educator, administrator, and designer with twelve years of experience in online education.	Kelly • Educator with five years' experience in K-12 online educational research

Specifically, each panel consisted of a researcher, administrator, designer, and teacher; all of whom had been directly involved with K-12 online learning.

During round one, each of the experts received a document containing the 52 iNACOL elements listed under the five main standards based on the results of the first phase of this research initiative. The document was color coded to indicate the nature of research supported for each standard (i.e., green for significant K-12 online learning research support, yellow for limited K-12 online learning research support, or orange for supported only by non-K-12 literature). There were also two additional sections added to the end of the document. The first

section offered four new standards that were found to be present in the K-12 online learning research, while the second suggested combining elements that were seen as similar in scope. In round one, the experts were asked to rate the importance of each standard as it related to course design using a basic Likert scale (i.e., 1 for low relevancy, 2 for some relevancy, and 3 for significant relevancy). An area for comments was also included for each section.

After compiling the ratings from round one, a second document was created that listed the average rating for each of the standards and the comments that experts made. Based upon both the raw rating, as well as expert suggestions, the researcher made suggestions about revising or removing certain standards. Experts were asked to select one of four options (i.e., keep the standard as is, revise the standard, combine with another standard, or delete the standard) and to provide a written rationale for that decision.

The responses from round two were again compiled in a new document that consisted of three sections:

1. standards where there were general agreement that should be kept as written,
2. standards where the expert feedback from the previous two rounds that had a clear consensus for either revision or deletion, and
3. standards that did not have a clear consensus from the expert panel and would require further discussion.

The experts' feedback from the previous rounds were listed under each standard. Round three consisted of 60-minute discussion with each expert panel using *Google Hangout* that focused on the second and third sections of the round three document.[4] During the *Google Hangout*, the researcher facilitated discussion around the standards recommended for revision or deletion until

[4] Due to a last minute emergency situation, one expert from Group A (Connor) was unable to attend the *Google Hangout*.

a consensus was achieved on whether to revise or delete a particular standard, as well as the specific wording for any revised standards.

Results

In this section, we organize the data using the complete iNACOL *National Standards for Quality Online Courses*, broken down by section. The revised iNACOL standards based on the expert review panel are provided in Appendix A.

Table 3.2.

Section A: Content Expert Scores

Academic Content Standards and Assessments	***Round One Average***	***Round Two Responses***
Element A1: The goals and objectives clearly state what the participants will know or be able to do at the end of the course. The goals and objectives are measurable in multiple ways	3	N/A
Element A2: The course content and assignments are aligned with the state's content standards, common core curriculum, or other accepted content standards set for Advanced Placement courses, technology, computer science, or other courses whose content is not included in the state standards.	2.875	N/A
Element A3: The course content and assignments are of sufficient rigor, depth and breadth to teach the standards being addressed.	2.625	N/A
Element A4: Information literacy and communication skills are incorporated and taught as an integral part of the curriculum.	2.5	N/A
Element A5: Multiple learning resources and materials to increase student success are available to students before the course begins.	2.25	Keep standard as is: 3 Revise standard: 3 Combine with another: 0 Delete standard: 3 (Revise/Delete: 1)
Course Overview and Introduction	***Round One Average***	***Round Two Responses***
Element A6: A clear, complete course overview and syllabus are included in the course.	3	N/A

Element A7: Course requirements are consistent with course goals, are representative of the scope of the course and are clearly stated.	2.875	N/A
Element A8: Information is provided to students, parents and mentors on how to communicate with the online instructor and course provider.	3	N/A
Legal and Acceptable Use Policies	***Round One Average***	***Round Two Responses***
Element A9: The course reflects multi-cultural education, and the content is accurate, current and free of bias or advertising.	2.75	N/A
Element A10: Expectations for academic integrity, use of copyrighted materials, plagiarism and netiquette (Internet etiquette) regarding lesson activities, discussions, and e-mail communications are clearly stated.	2.875	N/A
Element A11: Privacy policies are clearly stated.	2.5	N/A
Instructor Resources	***Round One Average***	***Round Two Responses***
Element A12: Online instructor resources and notes are included.	2.375	Keep standard as is: 3 Revise standard: 2 Combine with another: 2 Delete standard: 2 (Delete/Combine: 1)
Element A13: Assessment and assignment answers and explanations are included.	2.5	N/A

Section A was highly regarded by the expert panel in terms of significance to course design. In the first round, there was overwhelming agreement to keep the majority of the elements in some form, with the exceptions of A5 and A12. Both elements were further discussed in round two, with experts still divided on how to move forward. All experts shared in round three that the phrasing of A5 was problematic, questioning how realistic it was to have all materials present before the course begins. Ron mentioned that due to the logistics of certain courses, having all material available:

> …is technically not possible in some settings. Because you do an enrollment and that's when the students are there and they can't get access to the course until they are enrolled and they are enrolled at date of start. So it's not physically possible.

It was suggested, and agreed upon by Group A, to change the wording to "All course materials are available to students at the course start." Group B, on the other hand, did not think the element was appropriate. Amanda noted:

> …you really don't know what's going to work until the students start the course and actually, you know, get their feedback as to what's working and what's not working. The other thing is, is that your course materials could be specific to that student as well, like some students may better at, um, a virtual lab or something else, and another student might learn better by watching a video or doing something else…

With other elements in the rubric discussing additional materials, Group B moved to delete A5.

The round two discussions of A12 lead to a suggestion of combining it with A13 or keeping it as is. Both groups were quick to lean towards combining the elements. Ron suggested a further revision to include the pedagogy behind the material, as this understanding would help teachers "…to grade [the assignment] appropriately, but they would also be given the grading rubrics which they would then communicate clearly in an easy to understand manner to the students and parents." The rest of the Group A members agreed.

Round one did include two suggestions from experts that were put forth in round two. The first looked to combine A1, A6, and A7 due to similarities. Experts were unanimous on combining the elements, with both groups agreeing on the suggested wording put forth in round three. The other suggestion was to delete A4, with an expert wondering if it was better suited at a program level and not at the course level. Group A had little discussion, as all agreed it was too broad and not a part of the course design. Group B strongly thought that the communications piece was already handled in element B9, but perhaps the information literacy should remain. For example, Kelly liked the idea that information literacy should be:

> …embedded in the course design… I really do think that this might be a program related piece because it is overarching whole content areas, so it's not specific to a course design, but it should be interwoven into the courses specifically.

Group B agreed, and revised A4 to read, "Information literacy is incorporated as an integral part of the course."

Eventually, a decision had to be made regarding the differences between Group A and B results for element A4, A5, and A12. This was accomplished by reviewing the current K-12 literature against the expert comments from all three rounds. Element A4 was deleted, with the thought that information literacy should have a focus at the program or curriculum level, and not in the course design. Element A5 was kept in the rubric using Group A's wording. Research showed it was important for the students to have access to the materials before the course begins, allowing them time to make sure everything is compatible with personal technology. Finally, A12 and A13 were combined using Group A's suggestions as well.

Table 3.3.

Section B: Instructional Design Elements Expert Scores

Instructional and Audience Analysis	***Round One Average***	***Round Two Responses***
Element B1: Course design reflects a clear understanding of all students' needs and incorporates varied ways to learn and master the curriculum.	2.875	N/A
Course, Unit and Lesson Design	***Round One Average***	***Round Two Responses***
Element B2: The course is organized by units and lessons that fall into a logical sequence. Each unit and lesson includes an overview describing objectives, activities, assignments, and resources to provide multiple learning opportunities for students to master the content.	2.625	N/A
Instructional Strategies and Activities	***Round One***	***Round Two Responses***

	Average	
Element B3: The course instruction includes activities that engage students in active learning.	3	N/A
Element B4: The course and course instructor provide students with multiple learning paths, based on student needs that engage students in a variety of ways.	2.875	N/A
Element B5: The course provides opportunities for students to engage in higher-order thinking, critical reasoning activities and thinking in increasingly complex ways.	2.875	N/A
Element B6: The course provides options for the instructor to adapt learning activities to accommodate students' needs.	2.875	N/A
Element B7: Readability levels, written language assignments and mathematical requirements are appropriate for the course content and grade-level expectations.	2.75	N/A
Communication and Interaction	***Round One Average***	***Round Two Responses***
Element B8: The course design provides opportunities for appropriate instructor-student interaction, including opportunities for timely and frequent feedback about student progress.	2.875	N/A
Element B9: The course design includes explicit communication/activities (both before and during the first week of the course) that confirms whether students are engaged and are progressing through the course. The instructor will follow program guidelines to address non-responsive students.	2.375	Keep standard as is: 2 Revise standard: 6 Combine with another: 0 Delete standard: 1 (Revise/Delete:1, Keep/Revise: 1)
Element B10: The course provides opportunities for appropriate instructor-student and student-student interaction to foster mastery and application of the material.	2.5	N/A
Resources and Materials	***Round One Average***	***Round Two Responses***
Element B11: Students have access to resources that enrich the course content.	2.375	Keep standard as is: 3 Revise standard: 3 Combine with another: 0 Delete standard: 2

Much like Section A, Section B only had two elements, B9 and B11, which required further discussion in round 2. The wording of B9 was a point of contention for a few experts, with the element only mentioning the importance of checking engagement before and during the first week. There was a strong overall push to revise the element to include practices throughout the course, which lead to the proposed rewording, "The course design includes explicit communication/activities at multiple intervals throughout the course that confirms whether students are engaged and are progressing through the course. The instructor will follow program guidelines to address non-responsive students." Group B was in agreement with suggestion, while Group A continued the discussion. Joanne mentioned that courses also come with tools to assess engagement, and these tools should be mentioned and used. She was also concerned with the length of the first sentence, so it was split into two sentences for final consideration.

B11 was debated at length in both expert groups. There were numerous suggestions from round two, such as revising to include examples or combining with either A5 or B2. To start the conversation, the suggested revision, "Course design provides students with resources (e.g. alternate assignments, multimedia, simulations) that enrich course content," was offered up. Group A was fine with the suggestion, with one edit recommended from Ron to include mention of Universal Design for Learning (UDL). It was suggested to include it both in this standard and at the beginning of the new rubric.

Group B had already eliminated A5, knowing that B2 and B11 covered much of the same territory. A B2 revision was previously agreed upon, but the group was quick to see similarities. Jason summed up the group's thoughts when he commented:

> …B2 seems to be talking about the overview, and B11 is what is actually there, I guess. Or at least describing the opportunities, then. To go along with the overview…It just seems like they need to be focused together, to make them one.

Further, Kelly suggested, "Course design provides students with resources (e.g., alternate assignments, multimedia, simulations) that enrich course content. Each unit and lesson includes an overview of the key objectives that incorporate a variety of activities, assignments, and resources to provide multiple learning opportunities for students to master the content." The experts in Group A agreed.

There were two expert suggestions from round one that impacted B2 and B10. The concern over B2 stemmed from the use of the word logical, which appeared to lock the element into a traditional mode of design. Group B was quick to agree upon the revision, which simply eliminated "that fall into a logical sequence" from the end of the first sentence. Group A shifted their conversation to the use of units and lessons, with Joanne offering up modules. Ron agreed, adding:

> When we design courses, we design them around weeks. Not units not lessons, but around weeks. And I don't know if units and lessons precludes weeks, but I'm also not sure that it encourages that. And units and modules is better. But I would go around, I think organized by modules and take out the units.

Louise was unsure of eliminating units, but came to an understanding that the delivery depends on the instructor and mechanisms used. Therefore, modules could stand alone.

B10 was questioned by an expert for the use of foster, which implied that mastery only comes from the suggestions listed in the element. A revision, "The course provides opportunities (e.g., instructor-student and student-student interaction, assessments, access to resources) for mastery and application of the material," was suggested to the experts. Group A unanimously agreed, while Kelly had a further revision for Group B. Her thought was to keep the examples listed in the element similar to one another by relating each interaction to the student. The list

was changed to "student-instructor interaction, student-student interaction, student-course content, student-LMS," and experts were content to move on.

After collecting the expert suggestions, a final decision was made on how to phrase B2, B9, B10, and B11. The most complex of the revisions involved B2 and B11. The similarities brought up by Group B were logical, and the reasoning from Jason was enough to move forward with a combination. Group A's suggestion of changing units and lessons to modules was taken under consideration and added to the final wording. Group A's addition of tools and punctuation were accepted for B9, and Group B's wording was used for B10.

