

RESEARCH ARTICLE**Using Online Wikis for Assessment Transforms Student Articulation of Learning****Author**

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Abstract

Learning objectives guide an academic course with measurable behaviors a strategic result. The process of course mapping may explicate gaps in curriculum content that when offered to the student may appear more manageable when course content is partitioned into modules. Learning objectives for each module can further differentiate deeper understanding of the curriculum. However, students seldom articulate how their learning satisfies the objectives. Teaching online courses presents technologies useful for both faculty and student assessment. The use of the wiki technology mechanism as a student assessment tool is useful to demonstrate how students, through self - reflection, identify the intersection between individual learning, module objectives, and clinical practice application. In this paper, the author describes how online education and assessment with a technology such as wiki illuminate how course objectives are met and student learning occurs.

Key words: online learning, reflective practice, student assessment, higher education teaching

The advent of online education and its incumbent technology presented an enormous paradigm shift in higher education. The longstanding practice of a student sitting at a desk in a classroom in a brick and mortar edifice has been upended by the modern practice of a student at a computer screen in her living room in her home. Integrating technology and curriculum content require faculty reflection on different methods of teaching and learning as well as how to think about thinking (1, 2, 3). Furthermore, strategies that initiate active learning such as writing, reading, discussing, and reflecting can be integrated into the online education classroom (4). Assessment of student learning has occurred in all disciplines in a plethora of ways. However, new skill sets discovered in online teaching require changes in education practice to include how student learning is achieved. The purpose of this paper is to describe how wiki technology in a graduate nursing course was used for students to assess their learning.

Literature review

For the purpose of this paper, three areas of literature are explored: online education, assessment, and reflective practice. The three areas provide context for the explication of using wiki technology. Further, the specific literature characterizes the epistemology of transforming student learning.

Online education

With the current world reaction to the COVID 19 pandemic, education of students at the elementary, secondary and higher education levels required a massive paradigm shift from the face to face classroom to an online delivery method. While this may seem a rapid change to some, online education, as a flexible, convenient, and connective teaching and learning process taking place on

the internet, has been around for decades. Beginning in the 1980s, online learning emerged with the Western Behavioral Sciences Institute placing its School of Management and Strategic Studies online and with the University of Phoenix launching online bachelor and master's degree programs. The education paradigm shifted again in 2012 when Udacity launched Massive Open Online Courses (MOOCs) on behalf of Harvard and MIT that were utilized worldwide (5). Teaching as a discipline, as with the discipline of nursing, is both an art and a science. Parini (6) reminds us that content matters. Palmer (7) reminds us that good teaching comes from a teacher with integrity. Bain (8) proposes that teachers are content experts, maintain high expectations for students, and treat students respectfully. Bok (9) clarifies that the role of education is to generate new discoveries, expert knowledge, and well-trained adults.

In learning to become a teacher, Boice (10) describes a technique of active waiting – that is, the teacher pauses to reflect on what comes next. This pause requires patience, mindfulness and knowledge expertise such that one does not cram everything she knows into one lesson. The notion of the teacher's scholarship is crafted by Boyer (11) as one of assessing choice, performance, and character. While knowledge of specific content is an important factor of the teacher, Lang (12) postulates that understanding, connecting, and inspiring are necessary ingredients as well.

Online instruction is sometimes perceived as 'less than' what the traditional face to face classroom paradigm offers. This concern may reflect the notion that something happens in the physical classroom that does not occur in the online classroom. Thus, expectations and assumptions in terms of teaching and learning need to be identified by both teachers and students so a learning

environment can happen. Online education requires faculty learn and become proficient with various techniques of technology use. The notion of online education requires many changes for the educational professional (13, 14). For the novice educator this may require what I call a parallel process – learning how to teach content and learning the delivery method via technology. Both delivery methods require content expertise of the teacher as well as integrity and respect for students. Both delivery methods require establishing a community of learning as well as methods of evaluation of student learning or assessment.

