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Evaluating Transfer of Continuing Education to Practice: A Retrospective Mixed-Methods Study

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Evaluating Transfer of Continuing Education to Practice:

A Retrospective Mixed-Methods Study

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Abstract

Background: Continuing education (CE) is an essential component of building and maintaining the competence and performance of health professionals. Evidence of its impact on practice is lacking. Organizations need evidence of CE transfer to the practice setting to demonstrate its value and inform CE practice.

Objectives: The purpose of this study was to provide evidence of CE's impact on practice by analyzing nurses' reports of intent to change practice, actual practice change, and examples of practice change. Research assessing the effects of CE on nursing practice across multiple courses involving different topics, levels of nursing practice and location supports generalizability. The analysis of the nurses' practice change examples provides a deeper understanding of the outcomes and factors affecting CE transfer.

Methods: This retrospective, mixed-methods study analyzed nurses' quantitative and qualitative survey responses, both end-of-course and in a longitudinal evaluation. Descriptive and inferential statistics were generated on the intent and actual practice change responses. Thematic content analysis was conducted on the examples of practice change and respective barriers.

Results: Most participants reported positive intent to change practice (88.6%) and actual practice change (89.1%) following the CE courses. The actual practice change examples revealed four common themes including becoming certified, improved leadership, enhanced role performance, and educating or mentoring others. In some cases, these practice changes led to improvements at the organizational level.

Conclusions: The results of this study provide evidence that knowledge gained from CE can positively impact nursing practice, and that CE-related practice changes by nurses can lead to broader organizational improvements.

Introduction

Background

Continuing education (CE) is an essential component of building and maintaining the competence and performance of health professionals and potentially improving health care quality (AACN & AAMC, 2010; HHS, 2016). It is essential that the new knowledge, skills and attitudes learned in CE transfer to practice. The use of CE to deliver influential professional practice knowledge is well established (ANCC, 2015; Bell, Pestka, & Forsyth, 2007). However, little generalizable evidence exists to demonstrate that CE produces changes in practice. Stakeholders in medicine and nursing education, practice, and regulation have called for CE providers to increase the linkage between CE, competence, and performance (AACN & AAMC, 2010; IOM, 2010). An important next step is to follow through and evaluate the impact of CE on professional practice.

Problem Statement

American Nurses Association (ANA) delivers hundreds of CE courses annually. End of course evaluations have provided evidence of nurses' satisfaction and intent to change practice; however, the organization needed evidence of whether nurses applied what they learned from the CE courses in their practice.

Purpose

Our study's purpose was to provide evidence of the impact of CE on practice by analyzing nurses' intent to change practice and actual practice change following completion of CE courses. In addition, analyzing the nurses' narrative responses explaining actual practice change identified common themes to inform CE practice and research.

Specific Aims

The specific aims of our study were to:

1.   Analyze the nurses' intent to change practice upon completion of the CE courses.

2.   Analyze the nurses' actual practice change within one year following completion of the

CE courses.

3.   Analyze the relationship between the nurses' intent to change practice and actual practice

change.

4.   Identify common themes in the nurses' examples of actual practice change.

5.   Identify common themes in the nurses' examples of barriers to actual practice change.

Research Questions

Our study was designed to answer the following research questions:

1. What percentage of nurses reported positive intent to change practice upon completion of the

CE courses?

2. What percentage of nurses reported actual practice change within one year following

completion of the CE courses?

3. Is there a relationship between the nurses' intent to change practice and actual practice

change?

4. What common themes emerge in the nurses' examples of actual practice change?

5. What common themes emerge in the nurses' examples of barriers to actual practice change?

Significance

CE is essential to competence and performance for nurses (AACN & AAMC, 2010).

Evidence of CE's impact on nursing practice is lacking within the literature. This study expands

the literature on the impact of CE on professional nursing practice. Also, the analysis of the

effects of CE on practice change across multiple CE courses supports broader application of the results at an organizational level.

Literature Review

Consultation with a research librarian at George Washington University on search methods supported our literature review. Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text and the Himmelfarb Health Sciences Library databases were used. The keyword search for both included "continuing education AND nurs* AND effective* AND practice change". The search limiters included a publication date of 2007 to 2017, studies published in the English language, and publication types including randomized controlled trials and research. In the Himmelfarb Health Sciences Library database, some of the major databases selected were MEDLINE Complete and ERIC. The search limiters in this database also included the publication dates of 2007 to 2017 and publications in English. Additional search limiters were source types including academic journals and subjects including pre-tests and post-tests, nurses, nursing staff, and practice.

The criteria for study selection included the assessment of knowledge or practice change following CE for nurses. Studies were excluded that did not identify the education as CE, as this was an assumption of adherence to the operational aspects of CE courses established and enforced by accrediting bodies. Neither research designs nor educational designs were a determinant of inclusion or exclusion.

Evaluation of Satisfaction and Knowledge. It is customary for CE providers' evaluations to focus on learner satisfaction and knowledge gains. Gray (2014) focused primarily on nurse satisfaction and belief of efficacy following book club CE. The study found that a large

percentage of nurses were satisfied and believed the book club could support increased

knowledge.