Table 3.4.

Section C: Student Assessment Elements Expert Scores

Evaluation Strategies	***Round One Average***	***Round Two Responses***
Element C1: Student evaluation strategies are consistent with course goals and objectives, are representative of the scope of the course and are clearly stated.	3	N/A
Element C2: The course structure includes adequate and appropriate methods and procedures to assess students' mastery of content.	2.75	N/A
Feedback	***Round One Average***	***Round Two Responses***
Element C3: Ongoing, varied, and frequent assessments are conducted throughout the course to inform instruction.	2.375	Keep standard as is: 2 Revise standard: 6 Combine with another: 0 Delete standard: 0
Element C4: Assessment strategies and tools make the student continuously aware of his/her progress in class and mastery of the content.	2.875	N/A
Assessment Resources and Materials	***Round One Average***	***Round Two Responses***
Element C5: Assessment materials provide the instructor with the flexibility to assess students in a variety of ways.	2.625	N/A

Element C6: Grading rubrics are provided to the instructor and may be shared with students.	2.625	N/A
Element C7: The grading policy and practices are easy to understand.	2.75	N/A

Taken as a whole, Section C was positively viewed by the experts, with only C3 averaging below a cumulative 2.5 score. The use of the word "frequent" was an issue for the majority of experts, and it was suggested to replace it with "quality." Both groups were quick to agree with the new wording.

Three expert suggestions were taken from round one and shared with the group as a whole. The first was C2, with the wording "adequate and appropriate" seeming too vague, leaving some experts to wonder who determines this. The initial comments from round two were fairly split between keeping the original wording and revising the element. Group A promptly decided that the original, while a bit vague, gave enough direction for design. Group B, on the other hand, moved to eliminate and not replace "adequate and appropriate."

C6, according to one expert, suggested that the word "may" implies the rubric does not need to be shared with students. Another expert was concerned that a rubric will be forced upon a qualified teacher. A rubric must be supplied in the course, but a qualified instructor should have final say over which rubric to use. While there was unanimous agreement amongst the experts that the instructor will share the rubric with students, there was some discussion as to the phrasing of the final revision. The suggested wording supplied used, "Suggested grading rubrics are provided to the instructor. The instructor will share a final grading rubric with students." Group B accepted the revision, but Group A was concerned over misinterpretations about the word "final," as some might view it in the context of a final exam. Ultimately, "final" was replaced by "chosen" in the element.

Experts were also concerned over language in C7, and looked to replace "easy to understand" with "clearly communicated." Group B unanimously agreed, while Ron from Group A suggested both phrases should be used. Louise and Ron offered continued revisions by adding "to students and parents" at the end, as they are the stakeholders who will interpret the policies.

C2, C6, and C7, had minor revision details that had to be accounted for. C2 was kept as is, as the wording, even though vague in nature, gives some direction to the designer. Group A's version of C6 was kept to avoid misinterpretation, and C7 was also finalized by group A. Much like C2, the wording gives appropriate direction to the designer.

Table 3.5.

Section D: Technology Elements Expert Scores

Course Architecture	***Round One Average***	***Round Two Responses***
Element D1: The course architecture permits the online instructor to add content, activities and assessments to extend learning opportunities.	2.375	Keep standard as is: 4 Revise standard: 4 Combine with another: 0 Delete standard: 0
Element D2: The course accommodates multiple school calendars; e.g., block, 4x4 and traditional schedules.	2	Keep standard as is: 3 Revise standard: 1 Combine with another: 0 Delete standard: 4
User Interface	***Round One Average***	***Round Two Responses***
Element D3: Clear and consistent navigation is present throughout the course.	2.875	N/A
Element D4: Rich media are provided in multiple formats for ease of use and access in order to address diverse student needs.	2.714	N/A
Technology Requirements and Interoperability	***Round One Average***	***Round Two Responses***
Element D5: All technology requirements (including hardware, browser, software, etc…) are specified.	2.75	N/A
Element D6: Prerequisite skills in the use of	2.375	Keep standard as is: 2

technology are identified.		Revise standard: 2 Combine with another: 1 Delete standard: 3
Element D7: The course uses content-specific tools and software appropriately.	2.375	Keep standard as is: 3 Revise standard: 2 Combine with another: 2 Delete standard: 2 (Revise/Delete: 1)
Element D8: The course is designed to meet internationally recognized interoperability standards.	1.5	Keep standard as is: 2 Revise standard: 2 Combine with another: 0 Delete standard: 5 (Keep/Delete = 1)
Element D9: Copyright and licensing status, including permission to share where applicable, is clearly stated and easily found.	2.375	Keep standard as is: 5 Revise standard: 2 Combine with another: 0 Delete standard: 2 (Revise/Delete: 1)
Accessibility	***Round One Average***	***Round Two Responses***
Element D10: Course materials and activities are designed to provide appropriate access to all students. The course, developed with universal design principles in mind, conforms to the U.S. Section 504 and Section 508 provisions for electronic and information technology as well as the W3C's Web Content Accessibility Guidelines (WCAG 2.0).	3	N/A
Data Security	***Round One Average***	***Round Two Responses***
Element D11: Student information remains confidential, as required by the Family Educational Rights and Privacy Act (FERPA).	3	N/A

Section D proved to be one of the most contentious for the experts throughout the process. D1, D2, D6, D7, D8, and D9 were all flagged for further discussion coming out of round one. There was concern that D1 was not appropriate for all instructors, so adding "where applicable" at the end of the element was suggested by an expert. Both groups unanimously

agreed with the revision. D9 was quickly agreed upon as well, with both groups acknowledging the importance of copyright laws.

D2 was a lengthier discussion for both groups. All experts agreed that giving calendar examples limited what an online course could fit into. Group B suggested that the element was not needed at, and voted to delete the element. Group A, on the other hand, simplified the wording and related it to the module design previously mentioned in Section B.

In round two, the experts were split on how to handle both D6 and D7. For both groups, the conversation began with a possible combination the elements, using the suggestion "Prerequisite skills, course tools, and course software are identified and appropriate in relation to the students and course." Louise mentioned to group A that the notion of prerequisite skills should be part of communication, but was not a function of course design. The other experts agreed, and removed "prerequisite skills" from the revision. Group B was fairly adamant that D6 had to remain in some form or another. As Amanda put it:

> I'm looking at this from trying to explain to a parent, you know, why their student shouldn't take this specific course because maybe they don't meet those prereqs. …prerequisite skills in the use of technology are identified. That is, that is something that they need to know how to do. How to navigate, you know, different parts of the course. And it might be course specific, meaning different courses will have different prereqs, but I don't think you can delete this.

After a bit more discussion, Group B approved the combination of D6 and D7 as suggested.

From the round one and two comments, it appeared that some experts were not familiar with what D8 was referring to. Even after further explanation, Group A was quick to delete the element, not viewing it as a necessary part of design. Group B took a different stance, viewing D8 as something that will be important in the future of design. Jason brought up that as instructors and students move from one proprietary software to another, it is important they have

the ability to keep communicating and creating. The other experts agreed, and opted to keep the element.

As with the previous elements, a final version of the suggestions had to be obtained for D2, D6, D7, and D8. D2 appeared to have middling support from both research and the experts, so the decision was made to eliminate the element. The additional thought was that the modules in the course could be manipulated to fit any calendar, so there was not an overwhelming need to mention this as a design requirement. It would instead fall to the instructor and institution to make the course work for them. There was a strong argument for keeping D6, and the suggested combination of D6 and D7 was used. Finally, Group B's suggestion that D8 would be relevant in the future of design was enough to keep the element intact.

Table 3.6.

Section E: Course Evaluation and Support Elements Expert Scores

Accessing Course Effectiveness	***Round One Average***	***Round Two Responses***
Element E1: The course provider uses multiple ways of assessing course effectiveness.	2.75	N/A
Element E2: The course is evaluated using a continuous improvement cycle for effectiveness and the findings used as a basis for improvement.	2.875	N/A
Course Updates	***Round One Average***	***Round Two Responses***
Element E3: The course is updated periodically to ensure that the content is current.	2.875	N/A
Certification	***Round One Average***	***Round Two Responses***
Element E4: Course instructors, whether face-to-face or virtual, are certificated and "highly qualified." The online course teacher possesses a teaching credential from a state-licensing agency and is "highly-qualified" as defined under ESEA	2.375	Keep standard as is: 3 Revise standard: 3 Combine with another: 0 Delete standard: 2
Instructor and Student Support	***Round One Average***	***Round Two Responses***

Element E5: Professional development about the online course delivery system is offered by the provider to assure effective use of the courseware and various instructional media available.	2.625	N/A
Element E6: The course provider offers technical support and course management assistance to students, the course instructor, and the school coordinator.	2.325	Keep standard as is: 4 Revise standard: 2 Combine with another: 0 Delete standard: 2
Element E7: Course instructors, whether face-to-face or virtual, have been provided professional development in the behavior, social and when necessary, emotional aspects of the learning environment.	2.125	Keep standard as is: 2 Revise standard: 2 Combine with another: 0 Delete standard: 4
Element E8: Course instructors, whether face-to-face or virtual, receive instructor professional development, which includes the support and use of a variety of communication modes to stimulate student engagement online.	2.25	Keep standard as is: 3 Revise standard: 2 Combine with another: 2 Delete standard: 2 (Revise/Combine: 1)
Element E9: The provider assures that course instructors, whether face-to-face or virtual, are provided support, as needed, to ensure their effectiveness and success in meeting the needs of online students.	2.75	N/A
Element E10: Students are offered an orientation to taking an online course before starting the coursework.	2.25	Keep standard as is: 5 Revise standard: 1 Combine with another: 0 Delete standard: 2

Much like the previous section, E brought about much discussion as to how the elements pertained to course design, or if they did at all. E4, E6, E7, E8, and E10 were all forced into the discussion for round two. E2 and E3 were suggested to be combined by an expert in round one, and E4 through E10 were all put up for deletion in various round one suggestions. The conversation in round three began with combining E2 and E3. Group A believed the standards did not fit into design and should therefore be eliminated. Group B saw it differently, believing that the findings from the evaluation should be used to improve and update the course. However,

there was concern over the use of periodically and what that actually meant. Kim suggested adding "as needed" to the end of the combined revision, and the rest of Group B agreed.

During round one, it was suggested that elements E4 through E10 could be completely eliminated, as they do not relate to course design. Group A quickly moved to eliminate all remaining elements, with the exception of E6. Louise was adamant that support should be built directly into the course, and not remain at the institution level:

> It's the program that is delivering, designing, and then delivering this online course that makes the determination how the technical assistance is going to be provided. But the given is that within that course design, is the tool for technical assistance. But it's a programmatic decision. We don't care…who provides the assistance. As long as it can be found.

The rest of Group A agreed, and a revised version of E6 remained. Group B, however, came to the conclusion that E6, as well as the rest of the elements in the suggestion, could be eliminated. Kelly summed up the collective thought:

> I think too there's a lot of them that are …higher level program. The course provider in terms of technical support, they're going to provide that. I see a lot of program level, like orientation for students, I think that's program related piece, too. That should be for all students taking any online course within the program or whatever it might be.

Group B concurred, and elements E4 through E10 were deleted.

Reviewing data and all reviewer comments, the suggested combining of E2 and E3 was accepted into the final rubric. Course design can be continuous and ongoing, meaning there should be an evaluation and improvement process in place. The revised version of E6 was also added. Group A made a strong case for the need of technical support to be located in each course. While it does not matter who eventually supplies the support, there should be access to help for every instructor and student directly within the course.

Table 3.7.

Sections F & G: Suggested Elements and Revisions Expert Scores

Suggested Elements	***Round One Average***	***Round Two Responses***
Element F1: The syllabus promotes a student plan of work with attainable expectations.	2.625	N/A
Element F2: Technology is used to help increase self-efficacy of students.	2.625	N/A
Element F3: Activities are designed to encourage students' individual interests and goals.	2.5	N/A
Element F4: The instructor understands student goals and personalizes support.	2.75	N/A
Suggested Revisions	***Round One Average***	***Round Two Responses***
Combine elements B4 and B6	2.75	N/A
Combine elements E6 and E7	2	Keep revision as is: 1 Revise revision: 1 Combine with another: 0 Delete revision: 5

In round one, the experts were presented with four additional elements and two revisions. Elements F1, F2, and F3 were all readily accepted. In round two, there was a strong consensus to delete F4. When mentioned in round three, there was no call for discussion from either group, and F4 was eliminated. F1 and F3 were placed in Section B under the *Instructional Strategies and Activities* subsection. F2 was located in Section D under the *User Interface* subsection.