Assessment

Assessment is a broad term encompassing the process of evaluating student learning. There are many ways to assess student learning; selecting methods is contingent on faculty teaching philosophy. A teaching philosophy provides a framework for how evaluation will be directed as well as what kinds of evaluation will be performed. In addition, the teaching philosophy supports the value and worth of the evaluation process. This process calculates value, worth, or quality of data that can measure learning (15). A novice faculty may wonder what assignments need to be constructed to assess learning. Learning is a multi-level process that includes cognitive (knowledge), affective (attitude or self), and psychomotor (physical skills) domains as described by Bloom and colleagues (16). The three domains are often referred to now as KSA - Knowledge (cognitive), Skills (psychomotor), and Attitudes (affective). Bloom's taxonomy of the cognitive domain provides language promoting the goals of education that are outlined in learning objectives (17). Arranging goals in a hierarchical fashion assists assessment from less to more complex such that after a

learning episode, the student will acquire a new knowledge, skill, or attitude.

Assessment can be conducted in many ways; traditional forms include examinations, quizzes, oral presentations, and scholarly papers. Other methods incorporate critiques, appraisals, evaluation tables, poster construction, peer individual and group evaluation (18). Deciding how and what to assess requires composing learning objectives. The faculty as the content expert can consider how to assess the content learned with the expert help of the instructional designer (19). Instructional designers, technology and education experts, look for gaps in knowledge, validate intervention desired by faculty, and collaborate with the content experts to develop curriculum and assessment strategies. As more teaching and learning converts to an online delivery method, it is necessary that faculty are aware of improved methods for evaluating student performance (20).

The learning objectives provide a foundation to gauge conceptually planned learning through a process called course mapping (21, 22, 23). Course mapping provides a visual representation of alignment of objectives and assessments. It shows links to both practice and accreditation standards as well as best practices. An annual course mapping activity can assure updated practices, competencies, and course descriptions are accurate (24). It also illustrates how each course assignment meets the specific course learning objective. In a course design with modules, for example, each module learning can be further explicated from the course objectives as demonstrated in Appendix A. Assignments then are developed that indicate how the module objectives are met. In Table 1, the reader is directed to how a deeper

examination of the course objectives explicates learning objectives for the module.

Table 1. Module learning objectives extracted from course objectives.

Course Objectives	Module 4 Learning Objectives
Integrate philosophy of science, nursing theories, and theories from related sciences into the delivery of advanced nursing practice	Demonstrate intraprofessional collaboration from theoretical underpinnings
Evaluate applicability of nursing and related theories using evidenced based practice approaches to achieve optimal, aggregate healthcare outcomes	Summarize how theoretical foundations contribute to nursing practice
Appraise the significance of intercultural awareness and interprofessional collaboration within a theoretical context to provide advanced nursing practice leadership	
Demonstrate effective communication skills through respectful writing, listening, and reflecting	

To facilitate student learning and evaluate the complexity of learning, the use of rubrics offers clarity, improved transparency and consistency (25). In addition, the use of rubrics enhances the provision of meaningful feedback to the student for understanding how learning objectives are met (26). Consistent and clearly stated rubrics are helpful for maintaining grading objectivity (27). An example of the content faculty use to assess

student understanding is demonstrated in the reflection activity rubric criteria column in Table 2. In addition, a course calendar format can be used as a rubric the student can use for his self-assessment. Looking at the document, the student can observe the date, the content, the reading assignments, the grading assignments and the module objectives. An example of a course calendar to use as a rubric can be seen in Table 3 as one page of a course calendar I developed.

Table 2. Grade Rubric for Reflection Activity

Criteria	Possible Points	YOUR Points	Faculty Feedback
Describe how module and/or course objectives were met.	15		
Explain how your learnings can be applied to clinical practice.	20		
Name one item or learning that resonated for you.	10		
Complete sentences, signed name, maintain 300 word limit.	5		
TOTAL	50		

As online education has increased throughout the world, it is important to trust that the courses offered have value and quality, that is, the courses deliver what the institutions and the faculty guarantee. Developed in 2003 as a performance rubric and peer review process, Quality Matters© began at MarylandOnline, Inc., a consortium

dedicated to equivalency and quality assurance within online education (28). Thousands of professionals have been trained and certified in improved course design that assures quality online learning. This resource as well as procuring an instructional designer are invaluable assets in curriculum and course design (19).