Several studies have evaluated CE effects on knowledge using variations of a one-group

pre- and post-test design. De Gagne, et al. (2015) and Moores and Allan (2012) evaluated CE-

related knowledge gains by community health nurses. De Gagne, et al. (2015) examined the

effects of a CE course about continence care. Moores and Allan (2012) evaluated CE delivered at

a conference about vaccine administration. Guardini, et al. (2008), Schneiderman, et al. (2009),

Wolak, et al. (2008), Yacoub, et al. (2015), Yoshioka, et al. (2014) and Zhang and Hsu (2013)

evaluated CE-related knowledge gained by hospital nurses. Guardini, et al. (2008) evaluated a

CE course about postoperative pain management. Schneiderman, et al. (2009) evaluated a

computer-based CE module on arterial blood gas interpretation. Wolak, et al. (2008) evaluated

CE delivered by nursing grand rounds. Yacoub, et al. (2015) studied the effects of a CE course

about Diabetes. Yoshioka, et al. (2014) studied CE about end-of-life nursing care. Zhang and

Hsu (2013) studied CE about 12-lead electrocardiogram interpretation. Breneman, et al. (2015)

was an outlier and evaluated self-rated practice competence following a CE course about the

management of students with Diabetes for school nurses. The study showed a significant

increase in competence at the post-survey. All of these individual studies concluded that their

respective CE course improved knowledge.

Das Graças Silva Matsubara and De Domenico (2016) and Liu, Rong, and Liu (2014)

both completed randomized controlled studies to evaluate knowledge following CE. Das Graças

Silva Matsubara and De Domenico (2016) compared knowledge gains between an experimental

online CE course group and a comparison face to face CE course group and found that both

methods improved knowledge without significant difference. Liu, et al. (2014) evaluated the

effects of an e-learning CE course involving tests before, after, and 3 months following the course and found that knowledge scores increased significantly more for the experimental CE course group than the comparison group without a CE course.

There is value in the assessing of learner satisfaction and knowledge related to individual CE courses. However, evaluating CE-related knowledge across multiple courses makes the results more generalizable beyond one course topic, educational design and participant group. There were no studies that evaluated knowledge gains following multiple CE courses.

Evaluation of Practice Change. Researchers have examined the effects of CE on nursing practice. Many studied a combination of satisfaction, knowledge and practice change following one CE course and found increased knowledge with varied findings related to practice transfer. McNeill, et al. (2012) and Liaw, et al. (2016) evaluated satisfaction, knowledge and practice change following a CE course involving simulation for different nursing populations. McNeill, et al. (2012) evaluated effects of a CE course about simulation for nursing faculty and found that participants were highly satisfied with the course, improved knowledge, and adopted simulation in a staged fashion following the course. Liaw, et al. (2016) evaluated a web-based simulation CE course about deteriorating hospital patients for clinical nurses. The study found that participants were highly satisfied and increased knowledge compared to before the course. In terms of practice change, the results were mixed: nurses in the medical unit demonstrated significant improvements in recognition of deteriorating cases; this was not true of nurses in the surgical unit. Ramos-Morcillo, et al. (2015) also did not find practice change following the CE course. Using a two-group quasi-experiment of knowledge and practice following a CE course about evidence-based practice, Ramos-Morcillo, et al. (2015) found that knowledge scores increased but practice implementation scores did not.

There were two randomized studies of CE-related knowledge and nursing practice change. Bredenkamp's (2013) dissertation research compared a CE course delivered by online module about a hypoglycemic protocol with simulation. The study found a significant amount of knowledge gain that did not differ between the simulation and online participants, as well as reported improvements in clinical practice. Tsai, et al., (2011) studied practice change following CE about suicide awareness. The study found significant differences in suicide awareness knowledge among participants in the experimental group, and increased willingness to refer patients for suicide counseling, indicating transfer of this knowledge to practice.

Two studies researched the effects of a CE course on practice change exclusively. Ignatavicius and Chung (2016) studied CE delivered at a conference and found that nursing faculty implemented changes to their nursing curricula or educational practices following the CE. Tarnow, et al. (2013) studied the effects of CE about mindfulness. Findings showed increased implementation of mindfulness tools and techniques following the course.

Most of these studies demonstrate that the respective CE courses affected practice in some way, at minimum by increasing knowledge. However, depending on the CE course topic, course type, or nursing population studied these findings may be transferable only to a restricted group of CE providers in a similar practice area. Generalization of these results are limited.

Evaluation of CE Mandates on Practice. The National Council of State Boards of Nursing (NCSBN) studied the relationship of mandated CE hours to practice abilities. No significant differences were found in the practice abilities for nurses with and without CE mandates (NCSBN, 2003). An assumption of this study was that CE included a variety of different possibilities, not limited to offerings from CE providers. Respondent ratings of contributors to practice abilities indicated that CE contributed to a small degree, below work

experience, initial professional education and mentors. The possibility of variation in the respondents' definition of CE posed a limitation and may have affected the results related to CE's contribution.

The NCSBN (2003) study differed from our study because it focused on the outcomes of CE mandates specifically and did not delineate CE to offerings regulated by an accrediting body. Research clearly assessing the effects of CE course offerings is more indicative of CE transfer to nursing practice. In addition, our analysis of the nurses' practice change examples provides a deeper understanding of the outcomes of CE and factors affecting CE transfer.

Theoretical Framework

The evaluation and measurement of educational outcomes is ingrained in nursing professional development practice (ANCC, 2017). The specific evaluation of intent and actual practice change aligns with the New World Kirkpatrick Model. This model is utilized in course evaluations across health professions (Harper & Maloney, 2016; Johnson, et al., 2011; Lahti, Kontio, & Välimäki, 2016; Liaw, et al., 2016; Mann, Sargeant, & Hill, 2009) and it is a well-known and utilized standard of evaluation in CE for nurses.

The levels of evaluation in the model are based on learner outcomes and increase as value to the organization increases (Kirkpatrick Partners, 2009-2017). The levels of evaluation in the New World Kirkpatrick Model are defined as follows:

1. Level 1: Reaction is evaluated with learner satisfaction, engagement in the education and learning process, and relevance of education to the learner's practice.
2. Level 2: Learning is evaluated with gained knowledge, skills, attitude, confidence and commitment following education.

