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CONCEPT ANALYSIS

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Concept analysis of longitudinal assessment for professional continued certification

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Abstract

Background: This concept analysis presents a scholarly epistemological approach to defining the attributes, empirical referents, antecedents, and consequences of a knowledge maintenance approach—known as longitudinal assessment—to professional certification.

Aim: The analysis reports on the efforts of the National Board of Certification and Recertification for Nurse Anesthetists to explore this educational method as an approach to meet requirements for continued professional certification.

Method: Using the classical approach to concept analysis, the authors explore the structure and function of longitudinal assessment and define the characteristics of the concept in a way that is meaningful to the continued certification of nursing and medical professionals.

Conclusion: This analysis establishes a link between the goal and outcome of the continued certification process, including continuing education in nursing and medical practice, and the desirable characteristics of longitudinal assessment, which include proven principles of educational psychology. Through exploring model and borderline cases, the authors seek to demonstrate that longitudinal assessment is the best approach to foster lifelong learning of continuously evolving scientific, theoretical, and clinical knowledge in support of safe care for patients.

KEYWORDS

assessment, certification, concept analysis, credentialing, longitudinal

1 | BACKGROUND

At the turn of the 20th century, health-care credentialing organizations were charged by the National Academy of Medicine (NAM), previously known as the Institute of Medicine (IOM), to incorporate lifelong learning and evaluation methods in processes of licensing and certification.[1,2] Lifelong learning is synonymous with growth and expansion of knowledge and skills throughout one's life and career. With the ever-changing advances in healthcare, lifelong learning is not an option but a requirement for health-care providers to remain competent and relevant in providing safe, effective care.

Longitudinal assessment (LA), a concept that can be linked with the evaluation of lifelong learning, offers spaced learning on a wide array of professional, educational topics repeatedly over time.[3] The National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA), an advanced practice registered nurse (APRN) certification board, has begun to explore LA as a potential modality for providing lifelong learning as part of its continued professional certification program (CPC).[4]

2 | AIM

The aims of this analysis are to:

- Explore the academic underpinnings of LA in continued certification processes using Walker and Avant's Concept Analysis technique.
- Identify and illustrate the use of LA as a tool grounded in adult learning theory and knowledge retention to support lifelong learning.
- Scaffold changes within the NBCRNA CPC Program with broader implications to other health-care professions and credentialing entities.

3 | METHOD

The Education Resources Information Center (ERIC) database was searched using key words longitudinal formative assessment AND educational theory, resulting in two articles. The American Psychological Association (APA) PsycInfo database was searched using the key words LA certification; board certification assessment, and five articles were identified. Other articles were identified by examining literature relevant to professional medical and nursing recertification, and by searching for relevant articles cited in the previously reviewed literature. The concept analysis was created by examining the literature and following the eight-step process outlined in Walker and Avant's classic reference.[5] Step 1, identifying the concept, and Step 2, determining the aims of the concept analysis, were delineated above.

4 | RESULTS

4.1 | Concept use

LA has been used in two main areas. First, assessment is often grouped with the terms "testing" and "evaluation" in considering the outcome of an academic educational process.[6] Testing is the process of administering a test or instrument designed to measure a construct of knowledge, and evaluation is the process of assigning judgment to abstract entities such as institutions and individuals.[6] Assessment can be defined as the interpretation of data about student performance, which can be collected through multiple sources of information, such as testing, and contributes to the evaluation process.[7] Adding the term "longitudinal" implies collecting information regarding assessment over a specific time period.

Second, LA has been used more recently within credentialing organizations. To meet the goals of recertification, some medical boards have begun to use LA approaches. These can be broadly defined as repeated educational experiences delivered over a specified time period via an online platform to various electronic devices, requiring a defined score to pass and receive credit for sufficient continuing education to warrant recertification.[8,9]

4.2 | Definitions of LA

4.2.1 | Dictionary definition

The definitions of the term "longitudinal" in the Merriam-Webster online dictionary seem to have in common the conceptualization of "length," either of a physical dimension or time itself.[10] In the case of time as the identified dimension, its length appears to be divided into discrete periods for repeated investigation or observation, related in some way to the variables under consideration.

The definition in the Merriam Webster online dictionary reveals that assessment involves a process of evaluation allowing an observer to arrive at a judgment about an action or attribute of something under consideration.[10] LA can be considered to be a noun, describing observations over time used to evaluate or judge an outcome; LA may also be considered to be a verb: the act of making evaluations or assessments of a variable over time.

