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Effects of Community of Practice and Knowledge Translation Strategies on Nurse Practitioners' Knowledge and Practice Behavior

Helen M. Holman
University of North Florida

EFFECTS OF COMMUNITY OF PRACTICE AND KNOWLEDGE TRANSLATION STRATEGIES ON NURSE PRACTITIONERS' KNOWLEDGE AND PRACTICE BEHAVIOR

by

Helen M. Holman

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CERTIFICATE OF APPROVAL PAGE

The project of Helen M. Holman is approved:

Signature deleted

Nancy L. Davis, PhD — Date: 11-18-09

Signature deleted

Barbara Olinzock, EdD — Date: 11-18-09

Signature deleted

M. Catherine Hough, PhD, Committee Chairperson — Date: 11-19-09

Accepted for the Department:

Signature deleted

Li Loriz, PhD, Chairperson — Date: 12-9-09

Accepted for the College:

Signature deleted

Pamela Chally, PhD, Dean — Date: 12-10-09

Accepted for the University:

Signature deleted

David E.W. Fenner, Dean of the Graduate School — Date: 12-18-09

Dedication

I dedicate this to my family who, through their collective support, pointed me ever so gently to the finish line. I gratefully acknowledge the loving support of my husband Jon, who did not blink when I announced my plans to pursue another degree, and who spent many hours of solitude while I completed necessary tasks. I also thank my children, Matthew, Lizzie, and Jonathan for their assistance and encouragement, my father Stephen for his editing eye; even though he thinks it is “gobbledygook”, and my mother, Helen, who always supported my efforts with her encouraging smile.

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Abstract

Background: Emerging evidence suggests that interactive CE activities will have the most effect in terms of knowledge and practice. Using technology to provide interactivity via computer-based applications is as effective an educational strategy as traditional education formats.

Methods: A randomized controlled trial was conducted to test the effectiveness and satisfaction of educational activities provided within an online community of practice(CoP) on nurse practitioner (NP) knowledge and practice behavior. The online interactive website combined certified continuing education, professional forum, Ask-the-Experts, national guideline links, patient education tools, and professional resources. A Two-Group Control Group design was used. Study participants were assessed on knowledge and practice behavior prior to and after the six month study.

Results: A sample of 66 NPs was randomly assigned to an online education only control group (n=33) or a CoP group (n=33). NPs in both groups had similar pretest knowledge assessment scores: 46% (control) vs. 49% (CoP), and pretest clinical vignette scores: 51%(control) vs. 57% (CoP). After the intervention, there was no significant increase in the posttest scores of the CoP group at 6 months compared with the posttest scores of the control group (knowledge assessment: 67% vs. 60%, p =.17; clinical vignettes: 67% vs. 74%, p =.28).

Conclusions: The pilot test did not demonstrate that the intervention (CoP access) had a more positive effect on knowledge or clinical performance than access to online CE activities alone. It did however confirm the effectiveness of online education in improving knowledge.

Chapter 1: Introduction

Continuing education (CE) is a staple for health care professionals as a means to maintain professional licensure, improve skills, enhance knowledge, and remain current on emerging science. While legislation differs by state and profession, most health care professionals are mandated to secure continuing education to maintain professional licensure and/or certification. Currently, 26 states require continuing education of nurses as criteria for continued licensure.

Over the last fifteen years, consumers and policy makers have become increasingly concerned about the competence of health care providers. The Pew Health Professions Commission discussed concerns regarding the inconsistent state board regulations as they related to standards for competent practice (Lazarus & Lee, 2006). In 1998, the President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry (1998) described the many incidents of adverse events in the care of patients. In 1999, the Institute of Medicine (IOM) report, *To Err is Human: Building a Safer Health System*, raised awareness among health care providers and consumers of unsafe systems and practices within the US health care system (Kohn, Corrigan and Donaldson). IOM's subsequent report, *Health Professionals Education – A Bridge to Quality* challenged state regulatory agencies to move toward requiring licensed professionals to periodically demonstrate competence in five areas or core competencies

(Greiner & Knebel, 2003). These core competencies include patient-centered care, interdisciplinary teams, evidence-based practice, quality improvement, and informatics.

The National Council of State Boards of Nursing (NCSBN) defines competence as "the application of knowledge and the interpersonal, decision making, and psychomotor skills expected for the nurse's practice role, within the context of public health, welfare, and safety" (NCSBN, 2005, p.1). In a 2003 study, *Evaluating the Efficacy of Continuing Education Mandates* (Smith, 2003), the NCSBN concluded that work experience is a stronger contributor to the growth of abilities than continuing education, working with mentors or self-study (NCSBN).

While the NCSBN study appreciated clinical experience, CE contributes to the continued competence of health care professionals by providing evidence-based information about disease states, treatment options, and emerging science. It is, however, often difficult to measure the value of CE. Outcome measurement is the use of scientific methodology to collect information to assess effectiveness of the education in relation to achievement of the intended goals (Abdolrasulnia, 2005). Measurement of educational outcomes can be difficult to design, time consuming, and costly.

With the emphasis upon evidence as the basis for clinical practice, and with the increasing scrutiny of the involvement of commercial interests such as pharmaceutical companies in the sponsorship of continuing education, there is increasing pressure to measure CE outcomes. Current expectation is to measure the impact of CE beyond the increase in knowledge and skills to the improvement of competence and performance in practice, and finally to the effects such education has on patient and/or population health (Mansouri & Lockyer, 2007).

The drive toward measurement in continuing education stems from a variety of stakeholders. Policy makers desire this information to develop and implement new processes and patient programs; learners want to determine what type of CE is the most efficient and effective; educational providers wish to demonstrate educational effectiveness to employers, clients, and accrediting bodies; consumers demand assurances that their health care professionals are competent; and financial supporters want to justify resource allocation.

Purpose

The purpose of this project is to assess the effect of a Web-based community of practice designed to provide online education, networking, and practice tools on nurse practitioner (NP) knowledge and performance in the primary care setting.

Background

Knowledge that guides the activities of health industry professionals is dynamic and constantly evolving. The health care professional is an adult learner capable of determining his/her educational needs and choosing instructional methods best suited for individual learning. Likewise, the education of health care professionals is an ever changing, on-going process which encompasses the professionals, clients/patients, and the public-at-large. The health care environment is a complicated system with complex processes and multiple health professionals working in collaboration toward quality patient care.

While academic professional education is designed to prepare the health care professional at the pre-licensure level, CE is the planned, organized learning activities acquired after initial licensure or certification. CE is designed to ultimately improve the

health of clients and the public. CE bridges the “terminal” degrees of academia to the concept of life-long learning. Continuing education professionals are mired in accreditation standards developed by national accreditation councils charged with promoting an environment that supports continued competence and incorporation of new knowledge. Recently these standards have been honed and upgraded to better endure the intense scrutiny by practitioners, consumers, and government agencies.

The Accreditation Council for Continuing Medical Education (ACCME) has included criteria for compliance that includes the provider analysis of changes in learner competence, performance, or patient outcomes. To achieve the status of Accreditation with Commendation, CME providers must integrate their educational activities into the process for improving professional practice (ACCME, 2006). In 2006 the American Nurses Credentialing Center Commission on Accreditation (ANCC) released updated standards (American Nurses Credentialing Center, 2009), and in 2007 the Accreditation Council for Pharmacy Education (ACPE) announced its intention to revise standards (Accreditation Council for Pharmacy Education, 2007). While not as specific in their language, both the ANCC and the ACPE mirror the ACCME positions in their revised standards.

Even with studies showing that CE can make a difference in the outcomes as described above, there continue to be concerns that not enough is being done to affect change toward evidence-based practice (EBP). EBP incorporates multiple levels of learning because it charges the health care professional to incorporate critical thinking skills with algorithms, clinical practice guidelines, critically appraised topics and search strategies on best evidence, to affect patient-based change in the practice setting (Taylor-

Seehafer, Abel, Tyler, & Sonstein, 2004). According to a study completed by Nicholson, Warde, and Boker (2007), practicing clinicians and educators often lack the skills needed to practice according to evidence-based principles. The investigators found that case-based, longitudinal EBP education and access to online EBP resource can promote an increased understanding (Nicholson, et al.). The teaching of these newer competencies may require a less-traditional approach to CE.

Two newer concepts have been introduced to CE professionals over the last few years – continuing professional development (CPD) and knowledge translation (KT). While traditional CE utilizes primarily educational methods including lectures, print and electronic modalities, and are targeted to professional disciplines, CPD uses a wider variety of learning methods and targets multiple disciplines. CPD incorporates accredited CE with organizational learning theory and social psychology.

KT is the "exchange, synthesis and ethically sound application of knowledge – within a complex system of interactions among researches and users – to accelerate the capture of the benefits of research… set within the practice of health care and focuses on changing health outcomes using evidence based clinical knowledge" (Davis, et al. 2003, p 33). It is an overarching construct that includes continuing education and guideline implementation to integrate best practice into everyday care of patients, in order to affect optimal health care outcomes (Davis, 2006). It occurs primarily in the practice setting and incorporates a variety of tools and methods to overcome barriers to change. It builds upon CE and targets clinicians, teams, health systems, patients, populations, and policy makers. KT utilizes the educational principles associated with CE plus those associated with systems management, health services research, social marketing, patient education,

bioinformatics, and quality improvement (Davis, et al. 2003). KT values the complexities of moving knowledge into practice and recognizes the positive and negative forces that include policy, health care practitioners, patients, family members, and health care systems (Davis, 2006).

Technology-enabled KT strategies may prove helpful to health care professionals who struggle with information overload and the rapid rate that clinical evidence is generated, but who have educational gaps relating to their practice. Ho, et al. (2004) suggests that the knowledge of health care professionals have three dimensions of knowledge: (a) explicit or formal knowledge generated through scientific studies (ideal standard in disease management), (b) clinical knowledge generated through clinical encounters, and (c) clinical judgment or practice wisdom generated through past experience. The contextual framework of knowledge translation includes an inter-related, dynamic flow of information between the community of researchers – knowledge producers, community of practice – knowledge consumers, and the community of patients – knowledge beneficiaries. Instead of the practitioner remaining in a passive role as an information receiver, KT strategies utilize a push-pull operation where the practitioner actively seeks information (pulled from research) and direct it (push) towards the health care consumer (Ho, et al. 2004).

As a result of this KT movement, there have emerged three dominant themes from literature that relate to the knowledge producers: (a) communicating findings in a manner that influences decision making, (b) establishing effective working relationships among the various stakeholders, and (c) relevance of the proposed research to intended users (Bowen & Martens, 2005). Researchers are challenged to develop respectful and trusting

relationships in order to collaborate at all stages of the research process. This new model suggests a paradigm shift from the traditional independent roles of the research producers and the intended uses.

The concepts of KT appear to parallel those introduced by Etienne Wenger (1998) in his theory of learning through engagement in social practice, or communities of practice (CoP). McDonald and Viehbeck (2007) suggest the concept of CoPs as a means of "bridging the solitudes and overcoming limitations associated with current views of research translation" (p. 140). "Communities of Practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermott, & Snyder, 2002, p. 4). Wenger's work provides the theoretical underpinnings for CoPs and describes an evolutionary process for learning in groups. Building on the adult education theory of Malcolm Knowles, CoPs utilize constructivist principles, constructing meaning through problem-based learning, structuring meaning via social interactions, and building knowledge through interaction (Johnson, 2001).

Wenger's social theory of learning integrates the components of meaning, practice, community, and identity, into the process of learning (Wenger, 1996). CoPs expand the concepts of learning and include seven basic elements. According to Wenger (1996, 1998) learning is: (1) inherent in human nature, (2) fundamentally social, (3) changes who we are, (4) is a matter of engagement in practice, (5) reflects participation in communities of practice, (6) means dealing with boundaries, and (7) is an interplay between the local and the global. Wenger's work validates the need for shared practice and the importance of informal communities in sustaining learning.

Wenger (1998) highlights three essential elements of CoPs: (a) mutual engagement, (b) joint enterprise, and (c) shared repertoire. 'Mutual engagement' occurs through group members interacting and developing relationships; 'joint enterprise' consists of negotiating responses or tasks; and 'shared repertoire' is the development of shared routines, nomenclature, actions, or concepts (Wenger, 1998). The *shared* nature of these elements may ultimately allow CoPs to facilitate all phases of research (conduct, implementation, and use) by connecting researchers with practitioners and organizing them to purposeful actions that "deliver tangible results and benefits of interest and importance to members" (McDonald & Viehbeck, 2007, p. 143).

Johnson (2001) defines virtual communities as "designed communities using current networked technology, whereas communities of practice emerge within the designed community via the ways their participants use the designed community (p. 45)." CoPs are distinguished from other learning situations by three components: (a) differing levels of participant expertise, (b) a discernable progression from novice to expert, and (c) authentic tasks and communication (Johnson, 2001).

The health care audience may be uniquely suited to learning within CoPs. Parboosingh (2002) suggests that physicians learn naturally in CoPs, interacting with peers and mentors as they face the common challenges and tasks at the workplace. CoPs may address the barriers encountered with traditional CME (didactic lectures with key opinion leaders, at off-site locations). While traditional CME models rely on the characteristics of the individual physician with their varying motivational forces, CoP models rely on the characteristics of the community with the relationships and peer interactions serving as the motivation for learning and high standards of care. In CoPs,

community members support each other, collectively reflect on their practice, and respond to changes in their practices as the outcomes of the learning (Parboosingh, 2002).

Since Kirkpatrick's formative work in 1959, hierarchies of outcomes have been discussed in education literature. Kirkpatrick formulated four levels of evaluation - reaction, learning, behavior, and results (Kirkpatrick, 1998). The model recognized the importance of each level, and the complexities that arise moving, in evaluative terms, into the higher levels. Dixon (1978) subsequently adapted the four levels of criteria to include: (a) participants' perceptions and opinions of the course, (b) professional knowledge and attitudes, (c) professional behaviors in actual clinical work, and (d) impact of client status. Recently, the model has been further adapted in health care continuing education to include six levels: (a) participation - the number of professionals participating in the learning, (b) satisfaction - the extent of acceptance about the setting and delivery by the learner, (c) learning - the acquisition of new skills and knowledge by the learner, (d) performance - the changes in learner's clinical practice as a result of the application of the lesson, (e) patient health - the changes in health status of patients due to changes in professional performance, and (f) population health - the changes in population health outcomes (Moore, 2003).

Summary

This chapter defined the need for and purpose of CE in the health professions. The movement of accrediting agencies towards measurement of educational outcome was described and the author's doctoral project was introduced. The concepts of KT and

social theory of learning were explored as important components to virtual communities of practice. The chapter concluded with a discussion of Moore's hierarchy of educational outcomes.

Chapter 2: Review of the Evidence

This literature review summarizes the findings of relevant literature regarding the measured outcomes of continuing education on professionals' knowledge, skills, professional practice behaviors, and patient or population health. It begins with a look at the broad impact of continuing education on healthcare professionals' behavior; compares the effectiveness of specific educational modalities; evaluates the effectiveness of computer-based and Internet CE; and discusses the sustainability of outcomes related to CE. Evidence relating to the effectiveness of KT strategies and the social interaction associated with CoPs on professionals' knowledge and behavior are included.

Literature Search Methods

A review of the literature and research was conducted to locate articles related to the measurement of continuing education outcomes using the basic UNF Central Search. Databases such as CSA, EBSCOhost, ProQuest, MEDLINE, MEDSCAPE, CINAHL, and PubMed were included. Appropriate articles were selected. An additional review of bibliographic entries of the selected articles was conducted. Other search engines were utilized and included the Cochrane Collaboration, Sage Publishing, Research and Development Resource Base, and Google Scholar. UNF's Net Library was accessed to search for appropriate books on outcome measurement and CoPs. Finally a search of articles and presentations through the Alliance for CME and journals in the author's personal library was conducted. Search terms included: continuing education, CE,

continuing medical education (CME), outcome measures, impact, health care professional, nursing, medicine, pharmacy, communities of practice, and knowledge translation. A critical analyses table of the evidence may be found in Appendix A.