Table 3. Course Calendar as rubric

Module	Weeks/Topic	Instructional Material	Assignments	Module Learning Objectives
2	Week 2 Grand Theories	Lectures Module 2 Overview Grand Nursing Theory Working in small groups	Group Assignment #2 Sign Up (Wiki) DUE 9/3/19	Compare and contrast components of grand theory, middle range theory
		Readings Allgood Ch. 14, 16, 17, 24 Peterson & Bredow Ch. 11, 14	Group Assignment #2 (VT) DUE 9/10/19	Identify theoretical metaparadigms and assumptions of grand and

				middle range theories
	Week 3 Middle Range Theory	Lectures Middle Range Theory		
		Readings Alligood Ch. 7, 9, 28, 32, 33, 34 Peterson & Bredow Ch. 5, 9, 15 Barnum Ch.13 Ch. 13 (library course reserves)	Response to Peer's Group Assignment #2 (VT) DUE 9/17/19	Analyze and evaluate a nursing theory

Reflective Practice

Reflection is the process of stopping, taking a look around, and thinking about what just happened. This metacognitive activity is intentional and mindful in order to think deeply about the issue. Reflective questions can include thoughts such as Was this activity successful? If I do this again, what can I do differently? What new strategies have I tried lately that might benefit my students? Reflection assists with our practice of teaching if we are teachers, our practice of nursing if we are nurses, our practice of parenting if we are parents. Reflective practice attributes as posed by Copeland and his colleagues (29) contribute to the more reflective teacher. The assumptions that the attributes are ascribed to include problem solving, inquiry, process occurs on a continuum, and social context (29).

Reflection as a process was identified by Schon (30) as reflection-in-action and reflection-on-action. Reflection in action assists in modifying and developing ideas. Reflection on action is a kind of postmortem on those ideas or actions to include looking back at past practice. Gibb's reflective cycle (31) presented an approach of six functions:

description, feelings, evaluation, analysis, conclusion, and action plan. In the first function of description, one asks what happened while in the second phase one identifies feelings as well as what one was doing and thinking. When evaluating what happened, one questions what was good or bad about the activity. Trying to make sense of the situation occurs during analysis of the activity. What else could have been done is a question for conclusion which leads sequentially to the final function of creating an action plan. In the action plan, one designs what to do again based on the answers to the reflection process functions.

Freshwater (32) postulates that reflection is composed of three levels: descriptive, dialogic, and critical. In the descriptive level, what occurs in one's practice becomes conscious so that the practitioner/teacher can engage in the reflection-on-action process that Schon designated (30). One way to initiate descriptive reflection is using reflective journals. In the second dialogic level, the practice becomes purposeful or deliberative. In this level, discussion or dialogue may occur with peers, mentors, and teachers. Being able to articulate the internal thought

process through external means assists in normalizing and validating one's practice. The process can occur through clinical supervision or support groups. In the third and final level, performing critical reflection contributes to improvement or innovation. The critical conversations that ensue provide the core processes that assist in creating action plans.

Reflection entails necessary skills that once a person is aware of them, he or she can proceed instinctively. Enuke and Evawoma-Enuku (33) enumerate five necessary skills: self-awareness, description, critical analysis, synthesis, and evaluation. Some of these skills may seem similar to the approaches suggested by Schon and Gibbs, thus validating the conceptual models. Self-awareness requires that one is honest with oneself. In terms of reflection, a person becomes aware of her own character, belief system and value systems as well as unconscious bias. A skill of description requires that one can objectively describe the facts or behavior without judgment, thus, objectively and through depersonalization describe what is observed. A person who can critically analyze looks deeper than what is observed to ask why something is occurring. Doing so provides the ability to separate all components of the practice being examined. The fourth skill of synthesis is vital to taking those separate parts to then create a connected and coherent whole. Finally, when one uses evaluation, she utilizes a personal process that makes a judgment about the value of what is explored, discovered, and applied. Using reflection as a teaching tool assures transformational learning, critical thinking, and honest dialogue with ourselves, students, and colleagues (34).