4.2.2 | Academic educational definition

Assessment is the process of judging information about the performance of a test-taker, and may be collected via a multitude of means or practices.[6] Assessment may be further characterized by considering its aims and intended purposes, as well as the chronological attributes of the assessment process.

Formative and summative assessment address the intended purpose. Formative assessment has been defined in terms of its intended purpose, which has been called assessment for learning.[11,12] The learner receives feedback and rationale for the correct response to the testing items, with direction to learning resources. This approach encourages continual learning of new knowledge, in addition to assessing what has been learned.

Summative assessment consists of a test administered at the completion of a learning unit, aimed at assessment of knowledge as it exists at a defined point in time.[11] This approach allows the learner to demonstrate to the evaluating entity the knowledge gained over a period of instruction.

LA is identified in the educational literature as a chronologically defined attribute of assessment in general, applicable over multiple educational settings, characterized by multiple assessments occurring over time.[6] A commonly cited example in the medical education literature is the use of progress testing, in which students complete multiple staged assessments of learning over a defined period (e.g., semester).[13]

4.2.3 | NBCRNA operational definition

The NBCRNA is considering adopting an LA approach as a component of the Continued Professional Certification (CPC) Program.[4] The current CPC program involves two 4-year cycles of accumulating required hours in defined categories of learning experiences,

completing learning modules examining four key areas of nurse anesthesia practice based on a professional practice analysis (PPA), and taking an assessment in the second 4-year cycle. Thus, certified registered nurse anesthetists (CRNAs) must seek out approved educational opportunities at required levels, and then complete a nonhigh-stakes diagnostic assessment, which identifies areas requiring further continuing education to improve knowledge.

The LA approach could take the place of, or be complementary to, components of this process. The NBCRNA could, via an electronic platform, offer CRNAs a set number of questions on a timed basis, available for a specified time limit, on personal electronic devices. The assessment items may be derived from agreed-upon classic or core academic professional knowledge sources for the profession, or from published literature focused on new theory or techniques, identified for members at the beginning of an assessment cycle. These items are written by currently certified subject matter experts in nurse anesthesia, who have undergone item writing training, and are reviewed and refined by a designated panel of subject matter experts. Additionally, they are linked to knowledge elements of an assessment blueprint resulting from a PPA of nurse anesthesia and have undergone statistical analysis to verify alignment with the measured construct. Feedback would be provided immediately, identifying correct responses with rationale, references, and links to related learning resources.

In considering the dictionary and educational definitions of LA, and the components of the operationalized proposed LA program, the NBCRNA offers the following operational definition. LA is a method that determines adequate professional knowledge in a postcertification practitioner to assure public safety.

4.3 | Defining attributes

The defining attributes of the concept of LA in this analysis must be considered in the context of the definition and use of the term by the NBCRNA in the CPC Program.[4] LA in this analysis is an educational method used by an advanced practice nursing certification board to assure public safety by creating lifelong learning in postcertification practitioners. Knowledge is enhanced by intermittent and repeated exposure to current professional content using an electronic device-centered platform.[8,9,14] A key underlying assumption is that enhanced learning results in skilled practitioners who provide safe, high-quality clinical care. The defining attributes of LA in this context are shown in Figure 1, and include:

- LA utilizes principles of educational psychology to enhance learning, including the testing effect on learning (frequent repetitive testing[15,16]; spaced learning (exposure to materials interspersed with other activities[15,17,18]; interleaving subject matter (simultaneously presenting several different learning topics[15]); providing instant or immediate feedback[19]).
- LA is a repetitive learning experience.[14]
- LA is a convenient learning platform.[9,15]
- LA is self-directed.[14]

FIGURE 1 The defining attributes of longitudinal assessment [Color figure can be viewed at wileyonlinelibrary.com]

4.4 | Model case

4.4.1 | Maintenance of Certification Assessment for Pediatricians (MOCA-PEDS)

In 2015 the American Board of Pediatrics (ABP) proposed an alternative to the traditional maintenance of certification (MOC) examination.[20] Their goals were to develop a platform for continuous assessment, which included opportunities for learning that were rigorous and up-to-date with the comprehensive knowledge required for board-certified pediatricians and would provide immediate feedback on topics tested.[20] Following intensive research including focus groups with diplomates and pilot testing, the ABP developed MOCA-PEDS,[20] which has replaced the high-stakes examination.