Effects of Continuing Education on Practice Behavior and Patient Outcomes

The Cochrane Collaboration® conducted a meta-analysis of randomized controlled trials (RCTs) and non-equivalent group designs of studies that evaluated the outcomes of participation of health professionals or post-graduate health care students in planned educational activities including meetings, conferences, lecture, workshops, seminars, symposia and off-site courses (O'Brien, et al. 2001). As shown in Table 1, courses were classified as didactic (predominately lecture), interactive (provided for some type of interaction between participants), and mixed (included both didactic and interactive components). In this analysis, only those studies that reported objectively measured practice behavior or patient outcomes were included. A quality rating was assigned to each study which was based on three criteria – study design, blinded outcome assessment, and completeness of follow-up. Targeted behaviors were categorized as high, moderate, or low based on the complexity of the behavior to be altered (O'Brien et al., 2001).

Thirty-two studies conducted between 1966 and January 1999, thirty of which were RCT's and two that were non-equivalent group designs, met the inclusion criteria for the analysis and were included with a total of 36 comparisons. One study, designed to compare an interactive workshop with a didactic presentation, reported no differences between the study and control groups (O'Brien, et al. 2001).

Table 1

Data table, CE meetings and workshop effects on professional practice

Author	Year	Method	Participants	Practice Settings	Intervention	Effect Size
Angunawela	1991	RCT	31	15	Didactic	Small
Boissel	1995	RCT	385	278	Didactic	Small
Browner	1994	RCT	197	174	Didactic	Small
Dolan	1997	RCT	82		Didactic	Small
Parker	1995	RCT	35	2	Didactic	Small
Sulmasy	1992	RCT	83		Didactic	Small
Wirtschafter	1986	RCT	411	40	Didactic	Small
Mazzuca	1987	RCT	29		Mixed	Moderate
Sulmasy	1992	RCT	83		Mixed	Moderate
Ward	1996	RCT	34		Mixed	Moderate
White	1985	RCT	103	12	Mixed	Moderate
Roter	1995	RCT	35		Mixed	Moderate
Kottke	1989	RCT	66		Mixed	Mod. Large
Maiman	1988	RCT	83		Mixed	Mod. Large
Messmer	1998	NEGD	50		Mixed	Mod. Large
Stretcher	1991	RCT	261	11	Mixed	Mod. Large
Wilson	1992	RCT	22		Mixed	Mod. Large
Bexell	1996	RCT	?	16	Mixed	Small
Jones	1998	RCT	59		Mixed	Small
Levinson	1993	RCT	31		Mixed	Small
Ockene	1996	RCT	45		Mixed	Small
Pekarik	1994	RCT	22	3	Mixed	Small
Perrera	1983	RCT	26	1	Mixed	Small

Sulmasy	1996	RCT	88	1	Mixed	Small
Westphal	1995	RCT		8	Mixed	Small
Jennett	1988	RCT	31	25	Workshop	Moderate
Wood	1989	NEGD	13	1	Workshop	Moderate
Kimberlin	1993	RCT	194		Workshop	Moderate/ Mod. Large
Hadiyono	1996	RCT		24	Workshop	Mod. Large
Smith	1995	RCT	35		Workshop	Mod. Large
Dietrich	1992	RCT	98	98	Workshop	Small
Heale	1988	RCT	46		Workshop	Small
Clark	1998	RCT	74		Workshop	Small-Mod.

Note. RCT = Randomized Control Trial; NEGD = Nonequivalent Group Design. Adapted from "Continuing Education and Workshops: Effects on Professional Practice and Health Care Outcomes," by M. A. O'Brien et al., 2001, *Cochrane Database of Systematic Review*. CD003030.

The investigators of this systematic review concluded that interactive workshops may improve professional practice while didactic activities were unlikely to facilitate improvement in practice. However, flaws in the studies were cited. Methods used were poorly reported and there was insufficient detail about study designs (O'Brien, et al. 2001).

To further the evidence in CME/CE effectiveness, Fordis, et al. (2005) completed a randomized controlled trial that compared the performance outcomes of physicians who participated in Web-based CME with physicians who participated in live CME activities. Participants in the live CME group (n= 49) were provided with a single live workshop on the topic of cholesterol management guidelines. Interactivity was encouraged through small-group work with case studies, question and answer session, use of enabling tools (guideline summary, risk calculator, quick desk reference) and discussion. Participants in

the online CME (n=47) were provided access to a Web-based activity on the same topic. Didactic instruction was provided as well as interactive cases and enabling tools. Access was provided for a 2-week period and allowed multiple visits. The investigators included a control group (n=18) who received no intervention. Knowledge measures were used immediately before and immediately after each intervention. An additional knowledge measure was completed 12 weeks after activity completion. Significant knowledge gains were demonstrated between the pretest and posttest percentage scores: 31.0% [95% CI, 27.0%-35.0%, p <.001] and between the pretest and 12-week percentage scores [95% CI, 32.2%-40.6%, p <.001].

In addition to the measurement of knowledge change, Fordis, et al. (2005) were interested in measuring performance change. Participants from each of the two intervention arms (live CME – 19, online CME – 17) were randomly selected to complete chart audits. Chart audits were also conducted for the control group (18). All groups demonstrated appropriate screening of lipid abnormalities, with no significant difference between the groups. When compared with the live CME group and the control group, the online CME group saw a significant increase (5% [95%CI, 1.0-9.1%]) in appropriate drug treatment for high risk patients. The investigators concluded that knowledge and performance changes as a result of online CME are comparable or superior to those seen in live activities.

Effectiveness of Specific Continuing Education Modalities

There is a surfeit of primary studies attempting to answer key questions relating to continuing education effectiveness. To summarize the findings of these primary studies, many syntheses have been completed that include statistical meta-analysis, vote counts,

and narrative reviews. Robertson, Umble, and Cervero (2003) identified 15 research syntheses published after 1993 relating to the health care professionals' behavior and /or patient health outcomes as a result of continuing education interventions. The syntheses were categorized by research question and were assigned a wave number. Three studies were included in *Wave One* which was defined as those investigating the question "Is CE effective, and for what outcomes?" Twelve studies were included in *Wave Two* to investigate the question "What kinds of CE are effective?" Wave One studies verified that CE can impact outcomes at all levels of Kirkpatrick's model. However, these conclusions are based on primary studies of "questionable research quality" (Robertson, Umble, & Cervero, 2003, p. 150). Vote counts were utilized in two of the Wave One studies. The remaining study utilized a narrative review. The investigators concluded that there is a trend away from using syntheses to answer the question of CE effectiveness. Wave Two studies confirmed Wave One conclusion that CE is effective. However, Wave Two studies delved deeper in to the types of CE and its effects on professional behavior and patient health outcomes.

Effectiveness of Computer-based and Internet Continuing Medical Education

Continuing education occurs through a variety of modalities. Wutoh, Boren, and Balas (2004) sought to evaluate the effect of a particular modality – computer-based learning - on physician performance and health care outcomes (Table 2). This systematic review included RCTs, meta-analyses of RCTs, and pre/post studies of clinical interventions. The computer-based educational modalities studies included email or listserv, and curriculum modules that incorporated the Internet. This analysis also sought

to compare computer-based applications to other educational modalities (such as print and didactic formats).

Table 2

Data Table: Effect of Internet-based CME

Author	Method	N	Type	Improvement in:	Extent of improvement/ Other findings	*p*
Davis, et al. (1999)	Web	61	Interactive	Knowledge		*<.02*
				Knowledge		*.44*
Huntley & Conrad (1994)	Web communications	88	Interactive	Computer Literacy	16%	
Chan, et al. (1999)	Discussion with facilitator vs. control	23	Interactive	Knowledge		*51*
Curran, et al. (2000)	CDROM and Web	52	Interactive	Knowledge	Participants were satisfied	*0*
Kemper, et al. (2002)	Case-based modules, web discussion group, hyperlinks	537	Interactive	Knowledge		*<.01*
				Confidence		*<.01*
				Communication		*<.01*
Marshall, et al. (2001)	Online case discussion vs. control	40	Interactive	Awareness	58%	
				Performance	64.7%	
Lipman, et	Didactic group	127	Interactive	Performance		*<.005*

al. (2001)	vs. Internet group					
Bell, et al. (2000)	Print vs Web-based tutorial system	162	Interactive	Knowledge		*>.2*
				Learning efficiency		*.04*
				Satisfaction		*<.0001*
Maki, et al. (2000)	Lecture vs. Web	277	Mixed	Knowledge		
Bell & Mangione (2000)	Web vs Print	166	Mixed	Knowledge		*.93*
Goldberg & McKhann (2000)	Software/Web vs. lecture	40	Mixed	Knowledge		*<.01*
Komolpis & Johnson (2002)	Web	103	Mixed	Knowledge		*<.05*
Barden, et al. (2000)	Self-study vs. face-to-face vs. telehealth	42	Mixed	Knowledge Performance	No sig effect	*<.05*
Grundman, et al. (2000)	Print vs. Multimedia	121	Mixed	Performance Knowledge	78% preferred multimedia	*<.001*
Carr, et al. (1999)	Computer learning and interactive small	58	Mixed	Knowledge	Significant improvement	

	group				
Mehta ,et al. (1998)	Web-based modules	164	Mixed	Enhancement of Learning	50% improvement

Adapted from "eLearning: A Review of Internet-based Continuing Medical Education," by R. Wutoh et al., 2004, *The Journal of Continuing Education in the Health Professions, 24*, 20-30.

Eighty-six studies were identified but only 16 studies met all the inclusion criteria. Investigators concluded that computer-based CME is as effective as selected other CME in imparting knowledge. The investigators postulate about the possibility that when computer-based CME programs are applied using the same curricula as traditional formats, they apply the same deficiencies, which could render both formats ineffective. The investigators challenge CME producers and providers to examine what has been successful in traditional educational formats and incorporate them into computer-based applications, while designing formats that cater to the health care professionals' individual needs (Wutoh, Boren, & Balas, 2004).

A systematic review of the literature that included "nursing" as a search term was conducted by Cobb in 2004 with the intent to study the effect of internet continuing education on practices, preferences and evaluation. Through a search of online databases from January 1990 through January 2004, and manual searches of trade journals in continuing education, 17 publications were included in the analysis. This analysis provided additional information about the practices and preferences of health care professionals when seeking continuing education and evaluated the barriers associated with computer-based modalities. Education provided in-person, such as in a conference, was the most preferred format while computer-based education was the least preferred (inferred by the frequency of use of each modality). Format preferences were analyzed in

four of the included studies. Internet applications were shown to be ranked third, fourth and fifth most preferred (Cobb, 2004).

The studies shed light on the barriers associated with computer-based education which included accessibility, lack of computer competence among users, and technical difficulties with programs. Regarding accessibility of computers to health care professionals both at home and at work, nurses preferred the home computer for internet usage. Physician usage was mixed between home and work computers (Cobb, 2004).

Gender differences were also included in Cobb's analysis. Of the three studies that looked at gender differences as they related to participation in computer-based education and Internet use in general, one showed that female physicians participated in online education more than their male counterparts; one showed that males were more confident than females in the use of the internet to find medical information and more likely to use the internet on a daily basis. The third study found no difference relating to computer-based education or general internet uses (Cobb, 2004). In Cobb's discussion, the lack of theoretical frameworks for continuing education was cited as a reason for an unfocused approach to outcomes research and as a barrier to the movement towards evidence-based CE (Cobb, 2004).

Curran and Fleet (2005) conducted a review of peer-reviewed literature relating to the use of the Internet as an educational modality and included citations for all years up to December 2003. Of the 86 studies that were evaluated, only 31 included at least one systematic level of evaluation of effectiveness. This subset of the studies was categorized using an adapted model based on Kirkpatrick's process of summative evaluation which revealed 81% evaluating learner reaction (Level I), 52% evaluating learning (Level II),

and 7% evaluating behavior change at the practice level (Level III). No studies evaluated patient results (Level IV). The investigators concluded that the Web-based CME evaluation literature did not provide clear evidence to support the effectiveness of any particular format of Web-based education in enhancing practice or improving patient outcomes. Of the studies that did not meet the inclusion criteria, a number incorporated other evaluative methods that could be used to determine usage data (web server logs file analysis, conference posting, e-mail messaging) which may demonstrate the need to foster an interactive learning environment. By limiting their search to peer-reviewed literature, the investigators conceded that they did not attempt to include outcomes reported in technical reports, unpublished sources and other literature (Curran & Fleet, 2005).

Sustainability of Knowledge and Behavior Changes as a Result of Continuing Education

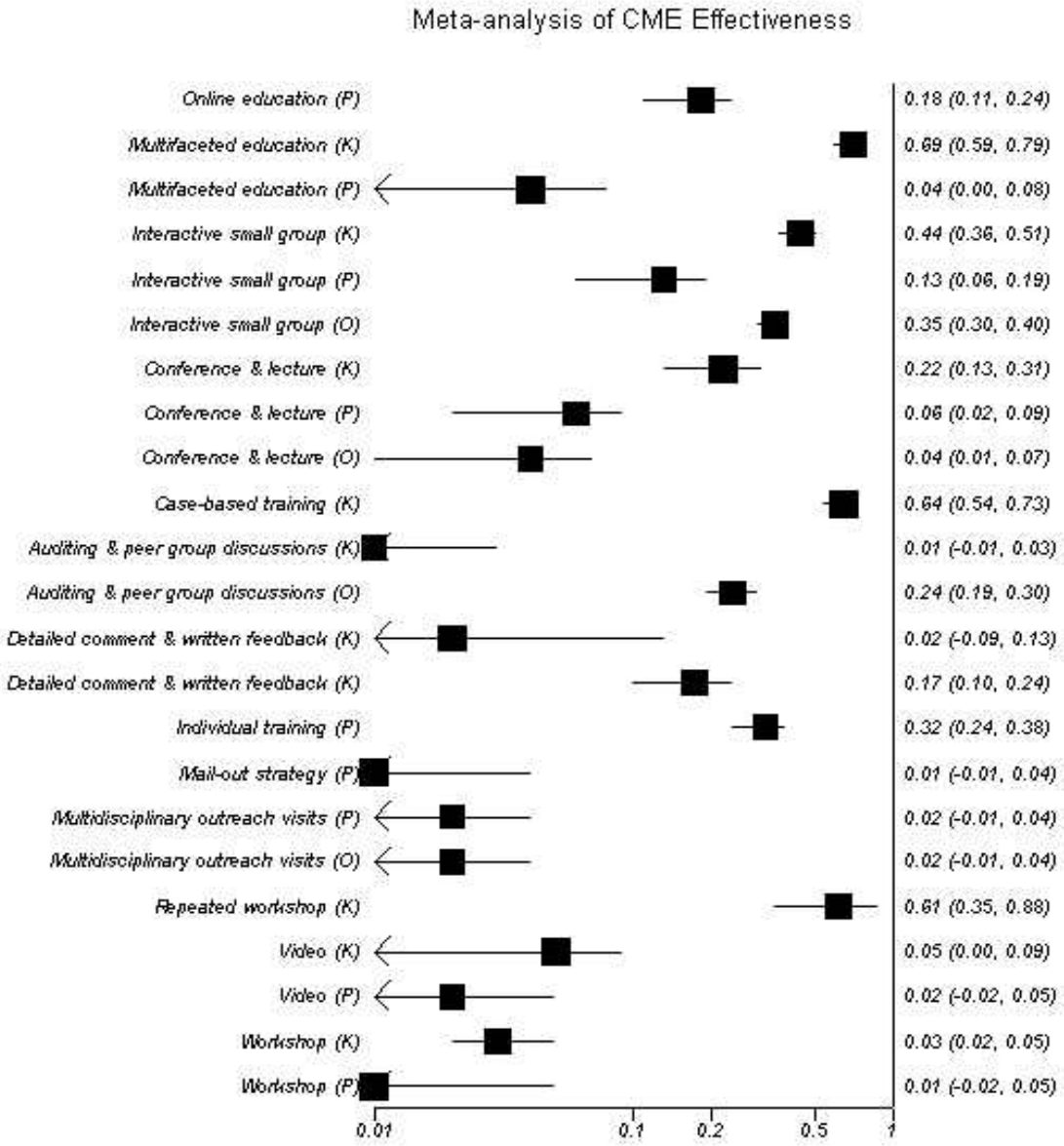
Building on the analysis by Curran and Fleet, investigators Tian, Atkinson, Portnoy, and Gold (2007) conducted a systematic review of the literature to analyze four areas. These areas included: (a) formal CME studies that have evaluated changes, (b) the effect of using different randomization strategies on the capacity to measure outcomes, (c) the reliability and validity of measurement in these studies, and (d) the follow-up period that is recommended to adequately demonstrate CME effectiveness. Thirty-two studies were identified and examined for level of evaluation, study design, randomization strategy, unit of analysis, length of follow-up, and outcome measurement instrumentation. The investigators conceded limitations in their analysis due to possible sample bias and restricted inclusion criteria. However, they described the “gold standard of CME evaluation” (Tian, et al. 2007, p. 21) as an assessment tool that would measure

outcomes at all four levels of evaluation: participant knowledge, attitude and skills; change in participant performance in practice settings, and patient health status improvements. At present, no such valid, reliable, and adaptable CME evaluation tool is available for comparison of CE effectiveness across CME interventions. The investigators also looked at the sustainability of outcome changes and put forward that the follow-up period should be at least 12 months to detect intervention effects. Regarding their research question relating to randomization, the investigators concluded that research identifying recommended ways for randomization is still needed.