3. Level 3: Behavior is evaluated with application of knowledge, skills, attitudes, confidence and commitment following education.

4. Level 4: Results are evaluated with the achievement of positive outcomes in the organization following education (Kirkpatrick Partners, 2009-2017).

This study aligns with Levels 2 and 3 of the Kirkpatrick model. Intent to change practice represents learning, Level 2 of the model. That is, reports of intent to change practice are synonymous with acquired knowledge and a commitment to apply it in practice. Actual practice change represents behavior, Level 3 of the model. Reports of practice change indicate that participant practice behaviors demonstrate application of the knowledge gained from the CE courses.

Variables

Table 1 displays the variables in this study. The independent variable is CE. The dependent variables are intent to change practice and actual practice change. The moderating variable, "course type" was also analyzed post-hoc for possible associations with the intent and actual practice change responses.

Methods

Research Design

This retrospective, mixed-methods research study evaluated quantitative and qualitative survey data gathered upon completion and within one year following participation in one of multiple CE courses. Quantitative survey data provided information about intent and actual practice change. Qualitative survey data enabled participants to expand on their actual practice change responses for a deeper understanding of how practice changed or the respective barriers to practice change (Creswell, 2014).

Study Population/Sample

The study sample consisted of nurses who completed one of 16 CE courses provided by the organization during the period of January 1, 2016 to October 1, 2016. No demographic information was collected during the survey. The nurses' names were the only identifiers collected and responses were de-identified for the study.

Inclusion criteria

The inclusion criteria for the sample was completion of one of the CE course offerings during the defined time frame with completion of the survey upon finishing the course (i.e., intent to change practice) and/or completion of the longitudinal survey within one year following the course (i.e., actual practice change). For clarity, only the first set of responses to either survey was included.

Exclusion criteria

Participants who did not complete either of the survey evaluations were excluded from the study. Completion of the intent to change practice survey did not guarantee completion of the actual practice change survey. Conversely, completion of the actual practice change survey did not guarantee completion of the intent to change practice survey. CE courses offered outside of the defined time frame were excluded.

Sample Size

Polit and Beck (2017) recommend basing effect size on prior literature rather than conventional effect size tables due to the complexity of estimating sample size requirements for chi-square analysis. Effect size related to chi-square analyses was not reported in the research literature reviewed due to study design. In the power analysis conducted to estimate the sample size for this study a-priori, we established a goal to detect an effect size of 0.50 (medium effect).

Most nursing studies cannot expect effect sizes of more than 0.50 (Polit & Beck, 2017). Where a relationship is analyzed using a chi-square test (x^2), the statistical significance level of alpha (α) 0.05 and standard statistical power of 0.8 was applied. Based on these values, a statistics calculator returned a minimum total sample size of 102 for a one-tailed study such as this (Soper, 2006-2018).

A nonprobability, convenience sample was used. There were 1,138 nurses enrolled in the CE courses in this study during the time frame of January 1, 2016 to October 1, 2016. The study sample included a total of 480 respondents ($N = 480$) to the intent and actual practice change surveys collectively. This added statistical power to the results and increased generalizability (Colorado State University, 2018; Polit & Beck, 2017). There was a subsample of 403 respondents ($n = 403$) to the intent to change practice survey. There were 77 occurrences of missing data excluded from analysis due to respondents' failure to answer the intent to change practice question ($n = 20$) or not completing the CE evaluation at all ($n = 57$). There was a subsample of 110 respondents ($n = 110$) to the actual practice change survey. This represents 370 occurrences of missing data due to lack of response to the voluntary actual practice change survey ($n = 370$).

Setting & Intervention

The CE courses in the study were provided by the ANA Center for Continuing Education and Professional Development. As an accredited provider of CE by the American Nurses Credentialing Center (ANCC) Commission on Accreditation, the provider unit adheres to criteria set forth by the ANCC Commission for all operational aspects of CE courses (ANCC, 2015). This includes the needs assessment, planning, implementation, and evaluation of CE courses. Evidence of these processes are submitted during accreditation review.

The CE courses in the study included nine certification review course workshops, three organizational excellence workshops, and four certification review practiceIQ courses. The certification review course workshops were face-to-face CE courses for specialty RN and APRN ANCC board-certification exam preparation. Topics included Psychiatric Mental Health Nursing, Medical Surgical Nursing, Gerontological Nursing, Cardiac Vascular Nursing, Informatics Nursing, Nurse Executive, Nurse Executive-Advanced, Family Nurse Practitioner, and Psychiatric Mental Health Nurse Practitioner. They were delivered across the nation in the following states: Colorado, Illinois, California, New Hampshire, New Jersey, Virginia, South Carolina, and Pennsylvania. All, except one, were delivered in a didactic model with opportunities for question and answer interactions throughout the course. The exception was the Medical Surgical Nursing Certification Review Course workshop which was delivered in a blended workshop model, consisting of two online asynchronous modules followed by a didactic session with opportunities for question and answer interactions. For this study, one certification review course workshop was randomly selected per ANCC certification topic. For example, one Medical Surgical Nursing Review Course workshop was selected from several Medical Surgical Nursing Review Course workshops offered during the period of January 1, 2016 to October 1, 2016.

The organizational excellence workshops were also face-to-face CE courses. They prepared nurses for the various roles in the Magnet Recognition application process for the credentialing of health care organizations. Topics included Journey to Magnet Excellence, Magnet Model Overview, and Empirical Outcomes. They were delivered in the following state and international countries: California, Brazil, and United Arab Emirates. They were delivered didactically, with group and individual learning activities as well as question and answer

interactions throughout the course. For this study, one organizational excellence workshop was randomly selected per topic. The exception was that one additional international Journey to Magnet Excellence workshop was included.