Procedure

For the purpose of this paper, Module 4 from a graduate nursing theory course designed with four modules was selected as

an exemplar. Before the course started and while working with an instructional designer, I performed a course mapping technique in two levels. The first level was mapping the course objectives with module learning objectives (see Appendix A). In other words, I "drilled down" into the overall course objectives to substantially identify with the created course content. Therefore, the deeper reflection yielded two learning objectives for the module from the four course objectives: *Demonstrate interprofessional collaboration from theoretical underpinnings* and *Summarize how theoretical foundations contribute to nursing practice* (see Table 1). The second level of mapping occurred aligning the assignments with the module learning objectives. Students were asked to reflect on their learning via the technology of discussion board and wiki assignments. In the following sections, procedures for wiki use, course assignment, and analysis of student responses are described.

What is a wiki?

A wiki is a website with pages that can be edited via a browser for students to share information and collaborate. Wiki was named in 1994 by Ward Cunningham to communicate software use (35). As internet use grew, the "wiki" evolved to what is now known as the popular website Wikipedia, a free content encyclopedia that can be edited by users. In the example of this course, students created pages but did no editing as that was not the purpose of the assignment. If it were, student members could be asked to view previous changes, make comments to new and existing content, and revise existing content as ways of assessing their understanding of course content. Compiled by the course members, a wiki serves as a repository for course information and knowledge that also helps build a community of collaboration and social interaction.

Since this was an online, asynchronous course, using a wiki to collaborate on shared content where students were in different time zones and locations was an advantage. Additionally, students can view previous changes, comment on content or changes, include new content, and revise existing content. Unlike a blog, which can be quite personal as well as opinion based, wikis require intense collaboration, where information is linked to and built upon. A wiki can be used to evaluate a student contribution (which is how I used it) or only for course content review, again depending on the purpose of its use (36). Wikis can be used for educational purposes such as communication, collaboration, interaction, networking, providing support (37), and increase the application of reflective thinking by fostering creativity, spontaneity, and innovation.

Assignment

As the last module of the course and using Bloom's taxonomy, I was interested in how students synthesized course material as it related to the course and module learning objectives. Students were asked to select either a course or module learning objective and using lectures, readings, and other instructional materials, relate their learning. There was word limit of 300 words to facilitate parsimonious yet robust entries. The wiki was not to be a laundry list of what had been done in the course (a knowledge domain according to Bloom) but a synthesis of learning as it applied to everyday life and clinical practice. How each reflection submitted as a wiki would be assessed can be seen in Table 2. The wiki would be a continuous document whereby each student could see what each other wrote. Some readers might question if students, reading what their peers wrote, would simply repeat what they read. I did not find this to be the case in using wikis as an assessment

technology with 180 graduate nursing students in six discrete nursing theory graduate courses.

Narrative analysis

An adapted use of the narrative analysis method originated by Braun and Clarke (38) was used to explore the wiki content for transformed student articulation of learning. Analyzing course and module objectives, I explicated themes from student reflections that represented a level of patterned response (student learning) that related to the data (learning objectives) in question (38).

The course objectives contained key constructs that would comply with national accreditation standards students were asked to learn. In the first course objective (see Table 1), *Integrate philosophy of science, nursing theories, and theories from related sciences into the delivery of advanced nursing practice*, nursing theories was a key learning outcome for both clinical application and national accreditation standards. In the second objective, *Evaluate applicability of nursing and related theories using evidenced based practice approaches to achieve optimal, aggregate healthcare outcomes*, **applicability of nursing theories** and **healthcare outcomes** were key. In the third objective, *Appraise the significance of intercultural awareness and interprofessional collaboration within a theoretical context to provide advanced nursing practice leadership*, was key. And in the fourth objective, *Demonstrate effective communication skills through respectful writing, listening, and reflecting*, **communication skills** were the expected learning. The bolded constructs above were considered essential components within a nursing theory graduate course to generate two substantial learning objectives for the final course module, *Demonstrate intraprofessional collaboration from*

theoretical underpinnings and Summarize how theoretical foundations contribute to nursing practice (See Table 1).