Effectiveness of Interactivity in Continuing Education

In 2007, Mansouri and Lockyer completed a meta-analysis of the outcome literature as they related to CME. In this analysis, the investigators examined the effect of "moderator variables" described as factors that influence the strength of the relationship between the CME interventions and CME outcomes. These factors included the types of interventions, the types and number of participants, time, and the number of intervention sessions held over time.

CME outcomes studies published between 1990 and 2004 were searched (Figure 1). Thirty-one studies (Figure 1) met the four main criteria of the meta-analysis: (a) study design was either RCTs or before-and-after experimental designs with participants were practicing physicians, (b) measured at least one outcome relating to knowledge, performance, or patient outcome, (c) described in sufficient detail the intervention type, the participant, and the duration of the educational intervention, and (d) included quantitative analysis including sample size, *t* scores, *d* scores and F scores. Studies were coded for independent variables (CME interventions), moderator variables, and


Meta-analysis of CME Effectiveness
Online education (P)
Multifaceted education (K)
Multifaceted education (P)
Interactive small group (K)
Interactive small group (P)
Interactive small group (O)
Conference & lecture (K)
Conference & lecture (P)
Conference & lecture (O)
Case-based training (K)
Auditing & peer group discussions (K)
Auditing & peer group discussions (O)
Detailed comment & written feedback (K)
Detailed comment & written feedback (K)
Individual training (P)
Mail-out strategy (P)
Multidisciplinary outreach visits (P)
Multidisciplinary outreach visits (O)
Repeated workshop (K)
Video (K)
Video (P)
Workshop (K)
Workshop (P)
0.18 (0.11, 0.24)
0.69 (0.59, 0.79)
0.04 (0.00, 0.08)
0.44 (0.36, 0.51)
0.13 (0.06, 0.19)
0.35 (0.30, 0.40)
0.22 (0.13, 0.31)
0.06 (0.02, 0.09)
0.04 (0.01, 0.07)
0.64 (0.54, 0.73)
0.01 (-0.01, 0.03)
0.24 (0.19, 0.30)
0.02 (-0.09, 0.13)
0.17 (0.10, 0.24)
0.32 (0.24, 0.38)
0.01 (-0.01, 0.04)
0.02 (-0.01, 0.04)
0.02 (-0.01, 0.04)
0.61 (0.35, 0.88)
0.05 (0.00, 0.09)
0.02 (-0.02, 0.05)
0.03 (0.02, 0.05)
0.01 (-0.02, 0.05)
0.01
0.1
0.2
0.5
1

From the 31 studies included in the analysis, 61 interventions were identified. A mean effect size was computed for the interventions and the dependent variables. Fifteen studies examined the effect of CME on physician knowledge for a mean effect size described as moderate [*r*=.22 (.16); 95% CI, .15-.28]. Nineteen studies examined the effect of CME on physician performance for a mean effect size described as small [*r*=.18 (.21); 95% CI, .08-.28]. Only eight studies examined the effect of CME on patient outcomes. The mean effect size for this comparison was small [*r*=.14 (.21); 95% CI, .31-.63] (Mansouri & Lockyer, 2007).

Mansouri and Lockyer (2007) examined the types of CME intervention, which were coded as *active, passive,* or *mixed*. Their findings mirrored the work of O'Brien, et al. (2001) of the Cochrane Collaboration confirming that traditional or passive approaches to continuing education are not associated with changes in performance or patient outcomes. The largest effect sizes were noted with mixed educational programs that included interaction through small groups and case discussions. Passive interventions including conferences, lectures, and videotapes were shown to have the lowest effect size. Participant types were stratified as "single discipline" and "multiple disciplines". The mean effect size for the CME intervention with a single discipline was medium [*r*=.30 (.27); 95% CI, .16-.32]. The investigators supposed that such interventions were more focused and relevant to the practitioner group. Unlike the Cochrane Collaboration and other analyses, this study looked at physician knowledge change as an educational outcome. Their results show a small to moderate effect of CME on physician knowledge (Mansouri & Lockyer, 2007).

Temporal issues relating to CME were also evaluated by Mansouri and Lockyer (2007). The meta-analysis suggests the length of the intervention has an effect on the results of education. Increasing the length will have a positive effect on the results. However, there was no correlation found between CME intervention and measurement of outcomes. As the interval time increased, the effect size decreased. The investigators suggested that behaviors learned may need to be reinforced to ensure sustainability.

Lastly, the impact of single versus multiple education sessions held over time was evaluated. The investigators found that longer contact time, coupled with continuing contact over time was associated with a larger effect. They concluded that if CME interventions are continuous and periodic, with new interventions, they are more likely to change behavior (Mansouri & Lockyer, 2007).

Effects of Knowledge Translation and Social Networking Communities on Learning

To answer the questions “What are the characteristics of effective knowledge translation?” and “In what contexts is knowledge translation more successful?” Bowen and Martens (2005) conducted a multi-method evaluation of Manitoba’s Center for Health Policy “The Need to Know” Project. This project was designed to address the need for research to support decision making of rural regional health authorities, and to promote/develop models of collaborative research. Through the use of an open-ended, semi-structured interview tool, 101 interviews with 62 different participants were conducted over a three year period. Multiple themes emerged from the interviews and included the importance of personal factors (attention to the political and values issues, relationships, trust) and in KT; the need to develop authentic and respectful peer relationships; and the need to address organizational barriers to the use of research in

practice. The interviews also identified the types of learning that was experienced through the project: factual learning (research concepts, research findings), search capabilities (locating and accessing information), and overall way research was viewed by the participants (Bowen & Martens, 2005).

Specifics of physician learning and the importance of the instructor in online learning environments were studied by Sargeant, Curran, Allen, Jarvis-Selinger, and Ho (2006) using focus groups and interviews to explore the physicians' perceptions and experiences of participating in online CME. The fifty study participants had varied experience with online CME, ranging from little or no experience (n=22), some experience (n=20), and expert (8). The investigators found that perceptions and learning were influenced by "social comfort of the participants and educational value of the electronic discussions, both in turn influenced by the facilitator" (Sargeant, Curran, Allen, Jarvis-Selinger, & Ho, 2006, p.130). Their study suggests that physicians in online programs valued learning through interpersonal interaction; this value was influenced by their comfort in the online environment; and that facilitators play a key role in creating comfortable online learning environments (Sargeant, et al. 2006).

In a review of literature pertaining to communities of practice, Johnson (2001) sought information on the success of current technology to support participative collaboration required by communities and focused on four questions. The first question related to the definition and main concepts of CoP. In all of the reviewed studies, Wenger's (1998) definition of CoP and his concepts of master to apprentice, learning-by-doing, and social structure were upheld.

The second question related to the feasibility of CoPs being established, maintained, and supported using Web-based applications that are primarily text-based. While the studies supported the feasibility, there often were problems associated with technology implementation, skills in asynchronous and synchronous discussion, and abilities with various online tools. Interactive materials were seen to be more suitable than text-based materials for web environments. The investigator noted that virtual communities' usage of asynchronous communication (which offers no physical presence) in contrast to traditional group norms caused by physical communication (including voice, stature, visible reaction of approval or disapproval) allowed for CoPs to emerge more easily (Johnson, 2001).

The third question examined the limitations of participation in Web-based applications. Aspects that help or hinder participation were included in this examination. Barriers noted by the investigator included withdrawing (a participant pulling away or being absent), cultural differences, problems associated with poor or superficial discussion by participants, and lack of urgency with discussions (Johnson, 2001).

The final research question evaluated the role of face-to-face contact in CoPs. All of the studies evaluated by Johnson (2001) note the importance of this contact during the development of the CoP. Only one of the studies found that face-to-face contact allowed for richer collaboration between participants but failed to state whether the participants had met on line, or if all participants had collaborated face-to-face. Johnson noted that the studies included in the literature review were designed with a different purpose than observance of CoPs. No study reviewed the creation of a virtual community and how it may lead to a CoP which he suggested as a potential research topic (Johnson, 2001).

Moule (2006), in a case based research study of 109 health care students on their ability to develop an online practice community, found that participants experienced certain difficulties in enabling Wenger's CoP concepts of mutual engagement, joint enterprise, and shared repertoire. Wenger's CoP framework has been supported in physically located environments. Moule, however, sought to study the use of CoPs in an online environment Results found that enabling engagement in a virtual environment was hindered by Internet connection difficulties for those students lacking computer skills, or with problems accessing the learning site. In the study, while participants were prescribed to complete a learning module thus predetermining their 'enterprise', negotiation techniques were used between the online participants in completing their task. Students working in the virtual community revealed an increase in critical review and computing skills which was seen by Moule as their 'shared repertoire'. Although Moule's interpretations are derived from one case study site, findings suggest that the study participants were able to develop the essential elements of CoP. Recommendations about the use of online CoPs include: (a) ensure access to the learning environment though development of computer skills, (b) consider group familiarity and socialization processes, (c) design online learning to facilitate socialization, and (d) link group activities to assessment processes or practice development to improve engagement.

The importance of "social presence", the perceived significance of the interpersonal relationship in e-learning environments, was studied by Johnson, Hornik, and Salas (2007) in an attempt to extend previous research by the development of a theoretical model of e-learning effectiveness. This study posed multiple hypotheses relating to two dimensions of e-learning effectiveness – human and design. Application-

specific computer self-efficacy (AS-CSE), which is defined as the individual belief about his or her competence in performing certain computer tasks, was the study variable for the human dimension. The design dimension included the variables of perceived usefulness, interaction, and social presence with a focus on the "environment's ability to facilitate a shared learning environment" (Johnson, Hornik, & Salas, 2007, p.5). Both dimensions affected the e-learning effectiveness in terms of course instrumentality, performance, and satisfaction (Johnson, Hornik, & Salas, 2007).

Participants (n=371) for the study were drawn from an Information Systems course at a large university in the United States (Johnson, Hornik, & Salas, 2007). They utilized an e-learning platform that included educational modules with multiple-choice quizzes, threaded discussions, course email, and online chat. Through a series of tools and statistical analysis, the investigators concluded that those with higher AS-CSE and those who perceived the technology to be more useful, had higher perceptions of course instrumentality, performed better, and were more satisfied with the e-learning experience. Those individuals who interacted more performed at a higher level and were more satisfied with the experience than those with minimal interaction. And finally, individual who perceived greater social presence had a higher perception of the course instrumentality, and were more satisfied with the experience (Johnson, et al. 2007).

Johnson, et al. (2007) and Moule (2007) evaluated the effectiveness of the e-learning environments as they related to undergraduate students. Completing the courses as a part of degree attainment, bring into question issues of motivation to engage in the e-learning environment and thusly may impact the applicability to the non-student adult learner. Investigators of both studies encouraged further research in this area.

Discussion

Although the research has been imperfect in design and statistical inferences, the numerous systematic reviews have confirmed that structured continuing education programs are effective tools to improve the knowledge and performance of health care professionals. The review of the systematic reviews completed by Robertson, et al (2003) validated this and encouraged more research on the effectiveness of the differing types of CE interventions.

Continuing education activities may occur in various live or enduring formats. Live activities include workshops, conferences, lectures, videoconferences, audio conferences, and web-casts. Enduring activities are those that are non-live and continue over time. These consist of print monographs, videotapes, CD-ROMS, and Web-based applications. More recently, through the concepts of CoPs and KT, mixed modalities are used as platforms or curricula providing in-depth information about particular disease processes. Researchers are attempting to determine what type of format has the most effect on the hierarchy of outcome levels. Effectiveness may mean improvements in the professional's knowledge or improvement in the implementation of knowledge through thoughtful practice choices. Other indices may include awareness of emerging science, increases in confidence or shifts in thinking.

In the Cochrane Collaboration review, one study, designed to compare an interactive workshop with a didactic presentation, reported no differences between the study and control groups (O'Brien, et al. 2001). Education provided in-person such as in a conference was the most preferred format. Computer-based education was the least

preferred (inferred by the frequency of use of each modality) as noted in the systematic review by Cobb (2004).

Emerging evidence suggests that continuing education activities that provide for participant interaction can result in moderately large changes in professional practice (O'Brien, et al. 2001). This interaction can be accomplished in most of the CE formats. Case-studies and small group activities can be used to provide interaction in live activities. Web-based and mixed formats are particularly suited to provide for this interaction as they have the ability to connect participants through emails, discussion boards, and case-based or real-time simulations. Emerging evidence suggests that continuing education activities that provide for participant interaction can result in moderately large changes in professional practice (O'Brien, et al. 2001).

Web-based interventions are shown to be more effective than print-based modalities on knowledge improvement (Wutoh, et al. 2004). Measures of learning efficiency however, were inconclusive in this comparison. While participants remarked that Web-based courses were more effective and enhanced learning, only one of six studies reviewed by Wutoh, et al. (2004) showed a statistically significant overall positive advantage of Web-based programs when compared with traditional didactic or lecture formats. Regarding the effectiveness of online educational modalities, the evidence suggests that it is as effective as selected other CME in imparting knowledge (Wutoh, et al. 2004). Curran and Fleet (2005) concluded that the Web-based CME evaluation literature did not provide clear evidence to support the effectiveness of any particular format of Web-based education in enhancing practice or improving patient outcomes. Research on Web-based education also demonstrates the positive effect continuing

education has on health care professionals. Self-reports by participants of improvements in professional skills/competencies, and changes in their practice environment support the effectiveness of Internet education (Curran & Fleet).

Regarding the sustainability of continuing education, three of the 16 studies used in one analysis showed self-reports of practice change, but another study indicated that any changes as a result of the education was not sustained beyond 4-6 months after the activity (Wutoh, et al. 2004). Measuring the effectiveness of educational interventions on patient or population health may prove to be more elusive. More research is needed to evaluate this important outcome. However, research in this area is becoming more difficult as information regarding specific patients or groups of patients has become more protected.

Although research relating to KT and CoP is not as numerous and relies primarily on case study methods, evidence is emerging that documents the importance of facilitating the social environment. Educators pursuing the development of CoPs are encouraged to provide online facilitators to bridge the gaps community members may have relating to computer competence and interaction timidity.

Conclusion

Continuing education remains an important link to professional competence. As technology advances, so must the producers and providers of CE programs. The best evidence demonstrates that interactive modes of education are more effective than didactic or single mode activities. Yet, faculty lecturing to large groups of professionals in huge lecture halls continues to pervade the industry. Theoretical frameworks such as CoP and KT allow CE professionals to validate the importance on non-educational

activities. Thoughtful conversations with colleagues, trial and error, researching evidence-based questions, and professional self-reflection augment formal programs and must be included in the analysis of educational effect.

Summary

This chapter discussed the empirical findings on the effectiveness of CE for the healthcare professions. Specific educational modalities were compared and contrasted in relation to impact on professionals' knowledge, professional practice, and patient outcomes. Studies addressing CE for physicians and nurses were then reviewed with an emphasis on the practice and preferences of these professionals when seeking CE. The extent to which interactivity within CE activities positively impacted the educational outcome was discussed. The chapter concluded with a discussion of research relating to KT strategies and the use of CoPs.