The revisions were split with the experts. There was strong support in round one to combine B4 and B6. The suggested revised wording was not brought up by experts for further discussion and was added to the final rubric. However, most experts did not believe E6 and E7 were closely related, and the combined suggestion was dropped. In the end, both elements were ultimately recommended for deletion by both expert groups.

Discussion

The first section of the iNACOL *National Standards for Quality Online Courses* (i.e., "Section A: Content") received a relatively high level of support from the panel of experts during

all three rounds of review. This result was not surprising, given the fact that these standards were primarily centered on structural and preparatory aspects of the online course. For example, in his study of course developers at a province-wide supplemental virtual school, Barbour (2005a, 2007a) reported several principles of effective course design that were focused on items like the consistency of navigation and structured course content. Similarly, students have also stressed the importance of structural and preparatory material in an online course. Gallini and Barron (2001–2002) reported that students preferred "a course structure with clear guidelines along with opportunities in the course to suggest alternative approaches to meeting course objectives" (p. 149), all aspects of structural and preparatory material found in an online course. Even most of the QM general standard areas (i.e., course overview and introduction, learning objectives/competencies, assessment and measurement, instructional materials, learner interaction and engagement, course technology, learner support, and accessibility) were focused on what online course designers would describe as structural and preparatory items (MarylandOnline, 2013).

Considering the significant tie between instructional and course design, expert support for the majority of the Section B elements was not unexpected. There was agreement that opportunity for higher order thinking, differentiating, and active learning be taken into consideration when designing the course. This was also supported by Mastropieri, Scruggs, Norland, Berkeley, McDuffie, Tornquist, & Connors (2006), who discussed how differentiating helped middle school science students achieve higher score on both in-class unit and state exams. The largest obstacle in Section B was actually related to the wording of certain elements. Experts agreed that resource materials could help with mastery, as have been seen in the K-12 online

learning literature with algebra students who used virtual manipulatives (Cavanugh, 2013). The wording and redundant nature of certain elements led to combining parts of Section B.

As a whole, the Section C elements were agreed upon and accepted by the experts in the revised rubric. This level of agreement was consistent with DiPietro (2010), who interviewed 16 online educators and found that participants agreed that assessment and feedback helped students engage with the content, along with meeting their individualized needs. In fact, as students become engaged with the learning, they are generally open to hearing feedback on how to improve and reach mastery of the subject material (Naidu, 2013). This feedback can be aided by the use of various resources, including rubrics, and by viewing course rubrics students become aware of expectations (Rice, 2012). As with Section B, the experts were mainly concerned with the wording of various elements, and moved forward with the section largely intact.

Unlike the previous three areas, Section D garnered more discussion with regards to both wording and how the elements pertained to course design. The experts agreed that flexibility was important to scheduling online courses, a notion that Wicks (2010) also supported. However, the experts thought an element specifically about different calendar types was unnecessary, and that element was subsequently deleted. Further, there was also open debate over interoperability of the course, with some experts not seeing the necessity of integration. However, Watson and Watson (2007) noted that LMSes needed to "truly become systemic, integrating systems seamlessly to allow for improved collaboration across systems among stakeholders" (p. 32). While many of the remaining elements were eventually reworded or combined, the experts were generally agreeable with the general sentiment found in Section D (i.e., that understanding that the technology used played an important part in course design). This is consistent with earlier studies into the design of K-12 online courses. For example, Barbour (2007a) interviewed six

online educators who found that minimal and simple navigation gave a consistency that was appreciated by the students. The same group of educators, however, didn't feel that a course should shy away from multimedia and interactive elements, which could be used to enhance the curriculum.

Section E was by far the most retooled area from the experts, but this is not to say that the elements were not important when creating an online course. As a few of the experts pointed out, all the elements were significant, but simply belong to different rubrics, as opposed to one focused on online course design. For example, the VHS required a 26-week class in how to design a course that utilized the LMS (Zucker & Kozma, 2003). Further, the Illinois Virtual High School (IVHS) used a similar practice shell as well, as was pointed out by Barbour, Kinsella, Wicks, and Toker (2009). IVHS also realized that continuous support was needed, and offered monthly professional development using face-to-face, synchronous or asynchronous methods. However, that did not mean that the need for professional development and support should be included in a rubric designed to measure quality online course design. Yet, not all elements from Section E were deleted. For example, continuous course updates were fully supported by experts, and was a practice utilized by many K-12 online learning programs (Ebert & Powell, 2015).

The final areas were Section F & G, which focused on the elements that were suggested for addition or elements that should be revised. The suggested elements looked to include student motivation in the course design structure, which was not a part of the original iNACOL standards. Three of the four suggestions were strongly supported by the experts, and found their way into the revised rubric without revisions. Both Chen and Jang (2010) and Kim, Park, and Cozart (2014) reported that motivation was an essential part of education, particularly in the

online learning environment. As such, it was important that components that fostered student satisfaction in autonomy and self-efficacy were planned for within the online course design.

Conclusions and Implications

After examining the iNACOL (2011a) *National Standards for Quality Online Courses* based on current literature and research in phase one of the study (see Adelstein & Barbour, 2016), a revised set of standards were reviewed by eight experts for phase two. The review occurred over three rounds, with the first two happening via e-mail and the third through a video conference. During all three rounds the experts recommended that certain elements be kept, combined, or deleted using their knowledge and understanding of online course design as a guide. The end result was a K-12 online course design rubric based off the original iNACOL quality standards that was further revised and refined.

The iNACOL standards, while praised by the expert panels, are purposefully broad, covering all aspects of online courses. The results of phase two of this study helped to bring essential online course design standards into focus. This specialized and more focused view may be able to help curtail how overwhelming the standards can appear, especially for those new to the field of K-12 online learning and designing online courses for a K-12 population. The revised rubric will allow stakeholders, including educators, course designers and administrators, to focus specifically on the aspects of online course design, creating a stronger base upon which to build asynchronous online course content.

Having said that, the researchers would recommend that further expert review be conducted. Due to time and resource constraints, the panel for this study was limited to eight individuals. Also, while the first two rounds were vital to giving the experts some guidance, the majority of the discussion related to and refinement of the individual elements occurred during

the video conference; which was limited to approximately one hour. It would be beneficial to provide the experts multiple opportunities to video conference over the course of the refinement of the standards. Finally, the iNACOL standards were choses due to their open, non-proprietary nature. However, there are also other widely used standards that could be used or supplemented as the basis for this model of expert discussion. As for our own line of inquiry, with the expert review completed, the next phase of this particular study will test the application of the rubric. Three to five teams of two reviewers will apply the rubric against current K-12 online courses. Using inter-rater reliability, the researchers will examine the reliability and validity of the rubric.

CHAPTER 4 REDESIGNING DESIGN: FIELD TESTING A REVISED DESIGN RUBRIC BASED OFF INACOL QUALITY COURSE STANDARDS

Abstract

Designers have a limited selection of K-12 online course creation standards to choose from that are not blocked behind proprietary or pay walls. For numerous institutions and states, the use of the iNACOL *National Standards for Quality Online Courses* is becoming a widely used resource. This article presents the final phase in a three-part study to test the validity and reliability of the iNACOL standards specifically to online course design. Phase three was a field test of the revised rubric based off the iNACOL standards against current K-12 online courses. While the results show a strong exact match percentage, there is more work to be done with the revised rubric.

Introduction

The use of online courses continues to grow, with supplemental online course enrollments at roughly 4.5 million (Gemin, Pape, Vashaw, & Watson, 2015). This influx of online courses into the United States education system has led to a realization of the differences between traditional and virtual environments. These differences would include the issue of the design of asynchronous course content. However, what is somewhat surprising is that the research into this critical aspect of K-12 online learning has been both minimal (Barbour, 2013; Barbour & Adelstein, 2013a), and narrow in scope, mainly focusing on specific schools (Barbour, Morrison, & Adelstein, 2014; Friend & Johnston, 2005; Zucker & Kozma, 2003).

There are current foundations and associations, such as the Michigan Virtual Learning Research Institute (MVLRI), that have taken up the task of researching further into course design. For example, since 2013 the MVLRI has included recommendations into educational

delivery models and instructional design standards in their yearly directives for the Michigan Legislature (MVLRI, 2016). To date these recommendations have focused on the International Association for K-12 Online Learning (iNACOL) (2011a) *National Standards for Quality Online Courses*, as one of the most popular, non-proprietary and publically available standards. Yet, the iNACOL standards were not developed using a traditional process that examines the validity and reliability of the standards and any instruments (i.e., rubrics) designed to measure those standards (Barbour, 2013; Barbour & Adelstein, 2013b; Molnar, Rice, Huerta, Shafer, Barbour, Miron, Gulosino, & Horvitz, 2014).

The following article outlines the third, and final phase, of a research study designed to begin the process of examining the iNACOL online course design standards for validity and reliability. The first phase of research of this study provided a cursory review of the iNACOL standards to determine the level of support for each of the standard elements within K-12 online learning literature, as well as broader online learning literature (see Adelstein & Barbour, 2016). During the second phase of this research study, two panels comprising eight experts from a variety of sectors in the field of K-12 online learning examined the standards based on the outcome of phase one over a cycle of three rounds of review (see Adelstein & Barbour, accepted). This second phase generated a revised list of specific design standards, as well as a revised rubric. In this article we describe the third phase of this research study, where four groups of two reviewers applied the phase two revised rubric using current K-12 online courses to examine the instrument for inter-rater reliability.

Literature Review

As indicated above, the research focused on K-12 online course design has been sparse. This is can possibly be attributed to the idea that online course design has not been stressed in

professional development (Dawley, Rice, & Hinck, 2010; Rice & Dawley, 2007; Rice, Dawley, Gasell, & Florez, 2008). While it has been suggested that design should be a completely separate role from the classroom instructor (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007), this notion has only been promoted in a handful of models. For example, the Teacher Education Goes Virtual Schooling[5] and Supporting K-12 Online Learning in Michigan[6] programs focused primarily on the role of the online learning facilitator, while the Iowa Learning Online[7] and Michigan Online Teaching Case Studies[8] initiatives focused on the role of the online teacher. However, there are several design trends that can be gleaned from the available literature. The release of a variety of general design standards, practitioner- and advocacy-generated literature, and limited research provide initial suggestions for guidance in online course design with enough commonalities to help form a larger picture, albeit one that is completed in broad strokes.

The first theme in the literature focused on keeping navigation simple. The design of the course should be formatted in a way that allows for intuitive, easy navigation of the site. For example, course designers from the Centre for Distance Learning and Innovation (CDLI) used a template to allow the students a consistency so they "don't frighten the kids with a different navigation menu on every screen" (Barbour, 2007a, p. 102). To add onto the understanding, it was recommended that designers give students a tour of the course, explaining how the virtual classroom is organized (Elbaum, McIntyre, & Smith, 2002). When used by VHS, the majority of students agreed that orientation gave them the comfort level to successfully navigate a course (Zucker & Kozma, 2003). This was also found to be important for students with special needs, as

[5] See http://itlab2.coe.wayne.edu/it6230/TEGIVS/
[6] See http://itlab2.coe.wayne.edu/it6230/michigan/
[7] See https://web.archive.org/web/20100716072923/http://projects.educ.iastate.edu/~vhs/index.htm
[8] See http://itlab2.coe.wayne.edu/it6230/casestudies/

consistent navigation patterns can curb frustration (Keeler & Horney, 2007). One of the positive aspects of courses with clarity and simplicity was that it not only worked for students with disabilities, but was also appropriate for all users (Keeler, Richter, Anderson-Inman, Horney, & Ditson, 2007). It was noted that a simplistic, linear approach should not necessarily bleed over into content delivery, as a variety in activities allows for a more interesting course, as well as tapping into different student learning styles (Barbour 2007a; Elbaum, McIntyre, & Smith, 2002; Barbour & Cooze, 2004).