The certification review practiceIQ courses were asynchronous, online CE courses for specialty RN and APRN ANCC board-certification exam preparation. They consisted of practice question banks, with quizzing and individualized performance reports for moderation. Nurses completed the courses on their own schedule, when convenient. The practiceIQ courses were newly designed in 2016. Topics included Nurse Executive, Nurse Executive-Advanced, Adult Gerontology Primary Care Nurse Practitioner, and Family Nurse Practitioner. All certification practiceIQ courses were included.

The subject matter experts (SMEs) that develop the content and/or facilitate the CE courses were vetted to ensure they met requirements for education, credentials, and practical knowledge and expertise appropriate for the course. They were required to be registered nurses and have a minimum of a Masters level education. Current practice experience in the respective content area and teaching experience were also requirements. The certification review course workshop and certification review practiceIQ course SMEs were required to hold the respective ANCC board-certification, while the organizational excellence workshop SMEs were internal ANA consultants that work with organizations to achieve ANCC organizational excellence in alignment with the ANCC Magnet® or Pathway to Excellence® designation programs.

To support consistency and quality management, accredited provider unit nurse planners manage all operational aspects of the CE courses.

Instrumentation/Measurements

        A search of CINAHL and ERIC databases returned a lack of validated evaluation

instruments relating to the constructs in this study. Content validity for the survey items was

established by provider unit nurse planner agreement that the intent to change practice and actual

practice change items aligned with the level 2 and level 3 constructs, respectively, in the New

World Kirkpatrick Model. Provider unit nurse planners are experienced in the operational

aspects of outcome-based CE courses set forth by the ANCC Commission on Accreditation.

        Nurses were required to complete an eight-item course survey for CE credit upon

completion of the courses in the study. There was a 42 % response rate for this survey and the

survey contained one item inquiring on intent to change practice (see Appendix A). The CE

incentive reduced systematic error from nonresponse (Trochim, Donnelly, & Arora, 2016).

        The intent to change practice measure related to our first research question, "What

percentage of nurses reported positive intent to change practice upon completion of the CE

courses?" A five-point scale measured the intent responses as follows (1 = I do not intend to

change my practice, 2 = I am undecided about changing my practice, 3 = I might change my

practice, 4 = I am committed to changing my practice, and 5 = I am highly committed to

changing my practice or 1 = very poor, 2 = poor, 3 = barely acceptable, 4 = good, and 5 = very

good) (refer to Appendix A). This construct aligns with The New World Kirkpatrick Model

Level 2: Learning (Kirkpatrick Partners, 2009-2017). The key above with definitions for each

level of the scale supported consistent understanding of the measurements across the sample to

reduce systematic error (Trochim, et al., 2016). Responses of 4 or 5 indicated a response of "yes"

and were coded as a "1" for analysis. Responses of 1, 2, or 3 indicated a response of "no" and

were coded as "2" for analysis. The intent to change practice survey responses were recorded on

a quantitative data collection tool.

Nurses were invited to complete a four-item longitudinal survey voluntarily within one year of course completion. There was a 9.6 % response rate and the survey contained three items inquiring on actual practice change. The survey inquired on whether the nurses changed or improved their practice based on knowledge gained in the CE course. The subsequent survey item requested that the nurses reflect on their response and provide an example of how they utilized the knowledge learned for practice change. Consequently, if practice did not change the next item inquired on what prevented it (see Appendix B). The CE incentive reduced systematic error from nonresponse (Trochim, Donnelly, & Arora, 2016).

An invitation to complete the actual practice change survey was emailed to all enrollees of the CE courses in the study. The email invitation went out on October 3, 2016 and included instructions, a direct link to the survey, a survey close date of November 30, 2016, and notice of a 0.5 contact hour incentive for reflection and explanation of the actual practice change response. A reminder message was emailed to those that had not completed the survey one week before the close date. Survey characteristics such as short length, use of an incentive, and a follow up request targeting non-respondents were implemented to reduce nonresponse error (Dillman, Smyth, & Christian, 2014; Trochim, et al., 2016).

The actual practice change measure related to our second research question, "What percentage of nurses reported actual practice change within one year following completion of the CE courses?" A binary measure of yes or no was used (refer to Appendix B). This construct aligns with The New World Kirkpatrick Model Level 3: Behavior (Kirkpatrick Partners, 2009-2017). Responses of "yes" were coded as "1" and responses of "no" were coded as "2". These responses were also recorded on a quantitative data collection tool.

The actual practice change survey also gathered narrative data from the nurses explaining their actual practice change or respective barriers. These narratives represent the nurses' lived experience in their natural voice and contributed to a deeper understanding of their perceptions of actual practice change. Analysis of this qualitative data addressed the fourth and fifth research questions, "What common themes emerge in the nurses' explanations of actual practice change?" and "What common themes emerge in the nurses' explanations of barriers to actual practice change?"

Data Collection Procedures

The data for this study was collected from the ANA Nursing Knowledge Center learning management system (LMS). This electronic solution is the required entry point for all course evaluations. Access to course-specific, individual respondent survey data was password-protected and only designated staff members, such as LMS Administrators and provider unit nurse planners, had the appropriate permissions and access.

The LMS administrator possessed technical knowledge and experience with the LMS and data collection. As such, the LMS Administrator managed the data collection process involving collection, de-identification, and provision of the data to the researcher. The researcher filtered and transferred the data to the quantitative and qualitative data collection tools and applied data definition codes (Table 2). A second nurse planner compared the data in the original files to the data collection tools to verify accuracy on 100% of the sample. After the data was verified as accurate, an import of the quantitative data from the quantitative data collection tool to the IBM® SPSS® Statistics Base for Windows software was performed. In the SPSS® Statistics software, the data was managed to ensure that the appropriate labels, values, and missing data were accounted for in preparation for the data analysis.