Chapter 3: Methodology

This chapter describes the evidence-based intervention that was used in the pilot study. The study design, sample, technology platform, and specific variables are identified. The Two-Group Control Group design is described as well as the method used to measure effect size. A description of the data collection instruments and clinical vignettes are included. The chapter concludes with a discussion of human subjects' protection.

Design

A randomized two-group design was used in this pilot study investigating the role of interactivity through a virtual CoP on the participation, learning, satisfaction, and changes in practice of NPs. Utilizing evidence from the systematic reviews relating to effectiveness of CE in combination with learning theory relating to CoPs, and following Institutional Review Board (IRB) approval from the University of North Florida, a Web-based CoP was developed.

Building on the evidence, the virtual CoP provided a series of online certified continuing education activities and non-educational interactive components. These components included a program checklist, links to guidelines, links to affiliated websites (e.g. American College of Gastroenterology), calendar of upcoming events (e.g. Gerontological Advanced Practice Nurses Association Annual Conference), a Gastroenterology News widget (an embedded program that constantly updates articles

available on the topic), patient education tools, reference guides, patient education links, Ask the Experts section, Current Cases section, Current Topics section, and library of articles and research.

Participant recruitment

Participants in this pilot study were drawn from NPs who opted into continuing educational activities through the investigator's accredited continuing education company, AKH Inc, Advancing Knowledge in Healthcare (AKH) and their non-accredited joint-sponsor, Medical Communications Media (MCM). At lease forty NPs were to be recruited to participate in the study. Participants were randomly assigned to either a study group receiving access to the CoP, or to the control group, receiving access to educational opportunities only. To meet the inclusion criteria the participant must have been able to read and understand the English language, be a licensed nurse practitioner working with elderly patients, and have access to a web-enabled computer. In addition, participants could not have been previously involved with any educational activity within the established educational initiative.

Methods

Evidence-based intervention plan. Several key studies providing Level 1 evidence according to Melnyk and Fineout-Overholt (2005) drove the intervention plan. Table 3 illustrates the evidence and the plan for incorporation of same into the doctoral project.

Table 3

Intervention Plan

Citation (Year)	Evidence Summary	Included in CoP
O'Brien, et al. (2001)	Interactive workshops can result in	A variety of interactive components

	moderately large changes in professional practice.	within the included CE activities.
Mansouri & Lockyer (2007)	Multifaceted educational programs with interactive small groups and case discussion interventions are an important component to CE.	Discussion board Ask the Experts Current Topics
Wutoh, et al. (2004)	Internet-based programs were found to be as effective as other methods (e.g. lectures, seminars, workshops) in imparting knowledge.	Online certified CE activities
Wutoh, et al. (2004)	Increasing the length of the educational intervention was found to have a positive effect on the educational results	Six month period of accessibility
Wutoh, et al. (2004)	Educational interventions with longer contact time with participants were associated with a better outcome.	Six month period of accessibility Discussion board
Johnson, Hornik, & Salas (2007)	Facilitation of social presence improves the success of online educational communities.	Online facilitator

Educational Initiative. Based on an extensive needs assessment completed by MCM in conjunction with the American Society of Consultant Pharmacists (ASCP) and AKH, a national multidisciplinary education initiative was designed. This initiative would provide pharmacists, physicians, nursing directors, nurses, geriatric nurse practitioners and other interested healthcare providers with comprehensive certified continuing education and support tools that focus on the prevention, diagnosis and

treatment of chronic constipation in elderly individuals. The integrated and comprehensive educational initiative titled E-IMPACCT (**E**lderly **IMP**rovements and **A**dvances in **C**hronic **C**onstipation **T**reatment) featured multiple formats including live meetings, print, Web-based education and other enduring materials designed to complement and reinforce educational concepts learned. This CoP was commercially funded through an educational grant from Sucampo/Takeda Pharmaceuticals. The independent accredited providers (ASCP and AKH) in receipt of the educational grant took responsibility for ensuring that all content (CE and non-CE) was provided free of commercial bias; and that appropriate faculty/planners disclosures of financial relationships with commercial interests were made. An independent review of the content against criteria ensuring that the evidence supported activity recommendations, was completed by the accredited providers

Technology platform. Three technology components of the study were developed and utilized – the pre/post assessment process, the landing pages for the control and CoP group, and the CoP interactive website. An online survey development tool, *Survey Monkey*, was used to create the pre-study demographic assessment, the pre- and post-study knowledge assessment, clinical survey, and clinical vignettes, and the post-study online satisfaction assessment. This online tool provided an interface to download responses to a spreadsheet format utilizing the numerical values of the responses for easy upload into a statistical software package.

A home page was developed for each of the study groups. The control group was directed to a page listing a variety of continuing education activities and the links to access each of them (Figure 2). The CoP group was directed to a page that introduced the

CoP and the online facilitator. On this page (Figure 3) two hyperlinks were visible – one to take participants to an online discussion forum and one to link participants to the E-IMPACCT site (Figure 4).

The investigator worked with MCM's technology professionals, experienced in the development of online platforms for CE, quality improvement, and outcomes management. In collaboration with MCM, the investigator assisted in the development of a website designed to provide CE on the designated topic (chronic constipation in the elderly). Figure 4 depicts the E-IMPACCT website and demonstrates the variety of links and options available to the participants. In addition, web page components were designed to provide for interactive work and communication.

Through email communication, and based on group assignment, participants were instructed to complete the online pre-assessments and were provided with links to the control or CoP landing pages. The control group had a limited view on the website that allowed access only to the CE activities. The CoP group had full access to all interactive web page components designed for an interdisciplinary audience of physicians, physician assistants, nurse practitioners, consultant pharmacists and nurses. Previously developed certified CE activities as well as new Web-based CE activities specifically developed for the initiative were available on both the control group web page and the CoP webpage. All activities were offered free of charge.

The investigator contracted with an independent nurse practitioner with experience in gastroenterology and geriatrics to function as the CoP facilitator. As discussed in the literature review, perceptions and learning may be influenced by "social comfort" within an online learning environment, which can be fostered by a facilitator

(Sargeant, Curran, Allen, Jarvis-Selinger, & Ho, 2006, p.130). The facilitator's role was to (1) announce to members of both the control and CoP groups when new educational activities are released; (2) monitor discussions on the CoP and enable engagement between participants through email communication; (3) announce to members of the CoP group when community tools (e.g. discussion boards, education tools, resource links) become available; and (4) to assist with any navigation questions the participants may have and forward technology questions to the developers.

ELDERLY IMPROVEMENTS & ADVANCES IN CHRONIC CONSTIPATION TREATMENT

Welcome

Chronic constipation is a common complaint in elderly persons effecting 15-20% of all elderly living in the community, and upwards of 50% in elderly persons who reside in long-term care facilities. The following online courses have been compiled to increase the knowledge, skills, and performance of the healthcare practitioners treating this population. These activities have been certified for continuing education credit (either through ACCME, ANCC, or AANP). To ensure proper CE credit is awarded, certain web information is captured by credit providers and is subject to their privacy policies. Accessing any of these activities takes you to the provider's websites where you will be asked to register and provide information such as name, address, professional license number, and email address. There is no fee for these courses.

This site will be open to you for a period of 4-6 months. You are encouraged to check back often as other courses may be added at different times.

Our current listing of All Professions programs are shown below. Click on the Topic or Program column headings to sort columns in ascending or descending order. Click on a hyperlink in the Medium column to view details about a specific program.

Topic	Program	Medium	Profession
Gastroenterology	Case Studies in Chronic Constipation: Diagnosis and Treatment in Long-Term Care Residents	- Online Presentation	Physicians Nurses Pharmacists
Gastroenterology	Contemporary Management of Chronic Constipation in Long-Term Care	- Online Presentation	Physicians Nurses Pharmacists NursePract
Gastroenterology NEW	Evaluation and Management of Chronic Constipation in the Elderly: Addressing Severe Complications	- Interactive Virtual Clinic	Physicians Nurses Pharmacists
Gastroenterology	Evaluation and Management of Chronic Constipation in the Elderly: Maintaining Quality of Life	- Interactive Virtual Clinic	Physicians Nurses Pharmacists
Gastroenterology	Getting Things Moving: Optimal Treatment of Chronic Constipation in Managed Care	- Online Presentation	Physicians Pharmacists
Gastroenterology	InfoCenter: CC & IBS-C	- Link - Online	Physicians PhysAsst NursePract
Gastroenterology NEW	Keeping Things Moving: Treatment Goals & Monitoring Strategies for the LTC Resident with Chronic Constipation	- Online Presentation	Physicians Nurses Pharmacists NursePract
Gastroenterology	Optimal Treatment of Chronic Constipation in Managed Care: Review and Roundtable Discussion	- Hyperlink: e-Monograph	Physicians Nurses Pharmacists
Gastroenterology NEW	Providing Medication Therapy Interventions for Patients with Chronic Constipation	- e-Monograph	Physicians Nurses Pharmacists

Figure 2. Control Group Home Page

Figure 3. CoP Group Home Page

Figure 4. E-IMPACCT Community of Practice Web Page

Evaluation Plan

The independent variable for this study was the professional's ability to access an online CoP designed to provide information on a key topic of interest for the NP in primary or long-term care settings. Dependent variables fell into four categories: (a) participation, (b) learning, (c) satisfaction, and (d) changes in practice. Demographic data were captured utilizing a Web-based enrollment form (see Appendix B). The form captured information including: age, gender, education level, specialty area, area of practice, and years in practice as NP.

Participation. Participation in continuing education activities was monitored and tracked by automatic notifications to the investigator generated when activities were accessed and completed. Participation in the discussion group with the facilitator was monitored on a weekly basis by the investigator visiting the discussion site. As these continuing education programs and the discussion board entries were the only components requiring login with username and password, these were the only components that could be traced and tracked. As participants in the CoP group were free to explore any component of the website without logging in, and could use any computer to access it, their participation and exploration could only be extrapolated through the posttest and post-surveys.

Satisfaction. Participant satisfaction with the educational program (control and CoP groups), and the perception of community (CoP group) was measured using the Online Satisfaction Survey, developed by Elaine Strachota (2003) and used with permission (see Appendix C). This survey tool was analyzed to answer the following questions:

1. What is the relationship of learner-content interaction of NP satisfaction?
2. What is the relationship of learner-facilitator interaction to NP satisfaction?
3. What is the relationship of learner-learner interaction to NP satisfaction?

The instrument contained 27 items used to evaluate the interaction constructs. Seven items measure learner-content interaction; six items measure learner-instructor interaction; eight items measure learner-learner interaction; and six items measure general satisfaction. For the purposes of this pilot study, one item addressing learner-

content interaction was eliminated as it related to the improvement of written communication skills, which was outside of the scope of this project.

As the original instrument was used to poll online students at a university, slight adjustments were made to the verbiage, with permission from the author of the tool, to better match the target audience of nurse practitioners, as shown in Table 4.

Table 4

Changes to Online Satisfaction Survey

Construct	Original verbiage	Substituted verbiage
Learner-content interaction	"The course documents – lessons or lecture notes used in this class"	"The documents and courses used in this website"
	"Class" or "Course"	"Website"
	"Preparation for quizzes/exams in this course"	"Posttests in the courses associated with this website"
Learner-instructor interaction	"Teacher" or "my teacher"	"Facilitator" or "the facilitator"
	"Class" or "Course"	"Website"
	"In this class the teacher functioned as the facilitator of the course by continuously encouraging communication"	"In this website the facilitator continuously encouraged communication"
Learner-learner interaction	"Class" or "Course"	"Website"
	"Student" or "students"	"Professional" or "professionals"
General Satisfaction	"Class" or "Course"	"Website"

Stachota (2003) established content validity for this tool by the use of field experts who evaluated survey questions for clarity and applicability to the four constructs (learner-content interaction, learner-instructor interaction, learner-learner interaction, and

general satisfaction). Construct validity was established by a pilot study (n=249), factor analysis and varimax rotation. Cronbach co-efficient alpha scores for items within the constructs were .89 for learner-instructor interaction and .90 for each of the learner-content interaction, learner-learner interaction, and general satisfaction. All scores indicated very high reliability of the instrument.

Learning. Learning was considered utilizing a pre/post test which assessed the theoretical and practical understanding of the designated topic area. This assessment tool was developed in collaboration with education and subject area experts and incorporated national guidelines and standards.

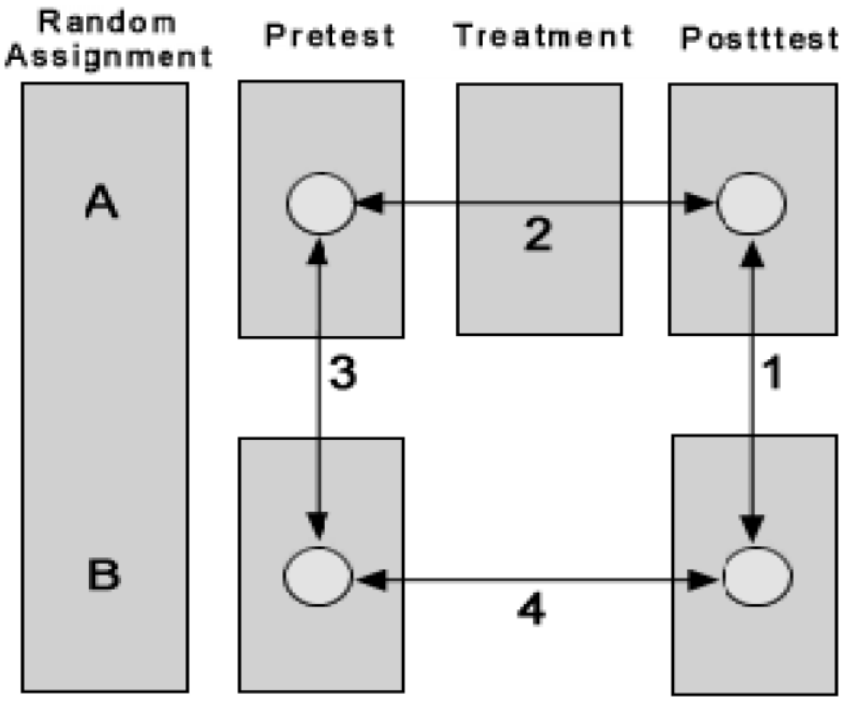
Pretests were administered after enrollment and prior to accessing educational or non-educational components of the website. Post-tests were administered six months after the initiation of the study.

Changes in practice. Finally, changes in practice were measured utilizing clinical vignettes at the beginning and end of the study period. Clinical vignettes are written case simulations and have been used by educators and researchers to assess quality of care among different providers (Peabody, Luck, Glassman, Dresselhaus, & Lee, 2000). Clinical vignettes have been shown to be a valid tool for measuring the quality of health care and clinical practice in diverse settings, including outpatient, Veterans Affairs medical centers, and private medical centers (Peabody, et al. 2000; Peabody, et al., 2004; Luck, Peabody, & Lewis, 2006). Peabody et al (2004) found that “vignettes provided consistently better measurements of the quality of clinical care than did medical record abstractions” when compared to a standardized patient method (p. 777). Vignettes have been developed by Outcomes, Inc., an assessment company providing quality

measurement services for CE providers, in association with MCM. The reliability of these vignettes was measured utilizing pilot testing. Validity of the vignettes was established in three fashions: (1) physicians within Outcomes, Inc. ensured that the measures were appropriate for the objectives; (2) expert faculty were used to develop the cases; and (3) cognitive interviews with community healthcare providers to ensure the cases and questions made sense, and predictive of an individual's performance. All clinical vignettes, surveys, and learning tests are being used with permission provided by MCM who owns the copyright (see Appendix D).