The second theme focused on less text and more visuals where appropriate. Using a visual over text can offer advantages to students enrolled in an online course. The perception from educators that students ignore text-heavy sites plays into the notion that online courses are, and should be, presented differently than traditional courses (Barbour, 2007a). Online information can be presented in unique formats, and using solely text is akin to assigning a reading from the textbook (Barbour, 2005a). It was therefore not surprising to see online educators ask for additional training, so they can create and add multimedia into their courses (Barbour, Morrison, & Adelstein, 2014). Students agreed, as they indicated that they found visuals and multimedia "really interesting and a lot better than sitting down and reading the book" (Barbour & Adelstein, 2013a, p. 60). A graphically intensive course also allows visual learners to flourish (Barbour & Cooze, 2004), as well as help provide structure to students with disabilities (Keeler et al., 2007). However, graphics should be used only when appropriate, and not just because they are readily available (Barbour, 2007a; Elbaum, McIntyre, & Smith, 2002). Too many or over-stimulating visuals and backgrounds might distract students with attention deficit disorders (Keeler & Horney, 2007), which is why a mix of audio, text, and visuals was recommended.

The third theme focused on clear instructions, The nature of online courses, especially asynchronous courses, means clear and detailed directions are needed to help move students along (Elbaum, McIntyre, & Smith, 2002). For example, Barbour (2007a) indicated that "the directions and the expectations [need to be] precise enough so students can work effectively on their own, not providing a roadblock for their time" (p. 104). Clarity was also a concern for students, who worried that online content, was not as straight forward as the textbook, or that it was even easily accessible (Barbour & Adelstein, 2013a). In fact, the notion of clarity was relevant enough for VHS to include it as one of the 19 standards used for their course review process. The standards asked designers to judge if "the course is structured in such a way that organization of the course and use of medium are adequately explained and accommodating to the needs of students" (Yamashiro & Zucker, 1999, p. 57). The use of consistent, explicit expectations was also important for exceptional students to stay on track as well (Keeler et al., 2007). The idea is that clarity of expectations will remove instructions as a possible barrier for students, allowing the student and instructor to focus on the work itself.

This leads into the final theme focused on providing feedback to students. Since the students do not have the ability to talk directly with the teacher in class as seen in a traditional course, it's important to provide frequent and predictable feedback to the students (Elbaum, McIntyre, & Smith, 2002). As was the case with the previous suggestion, VHS reviewed courses with feedback in mind, checking that "the structure of the course encourages regular feedback (Yamashiro & Zucker, 1999, p. 57)." Feedback can be accomplished in a variety of ways, from self-assessments to built-in auto-graded exams found in certain learning management systems (Elbaum, McIntyre, & Smith, 2002). A self-assessment feature that gives instantaneous feedback, for example, was highly touted by online students (Barbour & Adelstein, 2013b), who

appreciated knowing if they were on the right track. Immediate feedback can be a beneficial formative assessment for students (Huett, Huett, & Ringlaben, 2011). Regardless of the form it takes, feedback to students is vital to a course, as it keeps the students up-to-date on their standings and engaged in their work (Elbaum, McIntyre, & Smith, 2002).

The four principles listed above are a small but important collection of common elements found in K-12 course design literature. However, there is clearly more that should be taken into consideration, which is the focus of the overall study. This manuscript will focus on phase three, which looks to field test the revised rubric designed in phase two. The revised rubric contains elements determined to be vital by an expert panel in regards to K-12 online course design.

Methodology

Upon completion of phase one and two, which tested content validity through a comparison to the standards to the literature and then expert review, the third and final phase of this study examined the reliability of the rubric based on the revised iNACOL standards. When evaluating the rubric, it was important to test not just the validity, but the reliability as well (Taggart, Phifer, Nixon, & Wood, 2001). Further, Legon and Runyon (2007) noted that having instructors review online course design rubrics not only helped the instrument, but also benefited the instructors as well. These instructors mentioned feeling stimulated and motivated to improve their own courses based off the review process. Simply put, inter-rater reliability is a form of triangulation (Denzin, 1978), which is a method to find the accuracy of a specific point using different inputs.

Inter-rater reliability four pairs of reviewers using multiple responses can be determined in different ways, with kappa being one of the more popular methods. The kappa coefficient appeared the most appropriate, as it "indicates whether two judges classify entities in a similar

fashion" (Brennan & Hays, 1992, p. 155). However, as the data was reviewed, it became obvious that using kappa would be impossible to accomplish. Kappa cannot be calculated if a rater gives the same rating to what is being tested, as the rater changes from a variable to a constant. Since the study took the details of each specific element into account, there was an increased likelihood of the same rating being applied by one or both reviewers (this issue is discussed in further detail in the results). Understanding the limitations of using such a small pool of results, the results were ultimately shared through percentage agreement. As noted by Neuendorf (2002), "coefficients of .90 or greater are nearly always acceptable, .80 or greater is acceptable in most situations, and .70 may be appropriate in some exploratory studies for some indices" (p. 145 as cited by Moore, 2015, p. 26).

The purpose of this phase of the study was to field test the revised rubric using online courses that were already in use by K-12 online learning programs. The reviewers were K-12 online designers and/or K-12 online instructors who were not involved with the second phase of this study (see Table 4.1). People with similar backgrounds were specifically chosen and grouped together to promote a consistent application of the revised rubric.

Table 4.1.

Description of the Four Groups of Reviewers

Group A	Group B
Bob (all names are pseudonyms) • High school educator with K-12 online experience • Central Region Hilary • K-12 online educator • Northeast Region	Ashley • Secondary educator with online design experience • West Region Andrea • Educator and Administrator in K-12 online education • West Region
Group C	Group D
Donald • High school educator with K-12 online experience • Central Region Nancy • High school and online educator with design experience • West Region	Josh • Educator and Administrator in K-12 online education • West Region Sarah • Educator and Administrator in K-12 online education • West Region

Designers and instructors were selected because they were representative of the population who would most likely use the newly revised rubric. If you consider the current level of K-12 online learning activity in the United States (Gemin et al., 2015), the geographic distribution of the reviewers were fairly representative. The one exception was the fact that there is a significant level of supplemental K-12 online learning activity in the Southeast Region, but I was unable to

recruit any reviewers from this region. While reviewers from the Southeast Region were not represented during the recruitment process, the Central Region and West Region were well represented. Similarly, the literature has identified a number of roles that educators can assume within the K-12 online learning environment (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007; Ferdig, Cavanaugh, DiPietro, Black, & Dawson, 2009), including designer, teacher, facilitator, and administrator. Care was taken to ensure that those who were involved with the online course design (i.e., designer, teacher, and administrator) were represented within the reviewers.

As the reliability of an instrument is actually improved upon when the users undergo training (Taggart et al., 2001), the groups were trained on the different areas of measurement as well as how to use to use the rubric. After each reviewer agreed to participate, they were sent a training packet that included the revised rubric, examples on how to grade specific elements, and a sample course to try out the rubric against. Next, a *Google Hangout* meeting was scheduled one week later with each group individually to discuss the results of their application of the rubric to the sample course.

Upon completion of the meeting, each group received five courses to review. Reviewers had up to two weeks to individually complete the process. Courses reviewed covered core academic areas, as well as electives for both middle school and high school from two different online course providers[9] (see Tables 4.2 and 4.3).

Table 4.2.

Types of Courses Reviewed

[9] An application process to use a third provider to supply elementary courses for this phase of the study was completed, but ultimately the provider stopped communicating. Contact was attempted multiple times over the course of two months, but eventually the study moved forward without the third provider.

Grade Level	Subject Matter				
	Elective	Language Arts	Mathematics	Science	Social Studies
6	X		X*		
7	X	X*			X
8	X				
9	X				X*
10			X	X	X
11			X	X*	

X* = Course was designed to fit within multiple areas of middle school (MS) or high school (HS).

Table 4.3.

Courses Reviewed by Groups

	Subject Matter/School Level									
	MS Elect	MS ELA	MS Math	MS Sci	MS SS	HS Elect	HS ELA	HS Math	HS Sci	HS SS
Group A	X	X						X		X, X
Group B	X				X		X	X	X	
Group C		X	X			X, X			X	
Group D		X			X	X, X			X	

Each group used the final revised rubric on five courses and rated the measurements on a three-point Likert scale (see Appendix A). If the element was evident in the course it was rated a '3' for applied, a '1' was for elements that were not applied, and a rating of '2' meant the element was partially applied. Since certain elements had multiple aspects (e.g. a course includes both a complete overview and syllabus), a partially applied rating was required for reviewers.

The results between group members were coded using three levels. According to Bresciani, Oakleaf, Kolkhorst, Nebeker, Barlow, Duncan, and Hickmott, (2009), if the rubric itself is well-designed, even untrained evaluators will find a significant level of agreement. As such, results were tabulated by the size of difference per rating, looking at 'exact match,' 'different by one,' and 'different by two.' Of particular importance were the exact matches as well as those that were different by two. In the latter situation, it would mean that one reviewer in the group found no evidence of the element while the other believed it was fully applied.

Results

The results of the field test are presented by section titles as used in the revised rubric.

Section A: Content

Overall, Section A did not have strong consistency across the groups (see Table 4.4).

Table 4.4.

Section A Element Size Difference per Group

	1						2					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count
A1	40.0%	2	20.0%	1	40.0%	2	20.0%	1	40.0%	2	40.0%	2
A2	60.0%	3	40.0%	2	0.0%	0	20.0%	1	20.0%	1	60.0%	3
A3	40.0%	2	0.0%	0	60.0%	3	20.0%	1	20.0%	1	60.0%	3
A4	40.0%	2	60.0%	3	0.0%	0	60.0%	3	40.0%	2	0.0%	0
A5	60.0%	3	40.0%	2	0.0%	0	40.0%	2	40.0%	2	20.0%	1
A6	100.0%	5	0.0%	0	0.0%	0	20.0%	1	80.0%	4	0.0%	0
A7	20.0%	1	20.0%	1	60.0%	3	20.0%	1	40.0%	2	40.0%	2
A8	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
A9	60.0%	3	20.0%	1	20.0%	1	40.0%	2	20.0%	1	40.0%	2
	3						4					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count
A1	100.0%	5	0.0%	0	0.0%	0	60.0%	3	20.0%	1	20.0%	1
A2	80.0%	4	20.0%	1	0.0%	0	80.0%	4	20.0%	1	0.0%	0
A3	80.0%	4	20.0%	1	0.0%	0	100.0%	5	0.0%	0	0.0%	0
A4	20.0%	1	80.0%	4	0.0%	0	40.0%	2	0.0%	0	60.0%	3
A5	40.0%	2	0.0%	0	60.0%	3	20.0%	1	80.0%	4	0.0%	0
A6	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
A7	60.0%	3	40.0%	2	0.0%	0	80.0%	4	0.0%	0	20.0%	1
A8	80.0%	4	20.0%	1	0.0%	0	40.0%	2	0.0%	0	60.0%	3
A9	80.0%	4	0.0%	0	20.0%	1	80.0%	4	0.0%	0	20.0%	1

Still, more than half of the ratings were exact matches for groups one, three, and four. Two elements in particular, A6 (i.e., the course is free of bias) and A8 (i.e., privacy policies are stated), scored high – with 80% complete agreement across all groups (see Table 4.5). Taken as a whole across all groups, Section A had 58% complete agreement.

Table 4.5.

Section A Size Difference Cross Tabulation All Groups

Element * Size of Difference Crosstabulation

			Size of Difference			
			.00	1.00	2.00	Total
Element	A1	Count	11	4	5	20
		% within Element	55.0%	20.0%	25.0%	100.0%
	A2	Count	12	5	3	20
		% within Element	60.0%	25.0%	15.0%	100.0%
	A3	Count	12	2	6	20
		% within Element	60.0%	10.0%	30.0%	100.0%
	A4	Count	8	9	3	20
		% within Element	40.0%	45.0%	15.0%	100.0%
	A5	Count	8	8	4	20
		% within Element	40.0%	40.0%	20.0%	100.0%
	A6	Count	16	4	0	20
		% within Element	80.0%	20.0%	0.0%	100.0%
	A7	Count	9	5	6	20
		% within Element	45.0%	25.0%	30.0%	100.0%
	A8	Count	16	1	3	20
		% within Element	80.0%	5.0%	15.0%	100.0%
	A9	Count	13	2	5	20
		% within Element	65.0%	10.0%	25.0%	100.0%

Notably, there were not any extreme cases of 'different by two.' However, every group had at least one element from Section A with 60% of the scores off by two. A3 discussed having materials available at the course start and was flagged by two groups; while A4, A5, A7, and A8 each had one mention.