Participants in this assessment receive 60–72 questions per year, in quarterly increments, over a 5-year MOC cycle, with passing score set by the board. If passing by Year 4, the MOC requirement is met, and Year 5 is optional. If not passing by Year 4, participants must take a proctored examination to meet MOC requirements. The four lowest scoring quarters are automatically dropped in Years 1–4. For each year the passing standard is met, participants receive credit for Part 2 Continuing Education requirements. Forty-five learning objectives are specified per year; 60 questions are from professional core content (45 first-time questions and 15 repeat) and 8 questions from articles. Four featured readings are provided at the beginning of the yearly cycle, usually from practice guidelines with high levels of evidence; participants are asked two questions per article. Diplomates are provided a dashboard to track their progress. For flexibility, content is delivered via both Web-based browsers and mobile devices. Content is delivered quarterly, and content objectives are revisited or repeated over time. Users can choose when and where they would complete the continuous assessment as long as they complete it during the specific cycle. Immediate feedback is provided for each completed item, consisting of correct response, rationale, and links to supporting reference materials. This model demonstrates all defining attributes of LA: it is a self-directed, spaced, interleaving assessment of knowledge that provides immediate feedback delivered in a repetitive fashion on a convenient platform.

4.5 | Borderline case

4.5.1 | Continued Professional Certification (CPC)

Continuing education practices changed as a result of the hallmark reports issued by the IOM in 2003 and 2010.[21] These reports called for continuing education of health-care providers to encompass a demonstration of knowledge and skill as well as the incorporation of technology and evidence-based practice. A joint report from both the IOM and the Robert Wood Johnson Foundation identified the need for periodic assessment for ongoing credentialing.[21] In 2009, IOM issued a statement identifying the need for the demonstration of "lifelong learning" for all health-care professionals.[21] In response to these reports and changes in the continued education and assessment developed by other health-care professional organizations, and in conjunction with the National Council of the State Boards of Nursing white paper identifying the need for the continual assessment of competency, the NBCRNA developed and validated the CPC process, and the Continued Professional Certification Assessment (CPCA) of learning.

In efforts to promote continuous lifelong learning, the NBCRNA developed a continued certification program of 8-year cycles, with 4-year segments, and a 2-year "check-in" to maintain contact and verify maintenance of state registered nurse (RN) licensure, which is required for continued certification. The original CPC program was conceived in 2012, consisting of 60 credits of assessed continuing education (CE) every 4 years ("class A" CE); 40 credits of professional development every 4 years ("class B" CE); four core educational modules targeting key professional practice areas, every 4 years; and one diagnostic CPC examination every 8 years,[22] resulting in recommendations for areas of further study. CRNAs meeting the performance standard do not receive feedback on specific questions. The four aims of this original program were to (1) ensure the measured knowledge was in areas of nurse anesthesia practice needed by all CRNAs regardless of practice setting, based upon a PPA survey; (2) use the reporting of professional activity to promote the role of the advanced practice nurse in healthcare and leadership roles; (3) provide the most recent evidence guiding anesthesia practice through the delivery of the 4 core educational modules; and (4) create an adaptable continuing education program for all types of learners.[21]

The evolved CPC program is an example of a borderline case containing most of the defining attributes of LA (repetitive learning, self-directed, some experiences associated with convenient delivery platforms), but not all (instant feedback, principles of educational psychology including testing effect, interleaving, and spaced learning).

4.6 | Antecedents

Antecedents answer the following question: "What events must occur before occurrence of the concept, which can be defined as recertification using LA as a component of the NBCRNA CPC program?"[5] These events fall into two categories: events involving the professional seeking certification (certificant), and events involving the NBCRNA CPC program. The certificant must hold current certification as a CRNA, which means there has been completion of an accredited program of nurse anesthesia education and maintain licensure as a registered nurse; achieve success on the National Certification Examination (NCE) administered by the NBCRNA; and fulfill the NBCRNA-required practice component as a CRNA to participate in the CPC program.

With regard to the antecedent events involving the NBCRNA, the organization must have recognized the need for, as well as planned and initiated, the CPC program. This includes making an informed decision, based on research, to create, operationalize, and initiate LA as a means or component of achieving CPC.