Using step five (5) of Braun and Clarke's (38) thematic analysis phases and examination of the course and module objectives, I explicated three themes from student wiki submissions: theoretical foundations, nursing practice, and interprofessional collaboration. Further analysis of the student wiki posts while examining the key learning outcome constructs mentioned above, I established that a deeper comprehension of what the students learned had occurred. Examples of student posted wikis below demonstrate that deeper comprehension.

Theoretical foundations

Being able to communicate actual theory applicability, not just saying theories were used every day in clinical practice, a deeper student understanding of the usefulness of theories was displayed. It also indicated a higher level of cognition that evaluated, analyzed, and synthesized content. The examples below demonstrate how actual theories and their integrated contexts were applied.

I focused on Nola Pender's health promotion model, and I found that this theory was especially useful...for discharge planning as it helped me find a way to promote behavior change that would ultimately prevent readmissions.

I feel confident in appraising and utilizing appropriate theories to guide thinking and clinical based research.

I am excited to continue to implement the theory of balancing analgesia and side effects in daily practice.....great to be able tosee my classmates point of view on the selected theories that they had chosen.

Nursing practice

A recurring theme in all content I teach is to illuminate and emphasize how theory provides the foundation for any kind of nursing practice. Students cognitively decided how theory was fundamental to their own nursing areas of practice.

I have applied concepts from this class, especially the Health Promotion Model, to my current role by encouraging smoking cessation while being cognizant of barriers to cessation.

...for discharge planning as it helped me find a way to promote behavior change that would ultimately prevent readmissions

Interprofessional collaboration

Working as team members and communicating clearly with various healthcare disciplines is an expectation administration requires for nursing staff. Caring for one patient may seem a solitary process but that process occurs within the context of many providers due to patient complexity and comorbidities. Communication that is accurate and evidence-based expedites safe, thorough, and unfragmented care. Searching for and utilizing resources enhances safe care. In one case, the student contacted the nursing theorist as a primary source of clarification.

Incorporating previous assignments.... was a much easier task than I first anticipated because I had received so much valuable feedback and suggestions from peers and Dr. Bonham.

After deciding to use this theory on Assignment one, I first regretted my

decision because it is so abstract and difficult to understand, but after speaking with Lisa Burkhart and researching more about spiritual care, I am so glad I picked this topic.....will definitely be more cautious in the future to practice spiritual care on a daily basis.

Enveloping the wiki posts was a clear demonstration that the communication objective of writing and reflecting was met. The postings were thoughtful, grammatically correct, and evident of a synthesis level of thinking.

Discussion

Online education, as a flexible, convenient, and connective teaching and learning process has existed in various iterations for decades. It is presumptuous to think that online education is simply taking an existing classroom course and transferring it to an online learning platform. Teaching faculty characteristics such as content expertise, advocate for student success, and possession of ingredients that Lang (12) identifies as necessary (understanding, connecting, and inspiring) are incumbent for all people who teach, no matter what delivery method is used. A teaching philosophy that encompasses co - created narrations brings satisfaction to both the teacher and the student. A constructivist approach to teaching is helpful when the delivery method of education occurs online with the very nature of the learning occurring in an asynchronous way such that the student manages her learning. Active learning by the student – and yes, the mindful faculty who reflects on his teaching (7, 8, 9, 39) – creates a different kind of partnership. Connecting and inspiring students is common in the *en face* classroom; it can transpire as well in the online classroom using various kinds of technology (17, 18, 19). Assessment

strategies that include learning and grading rubrics are constructed from examination of the course through course mapping (21, 22, 23, 40). Doing so aligns the course objectives with the assessments and in turn, creates objective grading procedures that are welcomed by students. One advantage of the technology I appreciate is that with clarity, the grading process is also cleaner and simpler.