A simple table and Word document were used to compile the qualitative data. The researcher transferred the data to the qualitative data collection tool where accuracy verification on 100% of the sample was completed by the second nurse planner. Columns in the table delineated the respondent IDs, their actual practice change response, and their narrative examples to assist with coding and thematic content analysis.

Data Analysis

Descriptive and inferential statistics were computed on the quantitative data using IBM® SPSS® Statistics Base for Windows. Frequencies and percentages of nurses' intent to change practice and actual practice change were generated (see Table 3). A chi-square (x^2) cross-tabulation of intent by actual practice change determined whether a relationship existed. Then, a post-hoc chi-square analysis (x^2) of intent and actual practice change by course type was performed to determine whether course type was an influence.

A content analysis of the actual practice change examples consisted of the identification and coding of themes by the researcher and a third nurse planner. The examples were coded in the natural language of the respondents. Relevant and repeating ideas were highlighted. Identifying the "how" or "why not" in the respondents' statements encompassed the coding process and patterns emerged. Intercoder agreement between the researcher and the third nurse planner enhanced reliability (Polit & Beck, 2017). Agreement on a minimum of 90% of the themes identified and their definitions was accomplished. Then, the content themes were analyzed for frequency and context by the researcher (Trochim, et al., 2016).

Ethical Considerations

Strict management of the data collection process by the LMS Administrator protected the privacy of the study participants. Participant anonymity was maintained throughout data

collection. The data has since been stored and managed on a secure network in a private folder accessible only to the nurse researcher.

The organization provided a letter of permission to collect data for the study. The researcher and primary advisor completed training by the Collaborative Institutional Training Initiative (CITI) for Social and Behavioral Research and Health Information Privacy and Security. The organization does not have an Institutional Review Board (IRB). Therefore, the study was submitted to the George Washington University IRB for ethical review and determined to be research that is exempt under DHHS regulatory category 4.

Results

Quantitative Results

Demographic data was not collected on the sample. Refer to the Methods section for a description.

Analysis of the 403 responses (n = 403) to the intent to change practice survey addressed the first research question, "What percentage of nurses indicated positive intent to change practice upon completion of the CE courses?" There were 357 respondents (88.6%) that indicated positive intent to change practice. There were 46 respondents (11.4%) that indicated no intent to change practice.

Analysis of the 110 responses (n = 110) to the actual practice change survey addressed the second research question, "What percentage of nurses reported actual practice change within one year following completion of the CE courses?" There were 98 respondents (89.1%) that reported actual practice change. There were 12 respondents (10.9%) that reported no practice change.

There were 51 occurrences (n = 51) where respondents completed both surveys. This data was analyzed to address the third research question, "Is there a relationship between the nurses' intent to change practice and the nurses' actual practice change?" There were 44 respondents (n = 44) that reported both an intent to change practice and actual practice change. There were no respondents (n = 0) that indicated both no intent to change practice and no actual practice change. The lack of variance among these responses did not support a valid chi-square analysis of the relationship between intent and actual practice change.

The analysis above prompted the question of the relationship of intent and actual practice change to course type. In a post-hoc analysis, crosstabulation of the descriptive statistics on intent and actual practice change were analyzed by course type using a chi-square test. Table 4 and 5, respectively, shows the results for each by course type. Course type was not a significant factor in the intent to change practice responses, x^2 (2, n = 403) = 1.319, p = .517, V = .057. Nor was the course type a significant factor in the actual practice change responses, x^2 (2, n = 110) = 2.302, p = .316, V =.145.

Qualitative Results

All 110 respondents (n = 110) to the actual practice change survey provided a qualitative explanation of how the knowledge gained in the CE courses was applied in practice. A content analysis of the 98 explanations that reported actual practice change was conducted to identify common themes and address the fourth research question, "What common themes emerge in the nurses' explanations of actual practice change?" There were four common themes identified. The themes included becoming certified, improved leadership, enhanced role performance, and educating or mentoring others. The nurses' responses sometimes overlapped and contained

content related to more than one theme, as is common in qualitative data (Polit & Beck, 2017).

Table 6 provides descriptions and prevalence of the themes identified.

One theme identified in the nurses' practice change explanations was becoming certified. This theme described the nurses' application of the knowledge gained in the CE course to become ANCC board-certified as nurse executives "NEA-BC," family nurse practitioners "FNP," and other specialties. Nurses with the goal of becoming certified enter the endeavor knowing it may result in a change in practice. For example, specialty RN certification is required by clinical ladder programs for career advancement in clinical settings. This is also true for the APRN specialties because they will transition to a new scope of practice for advanced practice nurses. This likely influenced some of the responses. An interesting and important aspect of this theme related to how the CE course developed higher-level problem-solving skills needed for success on the exam and in practice. One participant described it as follows:

> It allowed me to learn to think critically. What I mean by this is I learned to problem solve through questions. Answering questions for the ANCC FNP exam required a step-wise problem-solving approach that no amount of memorization of knowledge could prepare you for and this program really helped me hone in on my problem-solving skills for the exam, but also as a future provider.

Another theme identified was improved leadership. This theme was revealed through participants' examples of applying improved leadership skills. An interesting detail was that participant explanations of improved leadership following the CE courses were not always related to formal leadership roles. Some participants described improved leadership behaviors that were not connected to positional authority but rather professional practice. One participant described a key contribution in leadership activities where he influenced professional nursing

practice in the organization. The participant stated, "I have adjusted current scripting and tip

sheets for [the] mental health clinic nurse triage line [incorporating information learned]. These

tip sheets and scripts are becoming part of the mental health clinic competencies for all nurses."