4.7 | Consequences

As a direct result of LA, provided the antecedents are met supporting the operational definition, LA would creatively underpin the NBCRNA mission to promote patient safety through credentialing programs that support lifelong learning. Since the focus of CPC impacts both practitioner and patient, LA could also improve patient safety. In fact, in those studies that gather feedback from participants, most physician LA participants acknowledge that this assessment strategy helped keep them current about practice knowledge or led them to make a practice change, and patient care was improved.[23,24] While no study or published account can measure degrees of overall improvements in patient safety related to a testing strategy, it is inarguable that a better prepared and more engaged health-care provider actively participating in relevant lifelong learning could offer a higher degree of patient safety.[25]

In addition to the public, the NBCRNA also serves certificants. To meet the expectations of these stakeholders, the NBCRNA continually examines the research, best practices, and assessment community to bring the most effective CPC experience to those who must maintain their certification to practice nurse anesthesia. Given the operational definition of LA, the convenience and availability of LA would also serve to meet the expectations of the CRNA community. Many practitioners prefer the ease of electronic assessment capabilities, rather than a more conventional high-stakes examination offered once or twice a year at a testing facility. Likewise, test anxiety may be

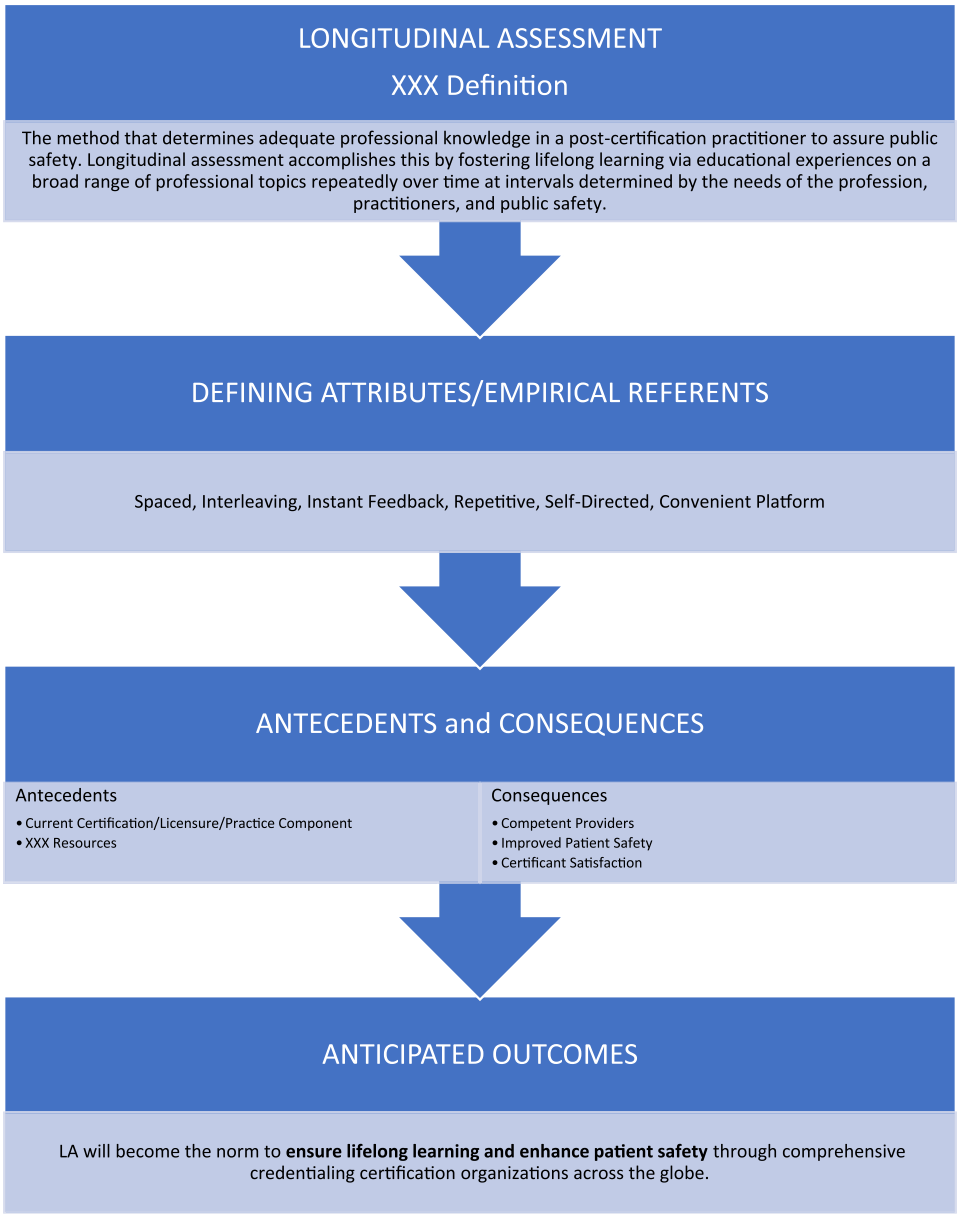

FIGURE 2 Overview of the process and purpose of the concept analysis of longitudinal assessment [Color figure can be viewed at wileyonlinelibrary.com]

reduced when one high-stakes examination is replaced by repetitive assessments with smaller numbers of items. Given the sporadic and often unpredictable hours kept by those in healthcare, it should be no surprise that the self-directed nature of LA is also more appealing to busy professionals.[20,23,24] LA offers the ability to complete assessments at any hour of the day without the lost wages or childcare issues a longer, higher stakes exam would require if taken at a testing facility. Thus, the consequences of LA are that while lifelong learning is enhanced with the potential to improve public safety, the convenience and self-directed nature of such a process is not sacrificed, meeting the needs of busy professionals.

4.8 | Empirical referents

The last step in concept analysis is determining the empirical referents; empirical referents demonstrate the existence of the phenomenon or concept.[5] In the case of LA, the defining attributes are the same as the empirical referents, as they are necessary to describe the attributes of the concept (see Figure 2).

5 | DISCUSSION