Statistical Analysis

Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 16.0 for Windows, Release 16.0.1. Utilizing a Two-Group Control Group Design, pretest/posttest, pre-survey/post-survey and pre/post-clinical vignettes comparisons was conducted to analyze both learning and practice performance. Figure 5 graphically displays the 4 types of comparisons: (1) how the scores of the posttests and post-vignettes of the CoP group differs from the scores of posttests and post-vignettes of the control group, (2) how the posttests and post-vignettes of the CoP group differed from the pretests and pre-vignettes of the CoP group, (3) whether or not the random assignment produced two equivalent groups, and (4) how the posttests and post-vignettes of the control group differed from the pretests and pre-vignettes of the control group. (Asynchronous Learning Networks Research, n.d.) Effect sizes for the posttest and post-vignettes were computed using the means and standard deviations of the two groups.



(ALN Research, n.d.),

Figure 5. Two-Group Control Group Design

A statistical analysis of the results from the Online Satisfaction Survey was used to measure the sense of community between the CoP and control groups. Utilizing SPSS, comparison tests for non-paired samples was conducted. An independent sample t test was utilized. The results of this exercise were evaluated by comparing the CoP and control group results and determining effect size.

Timetable

Submission of an application to the University of North Florida's Institutional Review Board (IRB) occurred during the summer semester of 2008, with approval in October 2008. After IRB approval, the website was developed, grant funding was sought, and certified continuing education activities were secured and developed for inclusion on the site. Participants were recruited in January and February 2009 and the study was

initiated February 8th. The study was active for a period of six months, followed by a period of data collection and analysis.

Feasibility

The pilot study was conducted as a parallel process to the E-IMPACCT educational initiative. E-IMPACCT is financially supported through an educational grant from Takeda Pharmaceuticals. Additional funding was sought from other sources to cover additional programmatic expenses related to the investigator's pilot study (e.g. online facilitator).

Protection of Human Subjects

Recruitment and self-determination of participants was accomplished via an email (see Appendix B) briefly describing the nature of the research and directing interested participants to a website using a hyperlink within the communiqué. A Nurse Practitioner email list was solicited from MCM. The enrollment email was sent to the list of provided email addresses. Utilizing the list provided by MCM derived from participants of past continuing education programs designed for the NP audience ensured authenticity of the potential participants as nurse practitioners. Due to the nature of Web-based research, certain issues were addressed to protect the study participants. Identity and confidentiality issues were minimized by the use of assigned pseudonyms (usernames) and passwords to ensure anonymity. Participants were asked to input responses to an internet pretest and survey. The participants were asked to complete a self-assessment of professional knowledge and skill by completing a series of clinical vignettes. The Internet Protocol (IP) address was the only identifying feature in this survey. IP addresses are difficult to match with users as they require network administrator rights and abilities.

The CoP group had access to discussion forums (“Clinical Case Corner”, “Ask the Expert”. Demographic information was recorded and was reported in aggregate form only. Both the control and the CoP groups had access to a series of free online CE activities. To ensure proper CE credit was awarded, certain web information was captured by AKH and ASCP (credit providers) and was subject to their privacy policies. This information includes at least: (1) name, (2) email address, (3) universal resource locator (URL) arriving from and (4) IP address. Participants were informed of this prior to accessing CE. Participants were informed that their responses to any survey or clinical vignettes, or their participation in the study would in no way affect their ability to obtain certified credit for CE activities that they access and successfully complete within the confines of the study.

Participant data is stored in servers housed at a MCM, the technology company providing the internet platform for the study. Servers are maintained in a climate controlled, security monitored communications room with full power redundancy, back up and generator with mission critical data applications. Security is constantly monitored and users must present valid identification to gain access to the locked server location facility.

Summary

The methodology of the development and initiation of the pilot study has been detailed. The dependent variables of participation, satisfaction, learning, and professional behavior were measured using a variety of tools to include web metrics report, pretest/posttest comparison, Online Satisfaction Survey, and pre/post clinical vignettes.

Effect size calculations were used on knowledge assessment and clinical vignettes posttests scores of group comparisons.

Chapter 4: Results

This chapter describes the results of the evidence-based intervention plan for the pilot study. It includes a description of the multiple statistical analyses that were completed to evaluate the effect CoP access had on NP knowledge and practice behavior. The key variables of demographics, satisfaction, knowledge and practice change are evaluated through a series of t tests. Effect size was calculated for knowledge and practice change.

Study Objectives

Participation. A total of 69 NPs responded to the study enrollment request. Of these, 66 met the criteria and were included in the study. Participants could enroll over a period of time which prevented the randomization of the complete sample at the time of the assignment. Participants' enrollment requests were logged as to the date and time of receipt. The first respondent was assigned to the control group based on a random flip of a coin. Subsequent participants were then alternately assigned to either the control or CoP group based on the date/time format. The second respondent was assigned to the CoP group, the third to the control group, the fourth to the CoP group and continued in this fashion until all participants were assigned. Both the control and the CoP group contained a total of 33 participants at the beginning of the study.

In the control group 32 participants completed the initial pre-study demographic assessment, knowledge assessment, clinical survey, and clinical vignettes (Appendix E),

with 9 (28%) completing all components of the study including the post-study knowledge assessment, clinical survey, clinical vignettes, and the online satisfaction survey, and 3 (9%) partially completing the assessments. In the CoP group, 21 participants completed the initial pre-study assessments, survey and clinical vignettes (Appendices E and F), with 7 (33%) completing all of the study components (Appendices F and G). Only three of the participants formally withdrew from the study. Two of these withdrawals were related to the time commitment requested and one was related to personal issues preventing completion.

The demographic variables for the control and CoP groups were described by way of frequencies (%). To assess the homogeneity of the groups, univariate analysis was completed to assess potential differences on age, race, marital status, children, student status, work status, years as a nurse practitioner, highest degree attained, practice area, and previous experiences with online education. As noted in Table 5, no significant differences between groups existed on these variables.

Table 5

Sociodemographic Characteristics of Study Population

Characteristic	Control Group n=32	CoP Group n= 21	Total n=53
Gender:			
Male	5 (16)	3 (14)	8 (15)
Female	27 (84)	18 (86)	45 (85)
Age Range:			
26-35	5 (16)	1 (5)	6 (11)
26-45	8 (25)	6 (28)	14 (26)

45+	19 (59)	14 (67)	33 (62)
Race:			
African American	0 (0)	1 (5)	1 (2)
Asian/Pacific Islander	1 (3)	0 (0)	1 (2)
White	31 (97)	20 (95)	51 (96)
Geographic Training:			
USA	32 (100)	21 (100)	53 (100)
Marital Status:			
Single	9 (28)	5 (24)	14 (26)
Married	23 (72)	16 (76)	39 (74)
Children:			
No	10 (31)	3 (14)	13 (26)
Yes	22 (69)	18 (86)	39 (74)
Student Status:			
Not a student	25 (78)	16 (76)	41 (77)
Full-time	3 (9)	0 (0)	3 (6)
Part-time	4 (12)	5 (24)	9 (17)
Work Status:			
Full-time	27(84)	17 (81)	44 (83)
Part-time	5 (16)	4 (19)	9 (17)
Years as NP:			
1-5	15 (47)	3 (14)	18 (34)
6-10	9 (28)	10 (48)	19 (36)
11-15	4 (12.5)	6 (29)	10 (19)
>15	4 (12.5)	2 (9)	6 (11)
Highest Degree Held:			
MS	4 (12.5)	1 (5)	5 (9)

MA	0 (0)	4 (19)	4 (7)
MSN	26 (81)	15 (71)	41 (77)
PhD	1 (3)	1 (5)	2 (4)
DNP	1 (3)	0 (0)	1 (2)
Practice Areas:			
Geriatric Primary Care	3 (9)	4 (19)	7 (13)
Adult Primary Care	29 (91)	15 (71)	44 (83)
Long-term Care	0 (0)	2 (9)	2 (4)
Successfully completed online CE in past:			
Yes	30 (94)	20 (95)	3 (6)
No	2 (6)	1 (5)	50 (94)
Range of online programs taken:			
1-5	4 (13)	2 (9)	6 (11)
6-10	1 (3)	4 (19)	5 (9)
11-15	3 (9)	4 (19)	7 (13)
>15	24 (75)	11 (52)	35 (66)
Primary Computer Access			
Home	12 (38)	9 (43)	21 (40)
Work	20 (62)	12 (57)	32 (60)
Library	0 (0)	0 (0)	0 (0)
Other	0 (0)	0 (0)	0 (0)
Reason for Taking Classes			
CE hours required for license	4 (12.5)	0 (0)	4 (7)
CE hours required for certification	4 (12.5)	0 (0)	4 (7)
CE hours required by employer	0 (0)	0 (0)	0 (0)
Personal growth	24 (75)	21 (100)	45 (86)

Note. There were no significant differences ($p<.05$) between groups. All data provided as n (%)

Participation in the online educational activities was entirely voluntary; however the investigator and the online facilitator encouraged the completion of at least two activities. Activities ranged in length from .5 contact hour to 1 contact hour. The activities were opened to participants in February 8, 2009 and continued until August 31, 2009. A total of 40 continuing education activities were accessed. The control group participated in 21 activities, 17 of which were completed and assigned credit for a total of 16.75 contact hours. The CoP group participated in 18 activities, 14 of which were completed and assigned credit for a total of 12 contact hours.

To encourage participation, a series of email blast communiqués were sent to participants (Appendix H). The control group received four communiqués from the investigator. The CoP group was facilitated by a nurse practitioner with geriatric and education experience. A total of 10 email communiqués were sent to CoP participants, four from the investigator, and six from the facilitator.

The facilitator invited CoP participants to join her in an online discussion that was available on the home page. This interactive option was not used during the 6 month study period. After repeated requests to send questions, or make comments, the discussion board remained empty. Post-assessment comments by CoP participants included: “Course content, design, and structure are more important to me as a learner than the other aspects mentioned. I am an independent learner” and “I enjoy doing on-line programs, but do not care to participate in discussions due to the time involved”.

Satisfaction. At the conclusion of the study period, participants from both groups were asked to complete a survey relating to their satisfaction with the educational

experience. Survey items that related only to the experiences of the CoP group were eliminated from the control group survey.

Table 6

Satisfaction Survey Responses

	Control Group		CoP Group		
Response (numerical value)	Post-study n=8 %	mean (*SD*)	Post-study n=7 mean (*SD*)	mean (*SD*)	*t (p)*
How important was taking these CE activities to you?					
Not important (1)	0	2.9	0	2.6	*.82*
Somewhat important(2)	25	(*.64*)	57.1	(*.79*)	*(.21)*
Important (3)	62.5		28.6		
Very important (4)	12.5		14.3		
On the scale, please rate the following: Was access to this/these CE program(s) via the Internet adequate?					
Very good (1)	50	1.5	57.1	1.43	*.26*
Good (2)	50	*(.54)*	42.9	*(.54)*	*(.40)*
Fair (3)	0		0		
Poor (4)	0		0		
Was technical support adequate?					
Very good (1)	37.5	2.8	57.1	2.3	*.49*

Good (2)	12.5	*(1.75)*	14.3	*(1.89)*	*(.32)*
Fair (3)	12.5		0		
Poor (4)	12.5		0		
Did not use (5)	25		28.6		
Were the login instructions given, course information, and navigation structure easy to use and understand?					
Very good (1)	25	2.0	57.1	1.86	*.24*
Good (2)	50	*(.76)*	28.6	*(1.46)*	*(.41)*
Fair (3)	25		14.3		
Poor (4)	0		0		
Did not use (5)	0		0		
If your online course was not available, would you take this course as a face-to-face continuing education activity?					
No	62.5		57.1		
Yes	37.5		42.9		
Participation in a discussion or chat group was available.					
No	87.5		57.1		
Yes	12.5		42.9		
The CE program(s) facilitated my learning.					
Strongly Disagree (1)	0	3.4	0	2.9	*1.22*
Disagree (2)	12.5	*(.74)*	42.9	*(.90)*	*(.12)*
Agree (3)	37.5		28.6		

Strongly Agree (4)	50		28.6		
I received timely feedback on the successful or unsuccessful completion of program(s)					
Strongly Disagree (1)	0	3.4	0	3.7	*-.70*
Disagree (2)	12.5	*(.74)*	16.7	*(.82)*	*(.25)*
Agree (3)	37.5		83.3		
Strongly Agree (4)	50		0		
The websites that were linked to this/these program(s) facilitated my learning					
Strongly Disagree (1)	na		0		
Disagree (2)	na		0		
Agree (3)	na		60		
Strongly Agree (4)	na		40		
I felt frustrated by the lack of feedback from the facilitator					
Strongly Disagree (1)	na		60		
Disagree (2)	na		40		
Agree (3)	na		0		
Strongly Agree (4)	na		0		
I am very satisfied with this/these online CE program(s)					
Strongly Disagree (1)	0	3.6	0	2.9	*1.81*
Disagree (2)	12.5	*(.74)*	42.9	*(.90)*	*(<.05)*
Agree (3)	12.5		28.6		
Strongly Agree (4)	75		28.6		

Completion of the post-tests associated with this/these online CE program(s) facilitated my learning					
Strongly Disagree (1)	0	3.5	28.6	2.43	*2.11*
Disagree (2)	12.5	*(.76)*	28.6	*(1.27)*	*(<.05)*
Agree (3)	25		14.3		
Strongly Agree (4)	62.5		28.6		
I would like to take other online CE program(s)					
Strongly Disagree (1)	0	1.8	0	2.0	*.49*
Disagree (2)	12.5	*(1.04)*	28.6	*(1.27)*	*(.32)*
Agree (3)	25		14.3		
Strongly Agree (4)	62.5		57.1		
The learning activities in this/these CE program(s) required application of problem solving skills which facilitated my learning.					
Strongly Disagree (1)	0	3.4	14.3	2.7	*1.26*
Disagree (2)	12.5	*(.74)*	42.9	*(1.3)*	*(.12)*
Agree (3)	37.5		0		
Strongly Agree (4)	50		42.9		
This/these online CE program(s) did not meet my learning needs.					
Strongly Disagree (1)	50	1.8	50	2.0	*-.41*

Disagree (2)	37.5	*(1.04)*	16.7	*(1.27)*	*(.34)*
Agree (3)	12.5		16.7		
Strongly Agree (4)	0		16.7		
I would recommend this/these programs to others.					
Strongly Disagree (1)	0	3.6	0	3.0	*1.386*
Disagree (2)	12.5	*(.74)*	42.9	*(1.00)*	*(.10)*
Agree (3)	12.5		14.3		
Strongly Agree (4)	75		42.9		
I learned as much in this online course as compared to a face-to-face course.					
Strongly Disagree (1)	0	3.8	0	2.5	*2.67*
Disagree (2)	12.5	*(.71)*	42.9	*(1.05)*	*(<.05)*
Agree (3)	0		14.3		
Strongly Agree (4)	87.5		42.9		
I feel online CE programs are as effective as face-to-face courses.					
Strongly Disagree (1)	0	3.1	0	3.1	*.84*
Disagree (2)	12.5	*(.90)*	28.6	*(.90)*	*(.21)*
Agree (3)	25		28.6		
Strongly Agree (4)	62.5		42.9		

To evaluate the difference in satisfaction between the control and the CoP group, independent t tests were completed on each of the comparable items. While the majority

of the scores showed no significant differences, three did. Scores of the control group were significantly higher than those of the CoP group on overall satisfaction with the online activities, on the rating of posttests as facilitators of learning, and the perception of learning in online courses when compared with face-to-face activities.

For the CoP group, the perception of community was measured using the Online Satisfaction Survey. Post-survey variables are described by way of percentages (Table 7). Participants were asked to rank the constructs of learner-to-content, learner-to-facilitator, and learner-to-learner (Table 8).

Table 7

Assessment of Interactivity in CoP group.