Another participant reported the completion of research and quality improvement efforts in their

organization following the CE course. The participant stated, "This was a great review and

granted me knowledge related to theory, laws and research. I have facilitated research projects

and quality improvement projects since my attendance."

Often the examples of improved leadership included a resulting return on investment for

the organization that aligns with a higher-level evaluation on the New World Kirkpatrick Model,

Level 4: Results and demonstrates the achievement of positive outcomes in the organization

following the education (Kirkpatrick Partners, 2009-2017). Examples included, but were not

limited to, practical skills for managers, improved decision-making, and organizational

improvements. One participant described that the CE course enabled the management of staffing

needs stating, "Practice change involved [a] better understanding of staffing and how to compute

FTE requirements based on standards of care and acuity." An example of improved decision-

making related to how information learned in the CE course helped the participant identify and

respond to problematic situations for a healthier work environment and resulted in the retention

of nursing staff. The participant stated, "Understanding workplace issues has helped me gain a

better awareness of negative behaviors. Recognizing the behavior and extinguishing it before it

got worse prevented a nurse from leaving the organization." Another example of how improved

leadership skills gained from the CE course resulted in organizational improvements described

reflection and implementation of new approaches for communication leading to better patient

satisfaction scores. The participant stated the following:

I reflected on my communication skills and implemented new strategies when interacting

with staff and patients. Being mindful of staff and patients, using active listening skills,

and modeling transformational leadership has led to improved patient satisfaction scores.

The participants' accounts of enhanced role performance encompassed the next theme

identified. It involved the identification of CE-related improvements in performance specific to

the participants' current roles. Examples included enhanced clinical performance,

interprofessional collaboration, and theory application. This was not limited to a position and

included managers, educators, and staff nurses. Evidence-based information in the CE course

was identified as an important factor for enhanced performance. One example stated, "The

information learned from this course has provided me with evidence-based practices that I carry

through my work." Another participant explained that the CE course validated his clinical

practice decisions with evidence and added new knowledge and perspectives that improved the

clinical care to patients. The participant stated:

> Direct patient interaction has improved due to the review of current evidenced based
>
> knowledge that validates [my] established knowledge base and experience. Assessments
>
> for mental health patients are more thorough due to the idea of assessing all aspects of the
>
> mental health patient's health.

Enhanced role performance examples also conveyed that knowledge gained in the CE

courses led to increased interprofessional collaboration, described conceptually as multi-

disciplinary and the involvement of team members for improved patient outcomes. One

participant stated that "reinforced and improved knowledge has facilitated [the] participation in

multi-disciplinary treatment team meetings that directly impact patient treatment plans and

outcomes." Another participant explained the practice of "patient centered care and involving

members of the team to focus on productivity and efficiency as well as providing consumers

with the right care at the right place at the right time."

Theory application was another aspect of enhanced role performance where participants

described how they have applied new or reinforced theoretical knowledge from the CE course

into practice. For example, one participant discussed learning about change theory in the CE

course and applying the concepts when leading a department or organization through change.

The participant stated:

> I find in my leadership roles and with program development plans and mergers it is very
>
> important to know how to [change]. Kurt Lewin: unfreezing-change-refreezing model is
>
> important to healthcare. We had to ask staff to change their thinking about best practices
>
> now in concert...a bundle...to achieve the outcome desired. As leaders knowing how to
>
> change is a required expertise. This was one of my most beneficial learnings of this
>
> educational program.

The final theme identified in the nurses' explanations of practice change was educating or

mentoring others. This theme described participants using new-found knowledge to develop

education for others and demonstrating new skills when mentoring others. This theme was also

not limited to a position. In fact, the participants described their roles in relation to others as co-

workers and educators. One participant explained that new clinical information learned in the CE

course would be shared in the education of co-workers for practice changes across the

department. The participant stated, "I learned many clinical facts that I did not know about the

cardiovascular system [and] used new-found information to educate the rest of our unit staff. We

discussed key changes that could be useful to implement on our unit." Another participant

described educating staff at an organizational level. The participant stated, "Based on the

information, I am training the organization to be better in documentation of unit council meetings or process improvement work [and to] understand and communicate better the Magnet expectations." In relation to mentoring others, one participant explained modeling newly learned behaviors. The participant stated, "[My] role as a clinical coach/mentor has improved as I am a better role model with direct patient interaction and am more focused on mental health knowledge versus just learning the routine functional clinical operations."

A content analysis of the 12 nurses' explanations related to no practice change provided evidence to answer the fifth research question, "What common themes emerge in the nurses' explanations of barriers to actual practice change?" There were two themes identified in the reasons for no practice change. The reasons related to a lack of association to the participants' current role and a lack of meeting the participants' learning needs.

The lack of association was described as instances where participants explained that practice did not change because the CE course lacked relevance to their current role. Where this theme was noted, it was explained by most participants as intentional. Participants described that their intentions for taking the CE course was not to improve practice in their current role but instead to learn about a new specialty area of practice. One participant stated, "Did not pertain to current practice - only potential future practice." Another participant stated, "I took this course to get a glimpse of what the knowledge base requirement for a nurse executive would be."

Another theme identified in the reasons for no practice change related to the course not meeting the participants' goals or preferences as a learner. One aspect of this related to the failure to become certified. One participant explained, "I thought the course was helpful but it was more of a review than learning new information. Unfortunately, I did not pass my certification test." Another aspect focused on the CE course design not meeting the participants'

preferences and possibly not understanding the course design entirely. The participant stated the following:

> I took the practice test and it was helpful in that I learned I was below in all areas. What would be more helpful is if the practice test linked to specific content that I could use to remediate. I did not [take] the quizzes and wonder if that would have provided the information that I needed.