Through a detailed literature search,[26] educational theory and psychology were found to support LA as a viable approach for formative testing, demonstrating that the assessment itself not only queried the knowledge of the practitioner but also offered a learning experience within the assessment. From the experiences assembled by other professional organizations and best practices, LA is described as most effectively delivered in a repetitive fashion, over time, at varied intervals, utilizing easy-to-use and convenient testing platforms that are electronically available for personal use (i.e., on smartphones, tablets, computers, and laptops).[3,20,23] This enables the credentialing entity or organization to offer the assessment experience to a vast array of practitioners, while giving the practitioners the freedom to choose when and how to complete the assessment. Interestingly, in this manner, LA also empowers the user to self-direct their CPC process, rather than being told when and how to maintain their certification.

Over time, LA offers an opportunity to fulfill the requisite notion that lifelong learning could be enhanced within the assessment itself in a convenient and self-directed fashion. LA fills the gaps in learning that point-in-time testing misses. The defining attributes are what contribute to the success of the LA process in knowledge retention. It is anticipated that as certification boards obtain additional feedback from certificants/diplomates and stakeholders about the outcomes of LA for their professions, more and more certification bodies will opt to transition to LA. As technology continues to advance the ability to deliver content on distance-accessible, convenient platforms, LA will become the norm to ensure lifelong learning and enhance patient safety through comprehensive credentialing and certification organizations across the globe.

6 | CONCLUSIONS

This concept analysis is essential to address the nascent incorporation of LA into continued certification programs. As health-care organizations continue to develop approaches to demonstrate the competence and quality of professional nurses in their evolving roles in world-wide health, this concept analysis will assist in this essential task by describing and defining the LA approach. Indeed, the contrasting model and borderline cases provide pragmatic examples for organizations to consider as guides to implementation of LA.

Further study is required to provide high-quality evidence that LA truly enhances lifelong learning and improves patient safety. The support for LA from certificants, diplomates, and those who credential practitioners must also be present for LA to be accepted as a component of continued certification. Application of this conceptual approach may inform other credentialing bodies of mechanisms to ensure lifelong learning of all practitioners to support patient safety. Once resources are in place, and pilot studies are conducted, it is hoped that bodies such as the NBCRNA can lead and serve as a model for other national and international professional nursing organizations to move forward with the improvement of credentialing processes.

DATA AVAILABILITY STATEMENT

There is no primary or secondary data in this article. This article is an explanation of the concept of longitudinal assessment for continued professional certification. It is not a report of original or secondary research.

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