	Strongly Disagree %	Disagree %	Agree %	Strongly Agree %
The non-educational aspects of this website (discussions, links, etc.) facilitated my learning	28.6	28.6	28.6	14.3
This website created a sense of community among professionals	28.6	28.6	42.9	0
In this website, I was able to share my viewpoint with fellow professionals	28.6	14.3	57.1	0
In this website the facilitator continuously encouraged communication	28.6	42.9	0	0
I received timely (within 24-48 hours) feedback from others	28.6	28.6	42.9	0
These online CE programs(s) encouraged participants to discuss ideas and concepts covered with other participants	28.6	28.6	42.9	0

Although I could not see the facilitator, I always felt his/her presence	42.9	28.6	14.3	14.3

Table 8

Importance Ranking of CoP Interactions

Recognizing that all of the below mentioned items are important, identify what you feel is the number one criteria for a satisfying online experience: (rank order these items: 1= most important, 2= moderately important, 3= least important)	n (%)	Overall Rank
Learner-Content interaction		
Rank #1	13 (87)	#1
Rank #2	2 (13)	
Rank #3	0 (0)	
Learner-Facilitator interaction		
Rank #1	2 (13)	#2
Rank #2	11 (74)	
Rank #3	2 (13)	
Learner-learner interaction		
Rank #1	1 (7)	#3
Rank #2	5 (33)	
Rank #3	9 (60)	

Learning. Baseline and new knowledge relating to the topic area was assessed using a 10 item test with questions relating to best evidence in the treatment of chronic constipation in the elderly populations (Table 9). A clinical survey querying the participants on the significance of the clinical issue and the effectiveness of treatment

option was also provided. This assessment was completed pre-study and again post-study.

Table 9

Knowledge Assessment Item Analysis – Answer Selection Percentage

	Control Group		CoP Group	
	Pre-study n=32	Post-study n=12	Pre-study n=21	Post-study n=7
According to the ROME III criteria, constipation is categorized as chronic if the criteria are fulfilled for the last ____ months.				
2	9.7%	0%	19%	12.5%
*3**	*48.4%*	*58.3%*	*47.6%*	*50%*
6	38.7%	41.7%	33.3%	37.5%
12	3.2%	0%	0%	0%
Increasing fluids improves symptoms of constipation in adequately hydrated patients.				
True	48.4%	25%	28.6%	12.5%
*False**	*51.6%*	*75%*	*71.4%*	*87.5%*
Assessment of psychosocial disorders is a critical part of an evaluation for chronic constipation.				
*True**	*100%*	*100%*	*90.5%*	*100%*
False	0%	0%	9.5%	0%
Polyethylene glycol (PEG) 3350 has demonstrated safety and efficacy in patients 65 years or older for up to ____ months.				

*3**	*32.3%*	*50%*	*47.6%*	*50%*
6	35.5%	8.3%	19%	0%
12	32.3%	25%	28.6%	37.5%
48	0%	16.7%	4.8%	12.5%
__ is the only medication specifically approved by the FDA for the treatment of chronic constipation in adults over the age of 65.				
Lactulose	29%	16.7%	19%	25%
*Lubiprostone**	*3.2%*	*58.3%*	*14.3%*	*62.5%*
PEG	29%	8.3%	28.6%	12.5%
Psyllium	38.7%	16.7%	38.1%	0%
Which of the following statements concerning opioid-induced constipation is true?				
70% of pts on long-term opioids develop constipation.	51.6%	41.7%	66.7%	25%
Fiber and fluids usually are effective treatment for opioid-induced constipation.	0%	8.3%	0%	0%
Laxatives should not be initiated until the patient has not had a BM for more than 3 days.	9.7%	0%	0%	0%
*When possible, the dose of opioids and other drugs that may cause constipation should be decreased or discontinued.**	*38.7%*	*50%*	*33.3%*	*75%*
Psyllium increases stool frequency.				
*True**	*35.5%*	*41.7%*	*38.1%*	*50%*
False	64.5%	58.3%	61.9%	50%
Constipation is more prevalent in men than				

women.				
True	9.7%	8.3%	9.5%	25%
*False**	*90.3%*	*91.7%*	*90.5%*	*75%*
_____ can worsen symptoms in patients with severe constipation.				
*Fiber**	*58.1%*	*66.7%*	*61.9%*	*62.5%*
Lactulose	9.7%	0%	14.3%	0%
PEG	3.2%	8.3%	9.5%	0%
Stool Softeners	29%	25%	14.3%	37.5%
According to the Herz study, ____ of patients describe constipation as a hard stool with no change in frequency**.**				
10%	12.9%	33.3%	9.5%	12.5%
*25%**	*35.5%*	*33.3%*	*28.6%*	*50%*
40%	22.6%	8.3%	14.3%	0%
50%	29%	25%	47.6%	37.5%

*Best answer based on prevailing evidence

Percentages were calculated to compare the mean of each item of the pretest/ posttest for both the control and CoP group. Independent sample *t* tests were completed to compare the pretest/posttest mean scores of the control group, and to compare the pretest/posttest mean score of the CoP group. As shown in Table 10, the posttest means of each group were significantly higher than the means of the pretests. However, the differences between the posttests of the control group and the CoP group were not significant. The value of Cohen's *d* and the effect-size correlation *r* was calculated using the means and standard deviations of the two groups (*d*=.30, *r=.15*), and indicated a low effect.

Table 10

Knowledge Assessment: Differences of Control and CoP Group Means

	Control Group Means			CoP Group Means			Control/ CoP
	Pre-study Mean/ SD	Post-study Mean/ SD	*t (p)*	Pre-Study Mean/ SD	Post-study Mean/ SD	*t (p)*	*t (p)*
KA Score	46/10.3	60/11.8	*-4.49 (<.05)*	49/14.5	67/18.9	*-2.64 (<.05)*	*-.99 (.17)*

Changes in practice. Clinical vignettes were utilized during the pre-survey period to assess participants' baseline practice behavior. The three cases presented were representative of the types of patient situations common to nurse practitioners caring for elderly clients. The same vignettes were presented to participants after the 6 month study period to discern if changes occurred in their practice behavior. Table 11 presents an item analysis of results described by way of percentages. Table 12 presents the mean pre and post scores of the two groups. A series of t tests reveal a significant difference between the pre and post scores for the control group only, and no significant results were seen when comparing the post scores of the control group with the CoP group. The value of Cohen's *d* and the effect-size correlation *r* was calculated using the means and standard deviations of the two groups (d = -.44, r = -.22), indicating a low effect.

Table 11

Clinical Vignette Item Analysis – Answer Selection Percentage

	Control Group	CoP Group

	Percentages		Percentages	
	Pre-study	Post-study	Pre-study	Post-study
	n=36	n=12	n=21	n=8
The goal of therapy in Patient #1 should be?				
1 movement/wk	0%	0%	0%	12.5%
2 movements/wk	14.8%	0%	0%	12.5%
*3 movements/ wk**	*63%*	*44.4%*	*68.4%*	*75%*
1 movement/day	22.2%	55.6%	31.6%	0%
Since your initial approach did not work, what would you do next?				
Oral mineral oil	14.8%	11.1%	21.1%	12.5%
*Oral PEG**	*77.8%*	*88.9%*	*78.9%*	*87.5%*
Subcutaneous methylnaltrexone	0%	0%	0%	0%
Enemas twice weekly	7.4%	0%	0%	0%
Does this patient have chronic constipation?				
*Yes**	*59.3%*	*89.9%*	*84.2%*	*62.5%*
No	14.8%	11.1%	10.5%	25%
Unsure	25.9%	0%	5.3%	12.5%
What medical condition is most likely contributing to her constipation?				
Mile cognitive impairment	3.7%	0%	0%	12.5%
*Parkinson's disease**	*44.4%*	*77%*	*26.3%*	*25%*
Interactivity	48.1%	22.2%	68.4%	50%
Hypertension	3.7%	0%	5.3%	12.5%
What would be the best approach to manage her constipation?				
Stool softener	37%	33.3%	26.3%	12.5%
Bulk fiber agent	22.2%	0%	26.3%	12.5%

*Stimulant/osmotic agent**	*25.9%*	*66.7%*	*31.6%*	*37.5%*
Increased physical therapy	14.8%	0%	15.8%	37.5%
How would you treat Patient #2				
Initiate an oral stimulant (e.g. bisacodyl) and a rectal suppository	55.6%	22.2%	42.1%	25%
*Initiate an oral type-2 chloride channel activator (e.g. lubiprostone)**	*37%*	*77.8%*	*52.6%*	*75%*
Initiate a subcutaneous mu-receptor antagonist (e.g. methylnaltrexone)	7.4%	0%	5.3%	0%
Increase the frequency of enemas until her bowel movements improve	0%	0%	0%	0%

*Best answer based on prevailing evidence

Table 12

Clinical Vignettes: Differences of Control and CoP Group Means

	Control Group Means			CoP Group Means			Control Post/ CoP Post
	Pre-study Mean/ SD n=27	Post-study Mean/ SD n=9	*t (p)*	Pre-study Mean/ SD n=19	Post-study Mean/ SD n=7	*t (p)*	*t (p)*
CV Score	51/25.5	74/26.5	*-2.37 (<.05)*	57/18.7	67/19.24	*-1.16 (.13)*	*.62 (.28)*

Summary

This chapter presented the results of the pre-assessments and post-assessments relating to the control group who had access to online education and the CoP group who had access to online education, facilitator, interactivity and various resource materials. A series of tables displayed the descriptive and parametric inferential statistical analysis for the multiple components of each of the study variables: participation, satisfaction, learning, and changes in practice. While the data showed statistically significant changes between pretest and posttest within each of the control and CoP groups, it did not show a significant difference based on the intervention of access to an interactive CoP.

Chapter 5: Discussion

This chapter provides a discussion of the data presented in Chapter 4. This pilot study provided preliminary testing of the hypothesis that online continuing education provided within the context of a community of practice would prove to be a more effective educational model, allowing for mutual engagement, joint enterprise, and shared repertoire between participants. Continuing education professionals are keenly interested in utilizing educational modalities that improve professional knowledge, competence, and that impact the care of patients at the bedside.

Participation. The initial response to the call-for-participants from the geriatric and adult NP population was encouraging and provided more subjects than were originally planned for the pilot study. Most participants completed the pre-assessment activities within the first week of the study. The two websites containing the educational programs were available to participants for a period of 6 months. Over the course of the study period, three participants formally withdrew, and only a small percentage of participants, 28% of the control group and 33% of the CoP group, took the project to completion. Both the control and CoP groups consisted primarily of married women with children, over the age of 45 who worked in a full-time status. The greatest percentage of the control group had been in practice from one to five years, while the CoP group had the greatest percentage in the six to 10 year range. The majority of the participants in both groups were very experienced in the use of online CE.

The age of the participants may have impacted the desire to engage in and the familiarity to online discussion activities. Web-based social networking sites have

traditionally been the purview of a younger audience, typically high school or college students and young adults. However, this audience composition appears to be changing. According to the Nielson Online Custom Analytics Report (Global Faces and Networked Places, 2007), audience composition of member community websites are beginning to shift. From December 2007 through December 2008, audience members under the age of 34 decreased (-1% for the18-34 age group, and -9% for 2-17 age group) while audience members over the age of 35 increased (2% for 35-49 age group, 4% for 50-64 age group and 7% for the over 65 age group). Social networking sites such as Facebook, Linkedin, and Twitter have seen phenomenal growth in unique visitors. ComScore Media Metrix (Smith, 2009) reported a 12% overall change in US internet users for 20 popular social networking sites from May 2008 to May 2009. Facebook and Linkedin logged 97% and 90% growth respectively, while Twitter logged a 2681% increase (Nielsen report on social networking's new global footprint, 2009).

Satisfaction. Even though univariate analysis revealed that the random assignment produced two equivalent groups; the CoP group differed from the control in their responses to satisfaction questions. Regarding the importance of taking the CE activities, 75% of the control group rated this as important or very important, while only 43% of the CoP group rated in the same manner. There were significant differences between the control and CoP group in rating their satisfaction with the online activities and their related post-tests with the control group rating these items higher. The CoP participants indicated greater preference for face-to-face activities for their learning. One participant of the CoP group stated he or she enjoyed completing on-line programs, but did not care to participate in discussions due to the time involved.

Three constructs of online education satisfaction as defined by Strachota (2003) were evaluated. The investigator sought to determine what relationship NP satisfaction of online education existed with learner-learner interaction, learner-facilitator interaction, and learner-content interaction.

Satisfaction with the learner-learner interaction was minimal. The interactivity survey administered to the CoP group post-study revealed that the components of the website that actively involved participants (e.g. discussion group) were not seen as valuable to the participants. The majority of the respondents disagreed that the non-educational aspects of the website (patient education tools, links, etc.) facilitated their learning (57%); that the CE program(s) encouraged participants to discuss ideas and concepts with other participants (57%); and that the website created a sense of community among professionals (57%). To protect their anonymity, participants were given usernames and were instructed to use them in all communications. This may have inadvertently impacted the social nature of the community. Without the familiarity of names and descriptions of common interests, the social networking might be more difficult as there is no perceived connection to the community. When asked to rank the importance of learner-learner interaction, participants ranked it 3rd of the three constructs (42%).

Satisfaction with the learner-facilitator interaction was generally poor as well. While the discussion board involving the facilitator was available to participants in the CoP group for the entire length of the study, no one opted to access it. Despite the numerous emails to participants encouraging participation, 100% of the respondents disagreed that the facilitator continuously encouraged communication; and disagreed

with the statements that the facilitator was an active member of the discussion group (57%); and that they felt the facilitator's presence (72%). When asked to rank the importance of learner-facilitator interaction, participants ranked it 2nd of the three constructs (73%).

An online facilitator should assist in developing this social presence by providing a human element to an otherwise technological environment. Nisbet (2004) described five stages on online discussion group interaction and the role of the facilitator within each stage. These stages included (1) access and motivation – where the facilitator assists to solve access problems and encourages participation; (2) online socialization – where the facilitator helps to create an atmosphere of mutual respect; (3) information exchange – where the facilitator organizes the discussion; (4) knowledge construction – where the facilitator attempts to build and sustain discussion and collaboration; and (5) development – where the facilitator provides support and response as needed while participants construct their own learning. These stages parallel Wenger's (1998) stages of community development: (1) potential – where participants discover the others face similar probe; (2) coalescing – where ideas incubate and participants see an immediate value to the group; (3) maturing – where participants focus and expand on ideas; (4) stewardship – where participants develop an ownership and openness; and (5) transformation – where participants let the community go, or to let the community live on.

The facilitator for this study was introduced in initial emails and her picture, name, and biography appeared on the website landing page. Unfortunately no sense of community was established during the six month study period. It appeared that the CoP

participants did not get past the Wenger's (1998) or Nisbit's (2004) first stages. The facilitator was not provided the opening from the participants to assist in problem-solving, or imaging how increased networking and knowledge sharing could be of value. Web-based communities that provide for interactive professional networking may require more time to build this sense of community.

Satisfaction items that related to the learner-content construct were generally rated in a positive fashion for both the control and the CoP groups. Participants agreed or strongly agreed with evaluative statements relating to overall satisfaction with the online activities and associated post-tests, desire to take additional online activities, application of problem solving skills, and ability to recommend these programs to others. When asked to rank the importance of learner-content interaction, participants ranked it 1st of the three constructs (86%). This ranking mirrors the finding of Strachota (2003) in her research involving university students in online courses. Her study also found that "quality content was identified as the most important variable to a satisfying course experience" (p. 137).

Learning. While this research focused on the effectiveness of an educational modality versus the content of the education, the investigator worked with medical writers and health professionals from MCM who developed the scored knowledge assessment of the topic that was provided to participants pre and post study. The most robust finding of this study confirmed the effectiveness of online education in improving knowledge as each group's mean knowledge assessment scores at posttest were significantly higher than at pretest. The intervention of access to an interactive community website did not make a discernable difference, however.

Changes in Practice. The investigator collaborated with Outcomes Inc. who developed three clinical vignettes and a clinical survey that was provided to participants pre and post study. Only the control group demonstrated statistically significant differences between the two test points moving their mean score from 51 to 74.

The use of non-educational and adjunctive strategies is encouraged by the ACCME to "creatively enhance change beyond CME activities" (Accreditation Council for Continuing Medical Education, 2009). An online community of practice affords these types of adjunctive strategies that include patient education tools, newsletters, and Ask the Experts sections. With a limited number of visits to an interactive site such as E-IMPACCT, participants in the study may not have fully availed themselves to the richness of the available resources. Future research may want to focus on a larger participant number and a longer period of study.