Discussion

CE-related practice change is difficult to evaluate. Though we are limited to self-reported data, the results of this study provide evidence of practice change following CE courses. This study analyzed the percentage of nurses that had an intent to change practice at the end of the CE courses. Then, the study analyzed self-reported actual practice change within one year following the same CE courses. There were three course types. The course topics were diverse and included certification review for seven different RN specialty areas, three APRN specialty areas, and three organizational excellence topics. The workshop locations included eight different states in the U.S. and two international countries. The practiceIQ courses were available online for 24-hour access by nurses across the U.S. and abroad. This makes the study results more generalizable to diverse nursing specialties, practice settings, levels of practice, and geographic location.

Previous studies evaluated and concluded that knowledge was gained from one CE course (De Gagne, et al., 2015; Yacoub, et al., 2015; Liu, et al., 2014; Moores & Allan, 2012; Zhang & Hsu, 2013; Schneiderman, et al., 2009; Wolak, et al., 2008; and, Yoshioka, et al., 2014). Our study demonstrated knowledge gained through the evaluation of intent to change practice following CE. The majority of nurses intended to change practice following the CE

courses. Our study also found that most nurses changed their practice behaviors within one year

following the CE courses. These findings augment previous studies that demonstrated practice

change following one CE course (Breneman, et al., 2015; Ignatavicius & Chung, 2016; McNeill,

et al., 2012; Tarnow, et al., 2013; Tsai, et al., 2011). This study contributes to the existing

evidence that knowledge is gained from CE courses and that this knowledge can transfer to

practice. Our study was unique in analyzing 16 different CE courses of differing course types,

topics, levels of practice, and geographic locations for more generalizable results.

About 10 percent of the nurses in our study completed both the intent and actual practice

change surveys. Almost all who intended to change practice followed through to change practice.

No one demonstrated the opposite, both no intent to change practice and no practice change.

None of the previous studies analyzed this relationship. This is an area where additional study

would be valuable.

Our post-hoc analysis of course type and intent to change practice aligned with the das

Graças Silva Matsubara and De Domenico (2016) study comparing knowledge gained between

online and traditional CE course types. CE course type did not appear to influence the knowledge

gained. Similarly, our analysis of course type and actual practice aligned with Bredenkamp's

(2013) study of transfer to practice following CE delivered by simulation and online courses.

Both Bredenkamp (2013) and our study concluded that the CE course types did not appear to

influence practice change.

Our qualitative analysis revealed the specific practice changes made following the CE

courses. The four practice change themes identified were becoming certified, improved

leadership, enhanced role performance, and educating or mentoring others. The examples of

actual practice changes demonstrate application of knowledge gained from the CE courses, and

in some cases, an organizational impact from the application of the CE-related knowledge. The

examples of practice change expanded on the quantitative survey items and enriched our

understanding of the CE's actual impact on practice. The NCSBN study evaluated CE mandates

and other contributors to practice abilities, CE included, but did not evaluate CE courses for the

actual practice change results as this study did (NCSBN, 2003). In fact, none of the previous

studies reviewed analyzed nurses' explanations of actual practice changes following completion

of multiple CE courses.

Study Limitations

The retrospective analysis of evaluation data for this study required the use of

nonprobability sampling. This limits our ability to make statistical inferences about all

populations of nurses from the quantitative analysis. Completion of the CE courses and the intent

to change practice survey and/or the actual practice change survey was a required inclusion that

prevented random selection of the sample. Additionally, surveys limit the ability to provide

strong evidence of a cause-effect relationship. Missing data resulted from decreased survey

response rates and the attrition of respondents to the actual practice change survey.

Implications for Practice

A large majority of participants intended to change their practice and perceived actual

practice change as a result of completing the CE courses in our study. Accordingly, the first

major practical contribution of this study is that it provides much needed empirical evidence of

CEs positive impact on nursing practice. Our qualitative findings reveal common themes and

specific examples to illustrate how CE can influence professional nursing practice. This

information does two things. One, it informs CE provider practice within the organization by

identifying and validating how the CE courses helped nurses to change their practice, the types

of learning activities that were viewed as valuable for practice change, and the content themes that resulted in practice change. Two, it helps to answer the call of key stakeholders to provide evidence of CEs impact (AACN & AAMC, 2010; HHS, 2016; IOM, 2010). In this sense, our findings suggest that organizations that invest in CE invest in nursing practice and lay a foundation for studies to further connect the investment in CE to nursing practice outcomes.

A second implication for improved practice relates to the inclusion of a diverse group of multiple CE courses for outcome evaluation. Comparable studies evaluated outcomes for one CE course whereas our findings result from analysis of participants' experiences across multiple CE courses of differing course types, topics, levels of practice, and locations. This makes the findings more generalizable.

A third implication relates to our findings on the relationship between intent and actual practice change. A small percentage of the sample completed both surveys and the lack of variance in the results did not warrant analysis. However, of those that responded almost all showed both intent to change practice and actual practice change. Outcome evaluation processes should include methods to reduce attrition of the sample and support analysis of the relationship. Future studies could build on this research by conducting systematic inquiries to investigate this relationship.

A fourth implication relates to our findings that course type did not influence intent or actual practice change. This raises the question of the effect of educational design on practice change. Outcome evaluations that inquire on the effects of educational design on intent and actual practice change are recommended.

Conclusions

Our study evaluated CE transfer to practice across a diverse group of CE courses. We analyzed intent to change practice and actual practice change through retrospective survey data that aligned with the evaluation levels in the New World Kirkpatrick Model. We conclude from our quantitative analysis that CE can have a positive impact on nursing practice. We further analyzed the nurses' real-world examples of practice change for added depth to the actual practice change responses. Our qualitative findings show that CE can support nurses in becoming certified, improving their leadership skills, enhancing their performance, and enabling the education and mentorship of others. The value of CE and its impact on nursing practice is evidenced in these findings. Organizations that invest in CE, invest in nursing practice and related organizational improvements.