Section B: Instructional Design Elements

Much like Section A, there was not a notable consistency of exact agreement in Section B (see Table 4.6).

Table 4.6.

Section B Element Size Difference per Group

	1						2					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
B1	40.0%	2	60.0%	3	0.0%	0	0.0%	0	100.0%	5	0.0%	0
B2	60.0%	3	40.0%	2	0.0%	0	80.0%	4	20.0%	1	0.0%	0
B3	60.0%	3	20.0%	1	20.0%	1	80.0%	4	20.0%	1	0.0%	0
B4	40.0%	2	60.0%	3	0.0%	0	20.0%	1	60.0%	3	20.0%	1
B5	60.0%	3	40.0%	2	0.0%	0	80.0%	4	20.0%	1	0.0%	0
B6	80.0%	4	20.0%	1	0.0%	0	20.0%	1	80.0%	4	0.0%	0
B7	80.0%	4	20.0%	1	0.0%	0	40.0%	2	60.0%	3	0.0%	0
B8	60.0%	3	40.0%	2	0.0%	0	20.0%	1	80.0%	4	0.0%	0
B9	40.0%	2	60.0%	3	0.0%	0	40.0%	2	60.0%	3	0.0%	0
B10	40.0%	2	60.0%	3	0.0%	0	80.0%	4	0.0%	0	20.0%	1
B11	40.0%	2	60.0%	3	0.0%	0	20.0%	1	80.0%	4	0.0%	0
	3						4					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
B1	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
B2	80.0%	4	20.0%	1	0.0%	0	60.0%	3	40.0%	2	0.0%	0
B3	60.0%	3	40.0%	2	0.0%	0	40.0%	2	60.0%	3	0.0%	0
B4	20.0%	1	20.0%	1	60.0%	3	80.0%	4	20.0%	1	0.0%	0
B5	100.0%	5	0.0%	0	0.0%	0	40.0%	2	20.0%	1	40.0%	2
B6	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
B7	80.0%	4	20.0%	1	0.0%	0	0.0%	0	100.0%	5	0.0%	0
B8	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
B9	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
B10	40.0%	2	0.0%	0	60.0%	3	40.0%	2	0.0%	0	60.0%	3
B11	40.0%	2	60.0%	3	0.0%	0	40.0%	2	60.0%	3	0.0%	0

Three of the four groups once again had over 50% exact match. Group two was again under 50% for this section. Looking across all groups, Section B had 57% exact match overall, yet none of the groups attained more than 75% on any given element (see Table 4.7).

Table 4.7.

Section B Size Difference Cross Tabulation All Groups

		Size of Difference			
		.00	1.00	2.00	Total
B1	Count	11	9	0	20
	% within Element	55.0%	45.0%	0.0%	100.0%
B2	Count	14	6	0	20
	% within Element	70.0%	30.0%	0.0%	100.0%
B3	Count	12	7	1	20
	% within Element	60.0%	35.0%	5.0%	100.0%
B4	Count	8	8	4	20
	% within Element	40.0%	40.0%	20.0%	100.0%
B5	Count	14	4	2	20
	% within Element	70.0%	20.0%	10.0%	100.0%
B6	Count	15	5	0	20
	% within Element	75.0%	25.0%	0.0%	100.0%
B7	Count	10	10	0	20
	% within Element	50.0%	50.0%	0.0%	100.0%
B8	Count	13	7	0	20
	% within Element	65.0%	35.0%	0.0%	100.0%
B9	Count	13	7	0	20
	% within Element	65.0%	35.0%	0.0%	100.0%
B10	Count	10	3	7	20
	% within Element	50.0%	15.0%	35.0%	100.0%
B11	Count	7	13	0	20
	% within Element	35.0%	65.0%	0.0%	100.0%

There were significantly less ‘different by two’ counts for Section B. B4 attained the 60% threshold with one group. Only B10, which discussed explicit communication, activities, and tools in the course at multiple intervals, had 60% of the scores separated by two numbers for more than one group. Overall, the majority of the elements fit into the exact match or one off.

Section C: Student Assessment Elements

The level of inter-rater reliability in Section C significantly improved compared to the prior two sections, with ‘exact match’ being the highest ranking for all four groups (see Table 4.8).

Table 4.8.

Section C Element Size Difference per Group

	1						2					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
C1	80.0%	4	20.0%	1	0.0%	0	100.0%	5	0.0%	0	0.0%	0
C2	40.0%	2	60.0%	3	0.0%	0	40.0%	2	60.0%	3	0.0%	0
C3	40.0%	2	60.0%	3	0.0%	0	20.0%	1	80.0%	4	0.0%	0
C4	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
C5	100.0%	5	0.0%	0	0.0%	0	40.0%	2	60.0%	3	0.0%	0
C6	20.0%	1	60.0%	3	20.0%	1	80.0%	4	20.0%	1	0.0%	0
C7	60.0%	3	40.0%	2	0.0%	0	40.0%	2	60.0%	3	0.0%	0
	3						4					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
C1	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
C2	60.0%	3	40.0%	2	0.0%	0	100.0%	5	0.0%	0	0.0%	0
C3	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
C4	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
C5	60.0%	3	40.0%	2	0.0%	0	80.0%	4	20.0%	1	0.0%	0
C6	60.0%	3	40.0%	2	0.0%	0	80.0%	4	20.0%	1	0.0%	0
C7	40.0%	2	60.0%	3	0.0%	0	100.0%	5	0.0%	0	0.0%	0

C1 (i.e., consistency of student evaluations in regards to goals and objectives) and C4 (i.e., students are continuously aware of progress) were both at 95% exact match across all groups (see Table 4.9).

Table 4.9.

Section C Size Difference Cross Tabulation All Groups

Element * Size of Difference Crosstabulation

		Size of Difference			
		.00	1.00	2.00	Total
C1	Count	19	1	0	20
	% within Element	95.0%	5.0%	0.0%	100.0%
C2	Count	12	8	0	20
	% within Element	60.0%	40.0%	0.0%	100.0%
C3	Count	12	8	0	20
	% within Element	60.0%	40.0%	0.0%	100.0%
C4	Count	19	1	0	20
	% within Element	95.0%	5.0%	0.0%	100.0%
C5	Count	14	6	0	20
	% within Element	70.0%	30.0%	0.0%	100.0%
C6	Count	12	7	1	20
	% within Element	60.0%	35.0%	5.0%	100.0%
C7	Count	12	8	0	20
	% within Element	60.0%	40.0%	0.0%	100.0%

Overall, the four groups came out with 71% exact match agreement. Transversely, the larger size difference decreased. C6, which looked for a suggested grading rubric, was the only element that had a pair of scores two apart. This only occurred once, with group one, out of twenty total reviews across all groups.

Section D: Technology Elements

The results for Section D were considerably consistent and inconsistent compared to the other sections. To start, Section D had high exact match agreements for all four groups (see Table 4.10).

Table 4.10.

Section D Element Size Difference per Group

	1						2					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
D1	0.0%	0	80.0%	4	20.0%	1	20.0%	1	20.0%	1	60.0%	3
D2	60.0%	3	40.0%	2	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D3	100.0%	5	0.0%	0	0.0%	0	80.0%	4	20.0%	1	0.0%	0
D4	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D5	80.0%	4	20.0%	1	0.0%	0	20.0%	1	60.0%	3	20.0%	1
D6	80.0%	4	20.0%	1	0.0%	0	20.0%	1	80.0%	4	0.0%	0
D7	40.0%	2	20.0%	1	40.0%	2	100.0%	5	0.0%	0	0.0%	0
D8	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D9	80.0%	4	0.0%	0	20.0%	1	100.0%	5	0.0%	0	0.0%	0
D10	100.0%	5	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.0%	5
	3						4					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
D1	20.0%	1	0.0%	0	80.0%	4	60.0%	3	20.0%	1	20.0%	1
D2	60.0%	3	20.0%	1	20.0%	1	100.0%	5	0.0%	0	0.0%	0
D3	80.0%	4	20.0%	1	0.0%	0	80.0%	4	20.0%	1	0.0%	0
D4	60.0%	3	40.0%	2	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D5	40.0%	2	20.0%	1	40.0%	2	80.0%	4	0.0%	0	20.0%	1
D6	40.0%	2	0.0%	0	60.0%	3	80.0%	4	20.0%	1	0.0%	0
D7	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D8	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0
D9	60.0%	3	0.0%	0	40.0%	2	80.0%	4	20.0%	1	0.0%	0
D10	100.0%	5	0.0%	0	0.0%	0	100.0%	5	0.0%	0	0.0%	0

For example, element D8, which discussed clearly stated copyright status, was an exact match for all 20 sets of reviews (see Table 4.11). Seven of the elements had at least a 75% exact match agreement across the groups, putting section D at 81% overall agreement, the highest level for any section.

Table 4.11.

Section D Size Difference Cross Tabulation All Groups

Element * Size of Difference Crosstabulation

		Size of Difference			
		.00	1.00	2.00	Total
D1	Count	5	6	9	20
	% within Element	25.0%	30.0%	45.0%	100.0%
D2	Count	16	3	1	20
	% within Element	80.0%	15.0%	5.0%	100.0%
D3	Count	17	3	0	20
	% within Element	85.0%	15.0%	0.0%	100.0%
D4	Count	18	2	0	20
	% within Element	90.0%	10.0%	0.0%	100.0%
D5	Count	11	5	4	20
	% within Element	55.0%	25.0%	20.0%	100.0%
D6	Count	11	6	3	20
	% within Element	55.0%	30.0%	15.0%	100.0%
D7	Count	17	1	2	20
	% within Element	85.0%	5.0%	10.0%	100.0%
D8	Count	20	0	0	20
	% within Element	100.0%	0.0%	0.0%	100.0%
D9	Count	16	1	3	20
	% within Element	80.0%	5.0%	15.0%	100.0%
D10	Count	15	0	5	20
	% within Element	75.0%	0.0%	25.0%	100.0%

However, Section D also had a high percentage of 'different by two' scores (i.e., a score of 1 and a score of 3) in the individual groups. For example, element D10, which discusses the course following Family Educational Rights and Privacy Act (FERPA) regulations and posting the information, was at 100% disagreement in group two. Group three had 80% disagreement in regards to D1, the element that inquired about the course architecture allowing the instructor to add content, activities, and assessments on their own. Looking across all the groups, D1 was at 45% with a score size difference of two.

Section E: Course Evaluation and Support Elements

With the lowest element count, Section E also had the lowest exact match scores (see Table 4.12).

Table 4.12.

Section E Element Size Difference per Group

	1						2					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
E1	0.0%	0	100.0%	5	0.0%	0	0.0%	0	0.0%	0	100.0%	5
E2	60.0%	3	40.0%	2	0.0%	0	20.0%	1	60.0%	3	20.0%	1
E3	100.0%	5	0.0%	0	0.0%	0	0.0%	0	20.0%	1	80.0%	4
	3						4					
	Size of Difference						Size of Difference					
	Exact Match		Different by One		Different by Two		Exact Match		Different by One		Different by Two	
	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count	Row Valid N%	Count
E1	0.0%	0	0.0%	0	100.0%	5	80.0%	4	20.0%	1	0.0%	0
E2	20.0%	1	20.0%	1	60.0%	3	100.0%	5	0.0%	0	0.0%	0
E3	60.0%	3	0.0%	0	40.0%	2	60.0%	3	40.0%	2	0.0%	0

Only groups 1 and 4 had over 50% exact matches, indicating that there was little in the way of agreement across review pairs. Across all groups, element E3, making sure the course offers technical support and assistance to the students and instructor, had the highest exact match rating at 55% (see Table 4.13).

Table 4.13.

Section E Size Difference Cross Tabulation All Groups

Element * Size of Difference Crosstabulation

		Size of Difference			
		.00	1.00	2.00	Total
E1	Count	4	6	10	20
	% within Element	20.0%	30.0%	50.0%	100.0%
E2	Count	10	6	4	20
	% within Element	50.0%	30.0%	20.0%	100.0%
E3	Count	11	3	6	20
	% within Element	55.0%	15.0%	30.0%	100.0%

Overall, Section E had a 41% exact match agreement. While groups one and four did not have any two-point size differences, groups two and three proved troublesome. Both groups had 100% two point disagreement for E1, the element that checked for multiple means of assessing course effectiveness. Group two also disagreed on E3, scoring 80% of reviews with a two point size difference.