Strengths

Pilot studies are designed to test the logistics and hone methods prior to developing larger studies. Strengths of this pilot study include the two-group experimental design, the use of measurement tools that were pre-tested for reliability and validity for satisfaction and knowledge assessment, and the use of clinical vignettes as a predictor of practice behavior. The inclusion of an online facilitator is also seen as strength.

Limitations

While this research was designed as a pilot study allowing smaller samples, the small sample size limited the ability to fully measure any potential impact of the community of practice. One noteworthy weakness in this study was the method of

randomization. While the systematic assignment based on an initial random assignment of the first respondent did not result in discernable differences between the groups, a more statistically valid method of randomization would have further eliminated any unforeseen biases. Weaknesses included the inexperience of the online facilitator, and her inability to build a social presence and encourage interactivity within the constraints of a short period of engagement; the number of participants who completed the study; and the degree of participation. The use of non-identifying pseudonyms may have detracted from an environment where professionals meet and discuss common issues and concerns.

Another limitation is the use of a volunteer sample. While study participants were provided with free continuing education credit for the CE activities they completed, the participants who enrolled in the study did not feel any pressure to complete programs.

Recommendations for Future Research

The professional continuing education industry has a surfeit of anecdotal and descriptive studies demonstrating that continuing education may have a positive impact on increasing knowledge and competence. Fewer studies demonstrate what effect continuing education has on practice performance. Fewer still are research studies utilizing an experimental design. Studies such as this pilot can advance the knowledge of educational design and measurement. Further study on this topic might include a more inclusive population that crosses professional barriers to include pharmacists, physicians, and other members of the healthcare team.

In addition to providing for a statistically credible randomization method, any conversion of this pilot study to a larger one should provide for a more longitudinal model, affording more time for the online community to develop. Another option may be

to use an existing community, similar to one being established on the American Academy of Nurse Practitioner's website. This tactic may decrease the contact time necessary to build a community of practice. As the use of online education has been shown to be an effective educational model, further study should focus on the evaluation of practice change..

Implications

The development of online communities of practice as an adjunct to continuing education activities is an expensive undertaking requiring advanced programming skills, commissioning of expert faculty and advisors, and a commitment to a long period of engagement with participants. Financing of these communities have typically come from commercial interests and are thus focused in a therapeutic area instead of a professional networking model. Continuing education professionals faced with dwindling opportunities for commercial support of educational activities need to carefully evaluate their existing communities of practice to determine the extent participants are utilizing all the tools and components. Based on this evaluation, further development of existing sites, or future development of new sites should focus efforts on those components that are perceived as important and beneficial to the end user – the healthcare professional.

Conclusion

While the results of this study did not show significant improvements in knowledge attainment and practice performance solely as a result of access to a Web-based community of practice with interactive online education and resources, it did confirm the effectiveness of online education in improving practitioner knowledge. The further advancement of online continuing education within professional networking

websites should place a major focus on the quality of the content within the activities they post. Clinician involvement and interaction may take time to build momentum. Although the importance of an online facilitator was not demonstrated in this pilot study, coordinators should not be deterred from considering this component in larger non-blinded ongoing Web-based communities of practice. The design and duration of this pilot study may have limited the establishment of a social presence.

Summary

This chapter presented a discussion of the pilot study results as they related to the dependent variables: participation, satisfaction, learning, and practice change. Through a discussion of the pilot study's strengths and limitations, recommendations for study refinement were presented. The implications of the study for continuing education professionals were introduced. The study reinforced the existing evidence that online activities are an effective method of providing continuing education for healthcare professionals. Further study is needed to determine if social networking provided through interactive tools such as discussion boards is a beneficial adjunct to online education.

Appendix A. Critical Analysis Table

Topic	Author(s)	Problem Statement	Bottom Line/Actions	Conclusion	Level of Evidence
CE Outcomes	Dixon (1978)	NA	NA	Evaluation of CE can be conducted using four levels of criteria: 1) participants' perceptions and opinions of the course, 2) participants' professional knowledge and attitudes, 3) participants' professional behaviors and 4) impact on client status.	Level VII - opinion of authorities and/or reports of expert committees
CE Outcomes	Keltner, Guilo & Higgs (1982)	Do RNs working in acute care facilities in six counties in California perceive nursing CE as having a positive or negative impact on nursing practice?	Nurses do perceive CE to be beneficial. Clinically oriented classes are perceived as more beneficial than are administrative and non-clinical courses. Nurses appear to be motivated by more than the legislative mandate to secure CE to maintain licensure.	Nurses in California perceived nursing CE to positively affect their nursing practice.	Level II - at least one well-designed RCT
CE Outcomes	Ellis (1996)	What is the relationship between research methods and the development of knowledge?	There is a shift from qualitative, non-experimental research designs in CE research.	While challenging, the classical experimental approach can be valuable in evaluating causal relationships between CE and practice.	Level V - systematic reviews of descriptive and qualitative studies
CE Outcomes	O'Brien, et al. (2001)	Are educational meetings and workshops effective in improving professional practice or health care outcomes?	Interactive workshops can improve professional practice. Lectures alone are unlikely to change professional practice.	Interactive workshops can result in moderately large changes in professional practice. Didactic sessions alone are unlikely to change professional practice.	Level I - systematic review or meta analysis
CE Outcomes	Robertson, Umble, & Cervero (2003)	What research questions are being asked by CE syntheses? What research methods are the syntheses using to ask their questions? What are the findings of the research syntheses? How do the syntheses and findings of the current study differ from those of the 1996 study?	CE that is ongoing, interactive, contextually relevant, and based on needs assessment is more likely to improve knowledge, skill, attitudes, behavior, and patient health outcomes.	There is a trend away from using syntheses to ask the question "Is CE effective, and for what outcomes?".	Level I - systematic review or meta analysis

CE Outcomes	Cobb (2004)	What are the user characteristics, frequency of use data, and factors that influence internet-based CE?	Internet can be an effective means of providing CE. Barriers exist, however, to its use. More research is needed to compare satisfaction of online activities with traditional formats.	Barriers to the use of the Internet for CE continue to exist.	Level I - systematic review or meta analysis
CE Outcomes	Curran & Fleet (2005)	To examine peer-reviewed literature and identify key evaluative outcomes	There is limited research available on the effect of Web-based CE on practitioner performance change and patient health outcomes.	There is a need for in-depth examination of the nature and characteristics of Web-based technologies and systems that are most effective in enhancing practice change.	Level V - systematic reviews of descriptive and qualitative studies
CE Outcomes	Fordis, et al. (2005)	Can Internet-based CME produce behavior change comparable to those produced from live interactive workshops?	Both interventions can be effective in changing physician knowledge and attitudes.	The study provided some evidence to suggest that online education may affect behavior change more than live interventions.	Level II – at least one well-designed RCT
CE Outcomes	Overstreet, et al. (2006)	Does evidence exist that CME related to each IOM competency translate into improved physician performance or patient outcomes?	Small number of studies that fit criteria, but those showed positive outcomes for physician performance or patient care.	Need for additional research and enhanced publication regarding outcomes of CME related to IOM competencies	Level V - systematic reviews of descriptive and qualitative studies
CE Outcomes	Goulet, Gagnon, & Gingras (2007)	Do physicians referred for remedial CE show improvement in clinical performance?	Statistically significant improvements occurred.	Practice enhancement through remedial professional development can result in improved clinical performances, as assessed through peer review.	Level II - at least one well-designed RCT

CE Outcomes	Mansouri &Lockyer (2007)	What is the effect of moderator variable on physician knowledge, performance, and patient outcomes?	Traditional passive approaches to CME are not associated with changes in physician performance or patient outcome. They may increase knowledge and awareness of issues. The results suggest that a combination of different interventions results in a better effect size. CE providers need to adopt new, creative, efficient, and interactive approaches with more than 1 method when attempting to change physician behavior.	CME activities may have a small to moderate effect on physician knowledge and performance, and on patient outcomes. Moderator variables such as the type of activity, the ability for interaction, the homogeneity of the audience, the size of the educational group, and the length or number of the educational settings, are important to consider when designing activities to impact the desired outcome level.	Level I - systematic review or meta analysis
CE Outcomes	Takhar , et al.(2007)	There is no standardized process or tool to identify sources of bias in CME presentations	Data analysis from study suggests that the CME bias assessment tool is valid and reliable. The use of the tool is only a part of the overall review of bias.	A valid and reliable tool for detecting, monitoring, and controlling bias is needed to control bias in CME.	Level VI - single descriptive or qualitative study
CE Outcomes	Tian, et al. (2007)	A systematic review of CME studies evaluating changes in physician knowledge and attitudes, clinical practices, and patient outcomes? What are the effects of using different randomization strategies on the capacity to measure outcomes? What is the reliability and validity of measurement in these studies? What follow-up period is recommended to adequately demonstrate CME-effectiveness?	A valid, reliable, and adaptable CME evaluation questionnaire addressing variables in the second level is needed to allow comparison of effectiveness across CME interventions. A minimum of 1-year post intervention follow-up period may also be indicated to investigate the sustainability of intervention outcomes.	Evaluation of the effectiveness of CME should include assessment of all 4 levels of evaluation.	Level I - systematic review or meta analysis
CoP	Johnson (2001)	1. What is the definition and main concepts of CoPs? 2. Can CoPs in their true definition be established, maintained, and supported using current (mainly text-based) web applications? 3. What are the limitations of these Web-based applications? 4. Does face-to-face contact enhance the concept of community of practice?	Need for more specific research on CoPs. When developing CoP ensure that enough “scaffolding” (ease of navigation, links, etc) is configured. Look for ways to transfer knowledge into real life situations. Consider a facilitator and moderator techniques to prompt online communication.	Wenger’s definition of CoP is pervasive in the literature. CoPs can be effectively established online. Barriers included: withdrawing, cultural differences, problems with asynchronous discussion, and lack of urgency in responding by participants.	Level V - systematic reviews of descriptive and qualitative studies

CoP	Moule (2006)	Are health care students able to develop characteristics of communities of practice when engaged in online module	Students were able to develop essential elements of CoPs – mutual engagement, joint enterprise, and shred repertoire. Trust issues emerged related to presenting identities online	CoP framework may be applied to online communities.	Level VI - single descriptive or qualitative study
CoP	Johnson, Hornik, & Salas (2007)	What is the relationship of perception of computer competence, usefulness of technology, peer interaction, and social presence to the effectiveness of online education?	Computer competence and perceived usefulness were related to course performance, satisfaction, and instrumentality. Peer interaction was related to course performance and satisfaction. Social presence was related to course satisfaction and course instrumentality.	Facilitating social presence is important in the success of online educational communities.	Level VI - single descriptive or qualitative study
KT	Davis (2006)	How does KT combine the principles of CE with guideline implementation, quality improvement and patient safety?	CME professionals and scholars need to incorporate a concept of adult learner-clinician, and consider an understanding of both micro (clinician-learner) and the macro (system) perspectives.	Article contains a table comparing CE and Guideline Implementation. KT is overarching construct for achieving adoption of best evidence.	Level VII - opinion of authorities and/or reports of expert committees

Appendix B. Web-based Enrollment Form and Eligibility Questionnaire

Dear Nurse Practitioner:

I am a student in the Doctor of Nursing Practice (DNP) program at Brooks College of Health, School of Nursing at the University of North Florida in Jacksonville, Florida. I am conducting a research study to evaluate the effectiveness of differing methods of online continuing education for nurse practitioners.

I am requesting your participation in this online research study which will involve a pre/post-assessment of knowledge and practice habits relating to the care of chronic constipation in the elderly. During the 4-6 months duration of the study, you will be given access to a webpage containing certified educational activities and you will receive email notifications of updates and releases of new activities. These certified activities **are provided at no cost** to you. After successful completion of the requirements of the posted educational activities, you will be able to view and print a certificate of completion. Activities may vary and be certified for *AMA PRA Category 1 ™,* American Academy of Nurse Practitioner (AANP), or American Nurses Credentialing Center Commission on Accreditation (ANCC).

Your participation in this study is voluntary. Your responses to the pre/post self-assessment, or a decision to withdraw from the study, will in no way affect your ability to obtain the certified credit from CE activities that you may have accessed and successfully completed within the confines of this study.

To ensure proper CE credit is awarded, certain web information is captured by the credit provider and is subject to their privacy policies. This information includes at least: (1) name, (2) address, (3) phone numbers, (4) professional license number, (5) email address, (6) universal resource locator (URL) arriving from, and (7) IP address. Participants will be informed of this prior to accessing CE.

The results of the research study may be published or presented, but your name will not be used. No monetary inducements are being offered. Anticipated benefits of the study are the provision of the latest evidence-based practice information for the practitioner and a further understanding of the effectiveness of Web-based CE, which may lead to improved services at the point-of-care. In addition to these benefits, you may acquire free certified CE credit that may be applied to licensure or certification reapplications.

If you have any questions concerning the research study, please call me at (904) 264-0674 or email me at M.Holman@AKHealthcare.com.

Should you choose to participate in this study, please complete the brief eligibility questionnaire below, consent to participate, and hit REPLY to this email. Your attestation that you consent to participate, your name and the date of consent will serve as your signature.

Sincerely,

Helen Mimi Holman, MS, RN-BC, CCMEP

Eligibility questionnaire (Mark with an X):

_____ I am able to read and understand English

_____ I am licensed as a nurse practitioner and am currently practicing

_____ I work with elderly clients (does not have to be exclusively)

_____ I have access to a web-enabled computer

_____I **have not** been involved in the development nor attended any of the following:

- *E-IMPACCT Case Studies in Chronic Constipation: Diagnosis and Treatment in Long-Term Care Residents* held at the regional or national conferences [Program Developers – Medical Communications Media, Inc. (MCM) and the American Society of Consultant Pharmacists (ASCP)]:
    - California Association of Long Term Care Medicine (CALTCM) on July 19, 2008 in Los Angeles, CA
    - American Society of Consultant Pharmacists (ASCP) on August 8, 2008 in Baltimore, MD
    - Texas Medical Directors Association (TMDA) on September 8, 2008 in San Antonio, TX
    - National Conference of Gerontological Nurse Practitioners (CGNP) on September 26, 2008 in St. Louis, MO
- Evaluation and Management of Chronic Constipation in the Elderly: Maintaining Quality of Life – online presentation [Program Developer – MCM]

If you marked X on all items, you are eligible to participate in this research study.

I consent to participate in the above study.

Name: _____

Date: _____

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact Office of Research and Sponsored Programs at the University of North Florida at 904-620-2455.

Appendix C. Online Satisfaction Survey Tool and Permission to Use

Online Satisfaction Survey

On the scale, please rate the following:

	Very Good			Poor
	1	2	3	4
Was access to this/these CE program(s) via the Internet adequate?				

On the scale, please rate the following:

	Very Good			Poor	Did not use
	1	2	3	4	
Was technical support adequate (Helpdesk, Log-in problems, Navigation, etc.)					
Were the login instruction given, course information, and navigation structure easy to use and understand?					

If your online course was not available, would you take this course as a face-to-face continuing education activity?

- ☐ No
- ☐ Yes

Participation in a discussion or chat group was available.