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Table 1 Variable Table

Variable Name	Variable Form	Theoretical Definition	Operational Definition
Independent Variable			
Continuing Education (CE)	Independent Categorical	16 CE courses selected, awards CE credit provided by ANA Nursing Knowledge Center	Completion of one of 16 CE courses in the study
Dependent Variables			
Intent to change practice	Categorical	Nurses' intent to change practice upon completion of CE course	Completion of survey item Level of commitment to changing practice: 1 = I do not intend to change my practice 2 = I am undecided about changing my practice 3 = I might change my practice 4 = I am committed to changing my practice 5 = I am highly committed to changing my practice Or 1=Very Poor; 2=Poor; 3=Barely Acceptable; 4=Good; and 5=Very Good Responses of 4 or 5 indicate positive intent to change practice = yes;

			responses 1, 2, or 3 indicate lack of intent to change practice=no
Reported actual practice change	Binary	Nurses' reported actual practice change within one year following completion of CE course	1=Yes 2=No
Explanations of practice change	Qualitative	Nurses' explanations of practice change	Narrative responses explaining the yes
Explanations of no practice change or respective barriers	Qualitative	Nurses' explanations of no practice change or respective barriers	Narrative responses explaining the no
Moderating Variables			
Course type	Explanatory Binary	Differing course types include Certification Review Course Workshop, Organizational Excellence workshop, or Certification Review PracticeIQ Course	1. Certification Review Course Workshops; 2. Organizational Excellence Workshops; 3. Certification Review PracticeIQ Course

Table 2 Quantitative Data Definition Codes

Intent to change practice	1=Yes=4 or 5 survey response 2=No=1, 2, or 3 survey response
Actual practice change	1=Yes 2=No
Course Type	1=Certification Review Course Workshops; 2=Org Excellence Workshops; 3=Certification Review Practice IQ Course

Table 3 Data Analysis Table: Quantitative

Variables	Certification Review Course Workshop	Organizational Excellence Workshop Course	Certification Review PracticeIQ Course	Analysis
Intent to change practice:	1=Yes 2=No	Freq & Percentage		
	Freq & Percentage	Freq & Percentage	Freq & Percentage	χ^2
	Freq & Percentage	Freq & Percentage	Freq & Percentage	
Actual practice change:	1=Yes 2=No	Freq & Percentage		
	Freq & Percentage	Freq & Percentage	Freq & Percentage	χ^2
	Freq & Percentage	Freq & Percentage	Freq & Percentage	

Table 4 Intent to Change Practice by Course Type (n=403)

	Course Type			
Intent to Change Practice	Certification Review Workshop *(n=193)*	Organizational Excellence Workshop *(n=93)*	Certification Review PracticeIQ Course *(n=117)*	**Total**
Yes *(n=357)*	171 or 47.8%	85 or 23.8%	101 or 28.2%	100%
No *(n=46)*	22 or 20.2%	8 or 17.3%	16 or 34.7%	100%

Note. Pearson Chi-Square. x^2 (2, n = 403) = 1.319, p = .517, V = .057.
Percentages may not equal 100 due to rounding.

Table 5 Actual Practice Change by Course Type (n=110)

	Course Type			
Actual Practice Change	Certification Review Workshop *(n=34)*	Organizational Excellence Workshop *(n=12)*	Certification Review PracticeIQ Course *(n=64)*	**Total**
Yes *(n=98)*	28 or 28.5%	11 or 11.2%	59 or 60.2%	100%
No *(n=12)*	6 or 50%	1 or 8.3%	5 or 41.6%	100%

Note Pearson Chi-Square. $x^2 (2, n = 110) = 2.302, p = .316, V = .145$.
Percentages may not equal 100 due to rounding.

Table 6 Actual Practice Change and Number of Respondent Explanations

Actual Practice Change Theme	Theme Description (Reflects that knowledge and/or skills gained from the CE course changed practice in the following ways)	Number of Explanations with the Actual Practice
Becoming Certified	Becoming board-certified in an ANCC nursing or advanced practice nursing specialty	38
Improved Leadership	Improved application of leadership principles in decision-making, communications, and actions, including organizational improvements	36
Enhanced Role Performance	Signs of improvements performance of current role, including enhanced clinical practice, interprofessional collaboration, theory application	35
Educating or Mentoring Others	Sharing of new knowledge and/or skills for improvement in practice by others	10

Note. *The number of explanations does not equal the number of respondents to the actual practice change survey (n = 98) due to the respondents' allowance to explain any actual practice change in their natural voice without restriction. There were 6 accounts of missing information where the responses did not address the actual practice change inquiry.*

Appendix A

Intent Survey

Intent Survey Item

Please indicate your level of commitment for the following statement using this scale:

1 = I do not intend to change my practice

2 = I am undecided about changing my practice

3 = I might change my practice

4 = I am committed to changing my practice

5 = I am highly committed to changing my practice

The level of commitment I have to change my practice based on what I learned in this activity:

OR

The level of commitment I have to change my practice based on what I learned in this activity.

5=Very Good

4=Good

3=Barely Acceptable

2=Poor

1=Very Poor

Appendix B

Actual Practice Survey

Actual Practice Survey Items

Question 1

Did you change or improve your practice based on knowledge gained through participation in the education program/product:

Yes

No

Question 2

Please reflect on your response. Set aside 30 minutes (15 minutes to reflect and 15 minutes to write

feedback). Provide a short example (approximately 100 words or so) on how you utilized the knowledge

learned in the education program/product to change or improve your practice.

Question 3

If you did not change or improve your practice, what do you believe prevented it?