Looking at the reviews as a whole, groups one, three, and four were in exact agreement over 60% of the time (see Table 4.14), with group 4 at nearly 75%.

Table 14.

Overall Size Difference per Group

		Size of Difference			
		.00	1.00	2.00	Total
1	Count	123	62	15	200
	%	61.5%	31.0%	7.5%	100.0%
2	Count	95	71	34	200
	%	47.5%	35.5%	17.0%	100.0%
3	Count	136	32	32	200
	%	68.0%	16.0%	16.0%	100.0%
4	Count	149	35	16	200
	%	74.5%	17.5%	8.0%	100.0%
Total	Count	503	200	97	800
	%	62.9%	25.0%	12.1%	100.0%

Group two, however, was under 50% exact agreement. Group two also had the highest two size difference, sitting at 17%. There are plenty of reasons why group two can be so far off in exact matches, including personal bias or inadequate training from the principle researcher. If exact match were only taken into account, the 62.9% would not be acceptable for reliability.

Discussion

The overall results had numerous outcomes where there was a difference of two between the scores of the two reviewers. Many of the elements did not feed into opinion and bias (e.g., appropriate course rigor, high variety of learning pathways), but rather were based on whether the item was present or not (e.g., FERPA laws are posted, privacy policies. This would imply muddled course navigation, with some reviewers unable to find important course items. To help negate confusion, designers can use a standard template for their courses, much like those implemented at CDLI (Barbour, 2007b). CDLI designers insisted that navigation should be simple and minimal to avoid confusion (Barbour, 2007a). A basic document, with all the navigational procedures and important document locations outlined, for example, would also be beneficial for students and instructors (Elbaum et al., 2002). Another option for a course would be to utilize unit checklists of expectations and effectively communicating that message out (Huett et al., 2011).

On the other hand, there were yes/no or simple direction elements (e.g., use of copyright materials) that were close to 100% exact match. These elements were able to show proper modeling of how to apply the element in a clear and easy to understand fashion. The use of proper modeling is important for a course, something that is a concern not just for instructors, but for the students as well (Barbour & Adelstein, 2013a). When expectations are modeled correctly, it helps to remove the guesswork behind the meaning (Barbour, 2007a). Explicit expectations

and modeling can extend to having a pacing guide that provides a clear overview (Huett et al., 2011), which can have a positive impact on all students – including exceptional learners (Keeler et al., 2007).

The elements that discussed use of appropriate multimedia and technology had some of the highest exact match scores, implying that the use of visual cues made rating the elements easier. Due to the unique medium of online courses, media should be added to help enhance the course (Barbour, 2005a; Barbour, 2007a). Courses that take advantage of multimedia help students to engage (Barbour & Adelstein, 2013a), while those without multimedia can be bland, making it difficult to keep student interest (Huett et al., 2011). Overuse of multimedia can be a negative (Keeler & Horney, 2007), causing overstimulation. However, when used appropriately media visuals can offer structure for students (Keeler et al., 2007). Unfortunately, the ability to design various media elements is one of the most commons aspects that online teachers report to needing professional development (Barbour, Morrison, & Adelstein, 2014; Dawley, Rice, & Hinck, 2010).

Conclusion and Implications

The iNACOL (2011a) *National Standards for Quality Online Courses* were compared to current literature in phase one (see Adelstein & Barbour, 2016), while an expert panel helped redesign a revised rubric that looked specifically at course design standards (see Adelstein & Barbour, accepted). Phase three had K-12 online educators and course designers apply the rubric to existing online courses. Four teams of two applied the rubric to five courses each, which allowed the researcher to review the rubric for percentage agreement. This allowed the researcher to test the inter-rater reliability of the revised rubric. While the overall results do not meet a reliability threshold, there are still lessons to take away from the initial field test. The

number of instances where there was agreement (i.e., 62.9%) or a differences of only one (i.e., 25%), strongly outweighed the number of instances where the reviewers had a difference of two (i.e., 12.1%). There are individual elements throughout the rubric that meet the reliability threshold (i.e., 90% or 80%), while other elements can be revised and improved. Other considerations, such as bias or elements that were difficult to determine (e.g., course rigor, course assessment), need to be taken into account for the next revision. Overall, the revised rubric provided a narrow focus on course design elements only, which reinforced ideas that were currently promoted in K-12 online education.

To discover the full potential of the revised rubric, further field tests are required to overcome the limitation from this initial study. These further field tests would include testing with reviewers from different regions and different roles. Additionally, having reviewers from different backgrounds (e.g., faciltitators/mentors or designers along with online teachers), would allow for dissimilar pairings. A well-designed rubric, regardless of the reviewer's background, should be able to show strong results for inter-rater reliability. One of the limitations of the initial study was the small number of participants. Having only four pairs was enough to gather initial thoughts and data regarding the revised rubric, but an expansion of reviewers is needed for a next step. Having only four pairs also limited how inter-rater reliability could be calculated. Adding additional courses for each group (e.g., K through 5, different content, different providers, supplemental and hybrid designed courses, etc.), as well as expanding out the number of groups, would allow for stronger results. Another limitation was using the revised rubric on current courses. While using current courses was an appropriate place to begin the study, a true test would be to design multiple new courses utilizing the revised rubric. This would allow for future

studies to compare designer and student opinions between courses created using the revised rubric with courses created using other standards.

CHAPTER 5 REDESIGNING DESIGN: STREAMLINING K-12 ONLINE COURSE CREATION

Introduction

Online courses have become a significant part of our educational landscape. K-12 online supplemental course registration has reached all-time highs, up to nearly 4.5 million enrollments (Gemin, Pape, Vashaw, & Watson, 2015). As we move towards this inevitable merging of online and traditional styles, it becomes vital to make sure the standards we hold online education up to are just as strong as what we provide in a face-to-face setting. These standards need to include every aspect of online education, even including how the course itself is designed.

Over the past year and a half, I have worked to create a revised K-12 online course design rubric based off the International Association for K-12 Online Learning (iNACOL) (2011a) *National Standards for Quality Online Courses*. In this article, I will describe why the iNACOL standards were selected, the process for creating a revised rubric, and finally results and recommendations.

The State of Standards and Revising a Rubric

Research with regards to online course design at the K-12 level has been limited (Barbour & Adelstein, 2013). The little information that is out there tends to focus on specific programs or institutions, such as the Center for Distance Learning and Innovation (Barbour, 2005a; 2007a) or the Florida Virtual Schools (Johnston, 2004). This lack of literature meant that practice standards slowly evolved alongside the dramatic expansion of K-12 online courses. This is not to say that there are not excellent sources for those that design online course content to select from.

A major barrier to entry, however, is that some of the more detailed and researched standards are proprietary (e.g., Quality Matters – see QM, 2016b), or linked specifically to their programs (e.g., Virtual High School – see Zucker & Kozma, 2003). For this reason, the

publically available and non-proprietary iNACOL standards are a popular choice. Originally based of standards released by the SREB from 2006, iNACOL, working with a team of experts, created the *National Standards for Quality Online Courses* in 2006. Taking feedback and reviews into account, an updated version was released (iNACOL, 2011a). For a variety of institutions and state programs, including those found in Michigan (Michigan Department of Education & Michigan Virtual University, 2015), the non-proprietary standards were an excellent place to start. The drawback is that there has been no research published on the validity of the iNACOL standards or how they directly relate to online course design.

Three Phases to Creating a Design Rubric

The revised rubric creation process was divided up into three distinct phases. Phase one reviewed the content validity of the iNACOL standards by comparing current K-12 and online learning literature against each of the original 52 elements (see Adelstein & Barbour, 2016), which showed that each element was at least partially supported by literature. Phase two tested the content validity by having eight K-12 online experts from various sectors review the standards along with the phase one results and suggestions. During the three rounds of review, the experts combined, deleted, revised, or kept the elements to form a new revised rubric that focused specifically on K-12 course design. The final phase had four teams of two reviewers testing the inter-rater reliability of the revised rubric against current K-12 online courses. Simply stated, the reviewers were testing whether there was agreement across the revised elements.

What Was Found?

To be clear, the iNACOL *National Standards for Quality Online Courses* are an excellent place for schools, districts, and state programs to begin. The elements listed are all supported by literature – to some extent, and offer guidance for the entirety of the course. The issue that arose,

however, was that the standards were too broad and could even be overwhelming for educators new to online course creation.

To look solely at just online course design, the iNACOL standards required changes. As the expert panel noted, every original element was important, but they did not all fit within the narrow scope of course design. The modifications were made to help educators focus on just the essential design elements and eliminate what was not required for the creation process.

Tested against multiple online courses, the revised rubric was put through the paces. However, while using the rubric against current courses is a proper start, further research is needed. The true test for the revised rubric will happen when educators begin the design process using the new rubric (https://goo.gl/KWCD4Q).

What the Revised Rubric Means for Online Educators

As online courses continue to grow, it will be expected that districts and states to incorporate online learning experiences. The burden of design can be a staggering and overwhelming process, which often leads to the more expensive but easier model of simply leasing content. The revised rubric resulting from the above study offers educators the ability to streamline the creation process with directed elements that solely spotlight design.

The rubric was created with both new and experienced designers in mind. The narrow focus will help direct beginners, while the wording and categories will be familiar to those who have worked with the iNACOL standards in the past. While there are no true shortcuts for educators who undertake this endeavor, the hope is that the revised rubric will help give some clarity to the process.

CHAPTER 6 CONCLUSIONS AND IMPLICATIONS

As described in the previous chapters, this study was conducted in three distinct phases. I reviewed and revised the International Association for K-12 Online Learning (iNACOL) (2011a) *National Standards for Quality Online Courses* through a literature review, followed by an expert panel review and then a field test with teams of reviewers. The end result was a revised rubric that specifically addressed K-12 online course design.

Conclusions

Research was conducted in three distinct phases, taking well over a year to complete. Phase one compared the iNACOL (2011a) *National Standards for Quality Online Courses* with the current literature in K-12 online education. Since this specific body of literature was limited, literature focused on online learning in higher education and with other relevant populations was used to supplement the literature review. This process showed that the iNACOL standards were indeed aligned with existing literature, although not necessarily with research – and specifically not research into K-12 online learning.

Phase two utilized an expert panel to revise the standards based on the existing document, as well as the results of the literature review from phase one, through the specific lens of online course design over the course of three rounds. For round one, the experts rated and commented on each element, while round two had the experts combining, revising, deleting, or keeping elements based off the round one results. Round three was a final review of the elements conducted electronically through *Google Hangouts*. The experts were thorough across the three rounds of review, forcing much debate over each element. It was challenging coordinating a synchronous session for the final round with each of the expert's personal schedules, but the

third round proved to be the most fruitful – with the experts able to openly discuss the elements face-to-face.

The final phase tested the revised rubric against current K-12 online courses. National recruitment for reviewers turned out to be a difficult proposition, as requirements and schedules eliminated many volunteers. After an initial training to standardize the reviewers to using the rubric utilizing a sample online course, the reviewers were organized into groups of two and tasked with independently reviewing five courses with the revised rubric. The reviewers eventually generated online course reviews that allowed the researcher to examine the inter-rater reliability of the revised rubric by comparing differences in scores for each element within the group and across all groups. While the overall results did not meet the reliability threshold for percentages, many of the individual elements were found to be reliable. This dissertation study was a positive first step for research into creating a set of validated standards – and associated rubric – for K-12 online course design.

Limitations of the Study

In phase one, the literature review of the iNACOL (2011a) *National Standards for Quality Online Courses*, the lack of K-12 online course design research quickly became a challenging factor. To supplement, more generalized K-12 online learning literature (i.e., non-research-based) and higher education literature was used. It is important to note that much of the more generalized K-12 online learning literature was produced by ideological proponents of K-12 online learning, and – as such – leaves a lot to be desired in terms of a true measure of content validity. Further, while there are many similarities between teaching and learning with adults and teaching and learning with adolescent and child learners, there are many differences in the two populations in terms of their development and ability to learn (i.e., supports for learning

required) – as such, the higher education focus was fairly limited. As a result, the content validity or "support" for numerous elements is somewhat questionable. For example, these questionably supported elements included items that looked to rigor, the use of multiple learning resources, and the inclusion of assessment answers.