Learning was articulated in the wiki postings each student made. Being given posting parameters such as word limit and self-selection of a learning objective that resonated for the student guided the student response. Each student reflected on what was learned as well as how that learning applied to everyday life and clinical practice (41, 42). This exercise was an example of active, adult learning that was individualized for each student (2, 8, 9). As key constructs were extrapolated from the course objectives into themes, I observed the transformative nature of what students individually learned in relation to theoretical foundations, nursing practice, and interprofessional collaboration. The ability to synthesize course content is a higher cognitive level (16, 17) and application to clinical practice provides evidentiary material associated with reflection (30, 31, 32).

An unexpected advantage of using wikis as an assessment instrument was increased student and faculty interaction. While editing the wiki was not required in this course, the use of the technology is one where interaction may be enhanced. While some readers may think that online education is a sterile process, I found the online classroom rigorous, stimulating, and filled with rich student interface. Creating and maintaining a safe online community for the students in each course was a challenge just as creating a safe physical classroom environment is. Building an online

community entails faculty presence, clear expectations, and evidence to the student of tangible deliverables (9, 18).

Additionally, I want to share several lessons learned. Consulting with and designing an online course with an instructional designer is key to success and satisfaction for both faculty and student. Since content related to course design and curriculum development is usually absent from most doctoral programs whose graduates may eventually teach, working with an instructional designer is invaluable. The enormous amount of information about curriculum development and how it unfolds in course design was helpful and transferrable to other courses I taught. The second lesson I learned was there are many kinds of technologies available for faculty to use, no matter what the course is. Having an instructional designer's expertise and knowledge of those technologies assisted me in selecting a different technology that related to the goal of student assessment. While wiki technology may be used in any academic venue, it was selected in the graduate nursing course I used as an exemplar in this paper as a technological assessment tool. The final lesson I learned was discovering that teaching online was more intense and time consuming than teaching face to face. Setting my own

boundaries around my availability, for example, had to be developed and integrated into communication with students. Lectures, assignments, instructions, and announcements had to be in place as well as updated and continually monitored. Furthermore, I discovered that online teaching was a parallel process – as a content expert, I shared my expertise in tandem with managing technology, both of which require their own areas of expertise. Teaching in a parallel process context requires time and energy that teachers cannot underestimate.

Conclusion

Online education is an exciting and challenging way to teach that requires faculty content expertise and reflection about one's teaching practice. The literature review of concepts such as course mapping, development of course objectives, assignment creation and reflection were presented in this paper as strategic prologue to use of an online technology such as a wiki to assess student learning. Asking students to reflect on their learning and how it relates to course objectives clearly renders students in charge of their individual learning. Doing so promotes participant active learning which, hopefully, contributes to clinical application and lifelong learning.

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Appendix A

Course Mapping Module Objectives from Course Objectives

Course Module	Integrate philosophy of science, nursing theories and theories from related sciences into the delivery of advanced nursing practice.	Incorporate nursing history in relation to professional identity and the future of the discipline	Evaluate applicability of nursing and related theories using evidenced based practice approaches to achieve optimal healthcare outcomes	Appraise the quality of one's own practice utilizing theoretical principles to improve aggregate outcomes	Incorporate the significance of intercultural awareness, interprofessional collaboration, and emerging genetic/genomic evidence within a theoretical framework to provide advanced nursing practice.	Utilize theoretical underpinnings to demonstrate leadership principles for the advancement of nursing science	Demonstrate effective communication skills.
Explain how philosophy contributes to nursing science	X						
Compare and contrast a personal meta paradigm with a nurse theorist paradigm	X	X					
Develop a meta paradigm from personal values and assumptions	X	X		X			
Recognize components of a nursing grand theory and middle range theory			X	X			
Identify theoretical meta paradigms and assumptions of grand and middle range theories			X	X			
Analyzing and evaluating a nursing theory	X		X	X			
Define ethical, wellness, aging, end of life, and leadership					X		

principle theories							
Critique the theories in relation to nursing practice				X	X		
Identify and research evidence based guidelines					X	X	
Identify your cultural sensitivity					X	X	X
Discuss cultural sensitivity and relate to personal nursing meta paradigm					X		
Applying intercultural sensitivity to nursing practice				X	X		
Demonstrate interprofessional collaborate from theoretical underpinnings						X	X
Summarize how theoretical foundations contribute to nursing practice			X	X	X		

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