Phase two, or the expert review, was limited by time and volunteers. While eight participants meant the suggestions and revisions were done on a smaller scale, the number of experts also made the process of trying to coordinate an online synchronous meeting difficult. The refinement that occurred during the *Google Hangout* was vital to the process. However, it appeared that the 60-90 minute time for this session limited the potential to really drill into and refine some of the elements.

In much the same way, phase three was limited by the number of reviewers and the number of courses to be reviewed. The small number of groups and course providers meant a limited number of courses in select content areas and grade levels were reviewed. This hampered the ability to calculate inter-rater reliability through kappa and other statistical procedures. With a limited number of courses being reviewed by each reviewer, as well as only using two course providers for the research, there was a high chance that an element was going to receive the same score across all courses. As such, there was an expectation that courses from the same provider would be similar, especially with elements that measured a legally required item. For example, if one course from a particular provider mentioned compliance with FERPA, then every course from that same provider was likely to receive a 3, or 'fully applied,' for that specific element. This turns the individual rater into a constant, making the use of kappa impossible. Using percentages was appropriate, but it became more challenging to determine bias and chance (i.e., something that the kappa procedure takes into account, but simple percentages do not). This

challenge could potentially be mitigated with the review of additional online courses per each reviewer. The use of additional courses would mean an increase in the number of values per reviewer, along with the added benefit of the reviewers becoming more comfortable with the overall review process and the application of the revised rubric. It should also be noted that phase three was limited by the access to the courses that were supplied. For example, the reviewers did not have access to elementary courses, and were limited to a specific pool of subjects and grades. The small sample of online courses used was not representative of the entire realm of K-12 online learning. A broader range of grade levels and subject areas – as well as simply more online courses – would allow for more data and, ultimately, help overcome some phase three limitations.

Implications for Practice

K-12 online course design research has been shown to be both minimal and limited (Barbour & Adelstein, 2013a). While the field of online learning has attracted a variety of studies, there has been a lack of focus on design itself. The research that does exist has mainly examined the course design process at specific schools or institutions (Barbour et al., 2014; Friend & Johnston, 2005; Zucker & Kozma, 2003). Therefore, the testing of content validity in both phase one and phase two of the iNACOL (2011a) *National Standards for Quality Online Courses* was the next important step to take. Further, phase three gave future researchers and designers a revised rubric from which to work on and focus solely on online course design.

The work completed has additional benefits for educators, institutions, and researchers involved in K-12 online learning. The review of the iNACOL standards in phase one implied that each element is tied to current K-12 or related online education literature, giving more credence to the overall standards. By narrowing the focus of the elements in phase two, the revised rubric

gave K-12 online course designers and educators a stronger platform to build from. Phase three strengthened the rubric further, with numerous elements showing high levels of inter-rater reliability. Ultimately, the research into the revised rubric gave all stakeholders a new starting point for course design, and with it the hope of improving student achievement.

Looking at specific stakeholders, state programs and educational institutions could take advantage of the focused revised rubric. As online course enrollments rise (Gemin et al., 2015), and laws continue to require states to offer online courses (Michigan Department of Education & Michigan Virtual University, 2015), there is an increased need for online design standards that are both reliable and valid. The revised rubric could provide institutions a more streamlined guide specific to online course design, which would allow for the development and/or review of a quality online course design in a shorter timeframe.

Also of note, online K-12 educators want to make sure they are working within the best learning environment for their students. While the iNACOL *National Standards for Quality Online Courses* are generally accepted standards to use for overall course creation (Adelstein & Barbour, 2016), the use of such broad elements can be difficult for educators to wrap their head around and pinpoint specific design elements. A smaller revised rubric that was based specifically around agreed upon design standards would give K-12 educators a more streamlined checklist for their online courses (e.g., Barbour, 2007a; DiPietro et al., 2008). This would also allow K-12 teachers to judge their online course design, giving them a clearer direction for possible revisions before the online class begins.

Finally, it is important to look at the intangible implications of the revised rubric. The streamlined design could have time saving benefits for online institutions. Fewer hours spent on design could translate to lower overall costs. In the classroom, a course designed with reliable

and valid elements should have a positive impact on student engagement, as the entire point of the design standards is to improve the online environment. With higher engagement levels, it would not be surprising to see an increase in student learning comprehension. For educators, a focused rubric can promote the importance of design, an aspect of online education that, until recently, has been generally ignored. The revised rubric should bring an understanding to a vital part of online student success.

Suggestions for Future Research

However, the current research presented behind the revised rubric can be improved. The review of the iNACOL *National Standards for Quality Online Courses* in phase one supplemented in adult population literature where appropriate and needed. The standards could use a more comprehensive review with solely K-12 literature. This review could be done one section at a time to avoid the length constraints imposed by journals and other publications. This more lengthy review would also allow for the research to have a narrow focus, as reviewing all five sections at once was overwhelming at times.

A repeat of the phase two expert review could benefit from multiple synchronous opportunities (e.g., *Google Hangout*) to discuss each element in greater detail. While the first two rounds via email were insightful by allowing the experts to gain an understanding of the elements, the face-to-face third round seemingly had a larger overall impact on element revision. However, due to time constraints, the video conference was limited. It appears that the entire process would have been dramatically improved if this synchronous meeting could have occurred multiple times, with each meeting focusing on a single section or a further refinement of the standards.

The revised rubric still needs to be used in a more robust field test across multiple topics and grade levels. The rubric was created to give directions to new online course designers, while still feeling familiar to the experienced reviewer. One possible suggestion to help ensure real world success would be to create a design team to use the revised rubric to create K-12 online courses. A team approach has worked well for other institutions (Barbour & Reeves, 2009), as educators, support staff and designers worked in tandem to create the overall course. This would give new K-12 online course designers another level of support when using the revised rubric, as the team environment provides a nature cadre of informed colleagues (Barbour, Morrison, & Adelstein, 2014).

The overall result of the revised rubric did not meet the reliability threshold of 80% or 90% agreement (Neuendorf, 2002). However, there were numerous specific elements that did. For further studies, a complete review of all elements would be a logical next step. It is important to review why certain elements worked. Wording and types of questions (i.e., yes/no, bias based, etc.) should be taken into account. Wording of failed elements should also be under consideration, as well as what the element was testing for. Personal bias can strongly influence how a reviewer responds, which is why proper phrasing is important. This process can be done with another expert review similar to what was completed in phase two of this study, with elements being revised, combined, or kept the same. Once completed, another round of phase three activities could begin.

Another possible agenda for future research focuses on phase three, which should be expanded to include more reviewers, as well as more online courses from a wider variety of grade levels, subject areas, and providers to be included in the process. Further, percentages were an acceptable place to begin the study, but their use made it difficult to determine bias and

chance. Percentages do not take chance into account, meaning that a high rate of agreement could simply be due to reviewers randomly selecting the same scores and not actually reading through the elements. Additionally, attempts at finding inter-rater reliability are important. An increase in data (i.e., more courses reviewed) would allow for statistical results utilizing weighted kappa, which would be appropriate for this type of study (Brennan & Hays, 1992). However, it would still be a challenge, keeping in mind that if reviewer gives a particular element across all online courses reviewed the same score (i.e. all threes), that reviewer becomes a constant and makes the use of kappa procedure impossible.

Other widely accepted standards can be used as the basis for all three phases. The iNACOL (2011a) *National Standards for Quality Online Courses* were specifically selected due to their open and non-proprietary nature. However, the use of other standards would give experts an opportunity to compare the current study with different results. QM, for example, are widely used in K-12 and would be an interesting comparison with iNACOL. It would also be appropriate to examine higher education and consider the use of the Online Learning Consortium's quality scorecard. This process could begin with the creation of a crosswalk to understand the level of consistency and inconsistency between the various sets of standards. Areas where there was any level of consistency, this would provide the researcher with the opportunity to compare the specific language of the element – both from their own knowledge, but also from the literature and from the expertise of the panel(s) of experts. If used in tandem with the current study, future research could help strengthen or revise expert arguments for elements deemed vital to K-12 online course design.

Finally, after the further research noted above, the revised rubric should be used to build new courses. While testing against current courses was the logical starting point, the full impact

of the revised rubric cannot be determined until it becomes a part of the creation process. A live field test will allow designers and educators to know just how effective the design elements actually are. After the creation and use of the new courses, designers and educators can be interviewed about the process. Student results from new courses can also be compared to other courses that were designed with different standards. The results can then be the basis for further studies, and revisions to the rubric, continually improving the K-12 online course design rubric.

APPENDIX REVISED RUBRIC FOR K-12 ONLINE COURSE DESIGN

SECTION A: CONTENT	
Element	Further Explanation
Subsection: Academic Content Standards and Assessments	
A1: The course content and assignments are aligned with the state's content standards, common core curriculum, or other accepted content standards set for Advanced Placement courses, technology, computer science, or other courses whose content is not included in the state standards.	The content and assignments for the core courses are explicitly and thoroughly aligned to the credit granting state's academic standards, curriculum frameworks and assessments. Advanced Placement® courses must be approved with the College Board and other elective courses should be aligned to other nationally accepted content standards such as computer science, technology courses, etc.
A1 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
A2: The course content and assignments are of sufficient rigor, depth and breadth to teach the standards being addressed.	The course components (objectives, assessments, instructional strategies, content, assignments and technology) are sufficiently broad, deep and rigorous such that successful students will have the knowledge and skills required by the standards upon completion of the course.
A2 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
A3: All course materials are available to students at course start.	Before the course begins, students are provided learning resources that are utilized during the online course. These could include textbooks, instructional materials links to browser plugins, and other software, which students must install.
A3 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Course Overview and Introduction	
A4: A complete course overview and syllabus, which clearly states course goals and objectives, are included. Course goals are consistent with course requirements and are measurable in multiple ways.	Within the learning management system the syllabus and overview objectives are present, explicitly stated, and can be easily found by students. The syllabus and overview objectives include: course objectives and student learning outcomes; assignments; student expectations; time requirements; required materials; the grading policy; teacher-student, teacher-parent contact policies; the intended audience; and the content scope and sequence.
A4 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION A: CONTENT	
Element	Further Explanation
A5: Information is provided to students, parents and mentors on how to communicate with the online instructor and course provider.	Instructor information is provided to students with contact, availability, and biographical information. Information on how to contact the instructor via phone, email, and/or online messaging tools is provided within the contact information. If regular contact with the instructor is required as part of the course, clear expectations for meeting this requirement are posted within the course.
A5 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Legal and Acceptable Use Policies	
A6: The course reflects multi-cultural education, and the content is accurate, current and free of bias or advertising.	The course creates equal educational opportunities for students from diverse racial, ethnic, social-class and cultural groups. The content is up to date, accurate and free of any bias.
A6 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
A7: Expectations for academic integrity, use of copyrighted materials, plagiarism and netiquette (Internet etiquette) regarding lesson activities, discussions, and e-mail communications are clearly stated.	A "Code of Conduct" including netiquette standards, copyright and academic integrity expectations is provided.
A7 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
A8: Privacy policies are clearly stated.	A policy statement is posted on the course provider's website and/or in the learning management system disclosing the organization's information gathering and dissemination practices.
A8 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Instructor Resources	
A9: Online instructor resources (e.g. assessment, assignment answers and explanations, notes) are included. Pedagogy behind the resources are shared with instructors.	Resources and notes, including assessments and access to answers, explanations to aid online instructors in teaching and facilitating the course are included within the learning management system.
A9 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION B: INSTRUCTIONAL DESIGN ELEMENTS	
Element	Further Explanation
Subsection: Instructional and Audience Analysis	
B1: Course design reflects a clear understanding of all students' needs and incorporates varied ways to learn and master the curriculum.	A variety of instructional and assessment methods, materials and assessments are used throughout the course, which allow students to demonstrate their achievement of the goals and objectives of the course.
B1 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Modules and Resources	
B2: The course is organized by modules. Course design provides students with resources (e.g. alternate assignments, multimedia, simulations) that enrich course content. Each module includes an overview of the key objectives that incorporate a variety of activities, assignments, and resources to provide multiple learning opportunities for students to master the content.	The course is organized by modules that fall into a logical sequence. At the start of each module, an overview is posted describing the activities, assignments, assessments, and resources to be used to complete the key objectives. A variety of activities, assignments, assessments, and resources are used to provide students with different paths to master the content. A wide variety of supplemental tools are clearly identified and readily available as well.
B2 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Instructional Strategies and Activities	
B3: The course instruction includes activities that engage students in active learning.	The course provides multiple opportunities for students to be actively engaged in the content that includes meaningful and authentic learning experiences such as collaborative learning groups, student-led review sessions, games, analysis or reactions to videos, discussions, concept mapping, analyzing case studies, etc.
B3 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION B: INSTRUCTIONAL DESIGN ELEMENTS	
Element	Further Explanation
B4: The course provides options for instructors to adapt learning activities based on student needs, allowing for the course and instructors to offer learning paths that engage in a variety of ways.	Students are given a variety of activities, assignments, assessments and resources to allow them to successfully master the content. If a student is unsuccessful with mastering a particular concept or is not challenged with the current module, the course content provides the instructor with suggestions they are able to use in order to provide additional remediation activities or alternative assignments. The instructor has access to adapt the course to meet the students' needs by providing additional assignments, resources and activities for remediation or enrichments for the course.
B4 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
B5: The course provides opportunities for students to engage in higher-order thinking, critical reasoning activities and thinking in increasingly complex ways.	Assignments, activities and assessments provide opportunities for students to elevate their thinking beyond knowledge and comprehension into the realm of analyzing situations, synthesizing information or evaluating an argument. Activities should include open-ended questions and encourage students to categorize and classify information. Opportunities for group work, decision-making and finding patterns should also be included in the course activities.
B5 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
B6: Readability levels, written language assignments and mathematical requirements are appropriate for the course content and grade-level expectations.	The course content should be written at appropriate readability levels for the grade level of the student audience and the grade level should be prominently explained within the course description.
B6 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION B: INSTRUCTIONAL DESIGN ELEMENTS	
Element	Further Explanation
B7: The syllabus promotes a student plan of work with attainable expectations.	The syllabus provides an academic outline for students in the course, which includes academic expectations at specific intervals.
B7 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
B8: Activities are designed to encourage students' individual interests and goals.	The course provides activities and assignments which are broad enough to allow for student connections. The connections are real world, such as personal interests, goals, or situations.
B8 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Communication and Interaction	
B9: The course design provides opportunities for appropriate instructor-student interaction, including opportunities for timely and frequent feedback about student progress.	Learning activities and other opportunities are created to foster instructor-student interaction. Students receive timely and frequent feedback on their progress that emphasizes the intended learner outcomes. The feedback is highly individualized, detailed, and recommends specific, individualized improvement, and strategies to encourage continued progress toward mastery.
B9 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
B10: The course design includes explicit communication/activities/tools at multiple intervals throughout the course. The instructor confirms whether students are engaged and are progressing through the course. The instructor will follow program guidelines to address non-responsive students.	Instructor-student interactions begin early enough in the course to confirm active participation by all students and continue throughout the course.
B10 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION B: INSTRUCTIONAL DESIGN ELEMENTS	
Element	Further Explanation
B11: The course provides opportunities (e.g. student-instructor, student-student interaction, student-course content, student-LMS) for mastery and application of the material.	Learning activities and other learning opportunities are developed to foster student-instructor, student-student, and student-LMS interaction. The technology and course content encourage exchanges amongst the instructor and students through email, discussions, synchronous chats, simulations, lab activities and other group projects. Within the grading policy, guidelines defining student participation and expectations are provided. Threaded and/or synchronous discussions are available for developing community, asking and finding answers to questions about the course, and around the content. Access is available to groups or individual students based on the purpose of the activity. Rules, roles, and expectations for the discussion are clear and posted within the discussion forum.
B11 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION C: STUDENT ASSESSMENT ELEMENTS	
Element	Further Explanation
Subsection: Evaluation Strategies	
C1: Student evaluation strategies are consistent with course goals and objectives, are representative of the scope of the course and are clearly stated.	The strategies used to assess students throughout the course are consistent with and aligned to what is presented in the course goals and objectives document posted within the course.
C1 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
C2: The course structure includes adequate and appropriate methods and procedures to assess students' mastery of content.	Assessment types are matched to the level of knowledge being tested. Both formative assessments (that inform and support learning) and summative assessments (that demonstrate mastery) are a part of the course structure. Student-selected assessment options, enabling learners to demonstrate mastery in different ways, are available.
C2 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Feedback	
C3: Ongoing and varied quality assessments aligned with course learning outcomes are conducted throughout the course to guide student instruction.	The course provides quality and ongoing formative assessments to check for student understanding and to ensure they are prepared for the next lesson. Initial pre-tests may be provided to assess student readiness.
C3 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
C4: Assessment strategies and tools make the student continuously aware of his/her progress in class and mastery of the content.	Feedback tools and procedures are built into the course to allow students to periodically self-monitor their academic progress.
C4 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Assessment Resources and Materials	
C5: Assessment materials provide the instructor with the flexibility to assess students in a variety of ways.	Multiple versions of tests, test banks and other resources that support alternative evaluation methods are available.
C5 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION C: STUDENT ASSESSMENT ELEMENTS	
Element	Further Explanation
C6: Suggested grading rubrics are provided to the instructor. The instructor will share a chosen grading rubric with students.	Rubrics, rationale, and/or characteristics are provided for each graded assignment. The instructor will make the final selection, which will then be shared with the students.
C6 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
C7: The grading policy and practices are easy to understand and clearly communicated to students and parents.	Grading policies and practices are easy to read and clearly defined and may include any penalties that may be assessed to grades and/or extra credit opportunities.
C7 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION D: TECHNOLOGY	
Element	Further Explanation
Subsection: Course Architecture	
D1: The course architecture permits the online instructor to add content, activities and assessments to extend learning opportunities where applicable.	The instructor of record for the course has access to make additions to the content within the learning management system (LMS). Access should allow the instructor to add content, activities, and assessments, where appropriate. The content from the "original" base course is left unchanged.
D1 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: User Interface	
D2: Clear and consistent navigation is present throughout the course.	The course utilizes consistent and predictable navigation methods. Students can move logically and easily between areas of the course; color, graphics and icons are used to guide the student through the course; and a consistent look and feel exist throughout the course (consistent text, colors, bullets, and heading styles). Minimal training is required to navigate the course.
D2 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
D3: Rich media are provided in multiple formats for ease of use and access in order to address diverse student needs.	Course makes maximum use of the robust capabilities of the online medium and makes these resources available by alternative means (video, CDs, podcasts).
D3 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
D4: Technology is used to help increase self-efficacy of students.	Technology used in the course does not hinder the student's ability to accomplish the academic goals set forth by the syllabus.
D4 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Technology Requirements and Interoperability	
D5: All technology requirements (including hardware, browser, software, etc.) are specified.	All technology requirements (including hardware, browser, software, etc.) are identified in the course description or during the student registration process and specified to students before they begin the course.
D5 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION D: TECHNOLOGY	
Element	Further Explanation
D6: Prerequisite skills, course tools, and course software are identified and appropriate in relation to the students and course.	All prerequisite technology skills, software, and online tools necessary for the specific class are identified in the course description or during the registration process and are shared with students before they begin the course. Tools should be appropriate, necessary for teaching and/or enriching the lesson, cross-platform and free to the student (or built into the course).
D6 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
D7: The course is designed to meet internationally recognized interoperability standards.	Interoperability technical standards allow sharing content among different learning management systems and ensure sharing of questions, assessments and results with others.
D7 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
D8: Copyright and licensing status, including permission to share where applicable, is clearly stated and easily found.	Course developers or publishers clearly state the copyright and licensing status of all content, including permission to share where applicable. Copyright and licensing information should be readily available, understandable and standardized in terms of use.
D8 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Accessibility	
D9: Course materials and activities are designed to provide appropriate access to all students. The course, developed with universal design principles in mind, conforms to the U.S. Section 504 and Section 508 provisions for electronic and information technology as well as the W3C's Web Content Accessibility Guidelines (WCAG 2.0).	Through the use of web accessibility evaluation tools, all web pages required for students to engage in online education (e.g., registration, library, course materials, grade retrieval) are validated to conform to accessibility standards. NIMAS is used to ensure textbooks and other instructional materials are accessible to the visually impaired.
D9 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION D: TECHNOLOGY	
Element	Further Explanation
Subsection: Resources and Materials	
D10: Student information remains confidential, as required by the Family Educational Rights and Privacy Act (FERPA).	Defined course procedures for reporting grade and student information complies with the Family Educational Rights and Privacy Act (FERPA) http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html) posted within the course.
D10 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

SECTION E: COURSE EVALUATION AND SUPPORT ELEMENTS	
Element	Further Explanation
Subsection: Accessing Course Effectiveness	
E1: The course provider uses multiple ways of assessing course effectiveness.	A combination of student, instructor, content experts, instructional designer and outside reviewers may be used to evaluate the course for effectiveness. A variety of methods may be used including course evaluations, student completion rates, satisfaction surveys, peer review, teacher and student feedback, and student performance on in-course as well as state or national assessments. University researchers have been encouraged to conduct studies on the effectiveness of the course.
E1 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Course Updates	
E2: The course is evaluated using a continuous improvement cycle for effectiveness. The findings are used to improve and update the course content as needed.	The provider indicates the frequency of course evaluations, whether reviews are conducted internally or externally, and how the provider uses evaluation results to improve courses. Courses should be reviewed to keep the content current, engaging, and relevant.
E2 Rating (1 = not applied, 2 = partially applied, 3 = applied):	
Subsection: Instructor and Student Support	
E3: Technical support and course management assistance are provided to students, the course instructor, and the school coordinator.	Online technical help and support should be available any time. If 24/7 support is not available, support hours are clearly posted within the course or on the online program's website and a maximum response time is noted. Assistance may take the form of Frequently Asked Questions, training resources, mentors, or peer support.
E3 Rating (1 = not applied, 2 = partially applied, 3 = applied):	

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ABSTRACT

REDESIGNING THE INACOL STANDARDS FOR K-12 ONLINE COURSE DESIGN

by

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Major: Instructional Technology

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The research presented created a revised K-12 online course design rubric based off the iNACOL *National Standards for Quality Online Courses*. The redesign was completed in three distinct phases, beginning with a literature review of the iNACOL standards that compared current K-12, higher education, and other related literature to each element found in the standards to test for content validity. Results of phase one showed that the iNACOL standards did match up to current literature. Phase two consisted of an expert panel review of the standards, along with phase one suggestions, over three rounds. Viewing the standards through the specific lens of K-12 online course design, the experts combined, revised, deleted, or kept individual elements. The end result was a revised rubric based off the original iNACOL standards. This revised rubric was field tested against current K-12 online courses in phase three. Four groups of two reviewers used the revised rubric to test the inter-rater reliability. While the overall results of the revised rubric did not meet the reliability threshold for percentages, specific elements did. Future research should consider why certain elements were successful (i.e. phrasing, type of question asked) while others were not. This study could also be replicated with other widely accepted standards to help strengthen or revise expert results.

AUTOBIOGRAPHICAL STATEMENT

DAVID ALAN ADELSTEIN

Born in Detroit and raised in the suburb of Southfield, I spent the majority of my life in southeastern Michigan. I have always felt lucky to be a Michigander and thoroughly enjoy everything the Mitten State has to offer.

After graduating from Southfield-Lathrup High School, I attended the University of Michigan where I eventually settled on history as my major. A quick four and a half years later, I enrolled at Wayne State University for graduate school to earn a teaching certificate and my first Masters in elementary education. In 2006, I earned my second Masters in educational technology. It only felt logical to continue on in the technology field, so I applied and was accepted into the Instructional Technology doctorate program at Wayne State University.

Starting in 2000, I began employment with the Huron Valley school district in a fourth grade year round classroom. I quickly moved into a middle school social studies setting where I found my groove. Over the next dozen years I shifted direction, taking on numerous technology responsibilities at both the building and district levels. This eventually led to the creation of the Instructional Technology Coordinator position, which I held for the past three years. Starting in the fall of 2016, I begin a new phase in my educational career, becoming the principal for the Beijing American High School in Beijing, China. My lovely wife, Elly, who also happens to be an educator, is just as excited for our next adventure in Beijing.