- ☐ No
- ☐ Yes

Interactivity Survey	Strongly Disagree			Strongly agree
	1	2	3	4
The online discussion board provided opportunity for problem solving with other professionals ***				
The online discussion board provided opportunity for critical thinking with other professionals ***				
The online discussion board was a waste of time***				
The facilitator was an active member of the discussion group offering direction to posted comments**				
The non-educational aspects of this website (discussions, links, wiki tool, etc.) facilitated my learning*				
This website created a sense of community among professionals ***				
In this website, I was able to share my viewpoint with fellow professionals ***				
In this website the facilitator continuously encouraged communication **				
In this website I was able to ask for clarification from a fellow professional when needed***				
I received timely (within 24-48 hours) feedback from others ***				
These online CE programs(s) encouraged participants to discuss ideas and concepts covered with other participants***				
Although I could not see the facilitator, I always felt his/her presence **				

Satisfaction Survey	Strongly Disagree			Strongly agree	N/A
	1	2	3	4	
The CE program(s) facilitated my learning *					
I received timely feedback on the successful or unsuccessful					

completion of the program(s) **					
The websites that were linked to this/these programs(s) facilitated my learning *					
I felt frustrated by the lack of feedback from the facilitator **					
I am very satisfied with this/these online CE program(s) ****					
Completion of the post-tests associated with this/these online CE program(s) facilitated my learning *					
I would like to take other online CE programs(s) ****					
The learning activities in this/these CE program(s) required application of problem solving skills which facilitated my learning *					
The learning activities in this/these CE programs(s) required application of problem solving skills which facilitated my learning *					
This/these online CE program(s) did not meet my learning needs ****					
I would recommend this/these program(s) to others ****					
I learned as much in this online course as compared to a face-to-face course ****					
I feel online CE programs are as effective as face-to-face courses ****					

Recognizing that all of the below mentioned items are important, identify what you feel is the number one criteria for a satisfying online experience: (rank order these items: 1= most important, 2= moderately important, 3= least important, and finally please comment)

Course content, design, and structure _____
Facilitator-learner interaction _____
Learner-learner interaction _____

Comment why you ranked the item #1

_____
_____
_____

* Learner-content construct
** Learner-instructor construct
*** Learner-learner interaction
**** General Satisfaction

Mimi

From: Elaine Strachota [strachoe@matc.edu]
Sent: Monday, February 11, 2008 3:22 PM
To: Mimi
Subject: Re: Request for use of tool

Mimi,
Yes, you can use my survey instrument and adapt as needed as long as you reference my name as the original author as it is copyrighted. My dissertation is available through http://www.umi.com At this site click on dissertation services and do a search. You can enter my name (Strachota) and select author by the drop down menu. The complete dissertation can be purchased through umi. When I wrote my dissertation I purchased several dissertations which gave me a reference as to how chapters were written by other students. I found this to be very valuable. I teach at a college so the library was able to get them for me however umi services are very good and they will sell you the dissertation. Best of luck with your dissertation.

Elaine Strachota, Ph.D, MS., OTR.
Milwaukee Area Technical College
700 W. State St.
Milwaukee, WI 53233
Occupational Therapy Assistant Faculty
Liberal Arts & Sciences Faculty
414-297-7160
strachoe@matc.edu

>>> "Mimi" <m.holman@akhealthcare.com> 02/10/08 1:41 PM >>>
Dr. Strachota,

I am a doctoral student at the University of North Florida preparing to do research on online communities of practice as an innovative learning model for health care professionals. I am interested in studying the effect of the proposed online courses, online tools, and discussion boards on nurse practitioners. In my literature search, I came across your article presented at the Midwest Research-to-Practice Conference in Adult, Continuing and Community Education titled: The Use of Survey Research to Measure Student Satisfaction in Online Courses.

I would like to receive additional information about this tool, and your permission to use and adapt it. The adaptation would involve changing references of "lessons and lecture notes" to "online courses" , "teacher" to "facilitator", and "class" to "Community of Practice".

I look forward to hearing from you at your earliest convenience.

Sincerely,

Mimi

Mimi Holman, President and CEO | AKH Inc.
320 Corporate Way, Suite 200 | Orange Park, FL 32073 | P: (904) 264-0674
| F: (904) 215-0534

Appendix D. Permission to Use E-IMPACCT Website

Michael Fullmer

From: Mimi [m.holman@akhealthcare.com]
Sent: Wednesday, September 03, 2008 2:18 PM
To: Michael Fullmer
Subject: Formal request to include website and tools in doctoral research

Sender **ALLOWED** [Remove] [Block]
Select SK Anti-Spam Control Panel

Mike Fullmer, CEO
Medical Communications Media

Dear Mr. Fullmer:

I am a doctoral student at the University of North Florida. I am conducting a pilot study on the effects of community and knowledge translation strategies on nurse practitioners' knowledge and practice behavior. As a component of this interactive website, I am requesting to utilize the dedicated webpage with all key areas, surveys, pre/post-tests and clinical vignettes developed as a part of the ASCP/MCM/AKH educational initiative titled: ***Elderly improvements and Advances in Chronic Constipation Treatment (E-IMPACCT).***

These tools were developed by Outcomes, Inc. in collaboration with MCM, and I believe that MCM holds the copyright.

RESPONSE OF COPYRIGHT OWNER:

[✓] Permission is granted as requested
http:// www. elderly constipation. org
[ ] Permission is granted as corrected or annotated
[ ] Permission is denied

[ ] Commercially available, order information is attached
[ ] Alternatives are attached

Signature deleted

Signature of Copyright Holder

Yours truly,

Mimi Holman

Helen M. Holman, MS, RN-BC, CCMEP
DNP Student
University of North Florida

Appendix E. Pre-Study Assessments Control and CoP Groups

1. Pre-study demographic assessment

Thank you for consenting to be a participant in this pilot study. While specific identifying information is not included in this enrollment form, please note that the Internet Protocol (IP) address will be the only identifying feature in this survey. IP addresses are difficult to match with users as they require network administrator rights and abilities.

This study will consist of three parts:
1. Prestest/pre-survey and clinical vignettes
2. Access to a website for a period of 4-6 months
3. Posttest/post-survey and clinical vignettes

Throughout the study period, certain continuing education activites will be available for completion. Please note that these activities have been certified for continuing education credit (either through ACCME, ANCC, or AANP). To ensure proper CE credit is awarded, certain web information is captured by credit providers and is subject to their privacy policies. This information includes: (1) name, (2) address, (3) phone numbers, (4) professional license number, (5) email address, (6) universal resource locator (URL) arriving from, and (7) IP address.

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

*** 1. I am:**

- Male
- Female

*** 2. I am:**

- 18-25 years old
- 26-35 years old
- 36-45 years old
- Over 45

*** 3. I am:**

- African American
- Asian and Pacific Islander
- White
- Hispanic/Latino
- American Indian or Alaska Native
- Other

*** 4. I am:**

- Trained in the United States
- Trained in a foreign country

*** 5. I am:**

- Single
- Married

*** 6. I have children:**

- No
- Yes

If yes, how many:

*** 7. Student status:**

- Not a student
- Full-time
- Part-time

*** 8. I work:**

- Do not work
- Full-time
- Part-time

*** 9. I have been a nurse practitioner for ____ year(s)**

- 1-5
- 6-10
- 11-15
- Over 15

*** 10. I hold the following degree (HIGHEST)**

- Diploma
- BS
- BA
- BSN
- MS
- MA
- MSN
- PhD
- EdD
- DNP
- DrNP

Other (please specify)

*** 11. I work in the following areas of practice (choose best option)**

- Geriatric primary care
- Adult primary care
- Long-term care

*** 12. I have successfully completed an online continuing education activity before:**

- No
- Yes

*** 13. If yes, how many (online CE programs)?**

- 1-5
- 6-10
- 11-15
- Over 15

2. Pre-study knowledge assessment

Pre-study knowledge assessment

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

* **1. According to the ROME III criteria, constipation is categorized as chronic if the criteria are fulfilled for the last _____ months.**

- 2
- 3
- 6
- 12

* **2. Increasing fluids improves symptoms of constipation in adequately hydrated patients.**

- True
- False

* **3. Assessment of psychosocial disorders is a critical part of an evaluation for chronic constipation.**

- True
- False

* **4. Polyethylene glycol (PEG) 3350 has demonstrated safety and efficacy in patients 65 years or older for up to _____ months.**

- 3
- 6
- 12
- 48

* **5. _____ is the only medication specifically approved by the FDA for the treatment of chronic constipation in adults over the age of 65.**

- Lactulose
- Lubiprostone
- PEG
- Psyllium

*** 6. Which of the following statements concerning opioid-induced constipation is true?**

- 70% of patients on long-term opioids develop constipation.
- Fiber and fluids usually are effective treatment for opioid-induced constipation.
- Laxatives should not be initiated until the patient has not had a BM for more than 3 days.
- When possible, the dose of opioids and other drugs that may cause constipation should be decreased or discontinued.

*** 7. Psyllium increases stool frequency.**

- True
- False

*** 8. Constipation is more prevalent in men than women.**

- True
- False

*** 9. _____ can worsen symptoms in patients with severe constipation.**

- Fiber
- Lactulose
- PEG
- Stool softeners

*** 10. According to the Herz study (Fam Pract. 1996;13:156-159), _____ of patients describe constipation as a hard stool with no change in frequency.**

- 10%
- 25%
- 40%
- 50%

3. Pre-study clinical survey

Pre-study clinical survey

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

*** 1. How significant are the following risk factors for patients developing chronic constipation in the long-term care (LTC) facility setting?**

	Low Significance		Moderate significance		High significance
Limited mobility	○	○	○	○	○
Hypothyroidism	○	○	○	○	○
Inadequate diet (fluid, fiber)	○	○	○	○	○
History of myocardial infarction	○	○	○	○	○
Recent abdominal surgery	○	○	○	○	○
Length of time residing in a LTC facility	○	○	○	○	○

*** 2. Please rate the effectiveness of the following options in managing chronic constipation in LTC patients. (select one for each choice)**

	Not at all effective		Somewhat effective		Extremely effective
Bulking agents	○	○	○	○	○
Stool softeners	○	○	○	○	○
Enemas	○	○	○	○	○
Stimulants/irritants	○	○	○	○	○
Osmotic agents	○	○	○	○	○
Lubricants	○	○	○	○	○
Chloride channel activators	○	○	○	○	○

3. How frequently are these treatments utilized in patients at your LTC facility (if you do not work in a LTC facility, then please indicate how frequently you see these agents being used)? (select one for each choice)

	Not at all		Sometimes		Almost always
Bulking agents	○	○	○	○	○
Stool softeners	○	○	○	○	○
Enemas	○	○	○	○	○
Stimulants/irritants	○	○	○	○	○
Osmotic agents	○	○	○	○	○
Lubricants	○	○	○	○	○
Chloride channel activators	○	○	○	○	○

4. In your institution, what percent of patients have chronic constipation? (select only one)

- Less than 5%
- 6% - 15%
- 16% - 25%
- 26% - 35%
- Greater than 36%

5. In your institution, what percent of patients who have chronic constipation use laxatives? (select only one)

- Less than 20%
- 21% - 40%
- 41% - 60%
- 61% - 80%
- Greater than 81%

6. In your institution, what percent of patients with chronic constipation will require an enema? (select only one)

- Less than 5%
- 6% - 15%
- 16% - 25%
- 26% - 35%
- Greater than 36%

7. In your estimation, what is the overall prevalence of fecal impaction in your institution? (select only one)

- Less than 2%
- 3% - 5%
- 6% - 10%
- 11% - 15%
- Greater than 15%

*** 8. How many patients with chronic constipation do you manage per week?**

* **9. A.) Do you manage patients in an LTC facility (e.g. nursing home)?**

- ○ No
- ○ Yes

10. B.) If yes, what percentage of your time do you spend in a LTC practice setting?

11. C.) If yes, how many years have you managed patients in a LTC practice setting?

4. Pre-study clinical vignettes

Pre-study clinical vignettes

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

1. From your perspective in working with patients in a LTC facility, to what extent does chronic constipation affect the patient's quality of life? (select only one)

○ 1 not at all ○ 2 ○ 3 moderately ○ 4 ○ 5 significantly

Case # 1: A 78-year-old resident of a nursing home has had constipation over the last 5 months. She reports that she has not had a bowel movement in 4 days. Her stool is hard and lumpy, with some difficulty in evacuating her bowels. Last week she had to be disimpacted manually. She has limited mobility due to osteoporosis and a recent vertebral fracture. Her appetite is good and she consumes 80% of her regular diet. Her pain is well controlled with hydrocodone and acetaminophen given on an every six hour schedule, which allows her to participate in physical therapy. Other medications include calcium 1500 mg daily and vitamin D 800 IU daily.

* **2. The goal of therapy in this patient should be? (select only one)**

- ○ 1 bowel movement per week
- ○ 2 bowel movements per week
- ○ 3 bowel movements per week
- ○ A daily bowel movement

Case # 1 continued: An initial approach with a stimulant laxative was prescribed. The patient is no longer taking hydrocodone, and has tried fiber supplementation and stool softeners; however, she still has the same difficulty with her bowel movement and has required several enemas every few weeks.

*** 3. Since your initial approach did not work, what would you do next? (select only one)**

- Oral mineral oil
- Oral polyethylene glycol
- Subcutaneous methylnaltrexone
- Enemas twice weekly

Case # 2: Ms. A is an 80-year-old woman recently hospitalized for Parkinson's disease. After her medications including levodopa/carbidopa 25/250 four times a day and adding entacapone 200 mg twice daily were adjusted, she has had moderate improvement in her rigidity. She is able to walk 50 feet with assistance, but is mostly bed or chair confined. She is transferred to the skilled care unit of your nursing home for further physical therapy. She has hypertension which is treated with verapamil 240 mg daily, clonidine 0.1 mg three times daily, and hydrochlorothiazide 50 mg, and receives venlafaxine 50 mg daily for depression. The hospital records indicate her last bowel movement was 3 days ago. Upon further questioning, she tells you that she had to strain and has had hard stools on almost half of her bowel movements over the past 4 months. Since arriving at the nursing home, she has not had a bowel movement in 2 days. Your examination of the abdomen shows no distention and decreased bowel sounds. The rectal examination shows no impaction and the stool is negative for blood. The remainder of the physical examination shows bradykinesia, but no cogwheeling or tremor. She has mild cognitive impairment. Blood pressure is 100/60.

*** 4. Does this patient have chronic constipation? (select only one)**

- Yes
- No
- Unsure

*** 5. What medical condition is most likely contributing to her constipation? (select only one)**

- Mild cognitive impairment
- Parkinson's disease
- Inactivity
- Hypertension

*** 6. What would be the best approach to manage her constipation? (select only one)**

- Stool softener (e.g. docusate)
- Bulk fiber agent (e.g. psyllium)
- Stimulant/osmotic agent(e.g. bisacodyl, polyethylene glycol)
- Increased physical therapy

*** 7. Rate the importance of the barriers that prevent an interdisciplinary approach for monitoring a patient's treatment progress (select one for each item)**

	Not Important				Somewhat Important					Extremely Important
Inconsistent descriptions of constipation	○	○	○	○	○	○	○	○	○	○
Lack of availability of a consultant pharmacist	○	○	○	○	○	○	○	○	○	○
Restrictive protocols within a facility	○	○	○	○	○	○	○	○	○	○
Lack of adequate training of auxiliary care personnel	○	○	○	○	○	○	○	○	○	○
Inconsistent or unreliable descriptions of bowel movements	○	○	○	○	○	○	○	○	○	○

Case # 3: Ms. J is a long-standing patient in your outpatient office. She has several chronic medical conditions including hypertension which is well controlled with an ACE inhibitor alone, diabetes mellitus which is controlled by diet, degenerative arthritis of the knees, and glaucoma which is treated by her ophthalmologist. Her current medication list includes lisinopril 40 mg daily, acetaminophen 650 mg at a frequency of about 2 per day, latanoprost 0.005% eye drops daily. Her main complaint is chronic constipation for 15 years. For this she has tried a number of different remedies. Increasing her dietary fiber has not worked, and she reports that she cannot consume the 30 grams of fiber daily that you recommended. She has also tried to increase her fluid intake. Currently, she is taking milk of magnesia 90 ml daily, but it is having no effect. She takes an enema of phosphosoda about twice weekly. Other over-the-counter laxatives have failed. Despite her attempts, she reports that she has fewer than 2 bowel movements per week with straining and a feeling of incomplete evacuation. You repeat your general physical examination, but there are no specific abnormal findings. A rectal examination shows no stool in the rectal vault. A complete blood count, electrolytes, serum creatinine, and serum calcium are within normal range, and her hemoglobin A1c is 5.9%. A plain film of the abdomen is unremarkable.

*** 8. How would you treat this patient? (select only one)**

- ○ Initiate an oral stimulant (e.g. bisacodyl) and a rectal suppository
- ○ Initiate an oral type-2 chloride channel activator (e.g. lubiprostone)
- ○ Initiate a subcutaneous mu-receptor antagonist (e.g. methylnaltrexone)
- ○ Increase the frequency of enemas until her bowel movements improve

9. How frequently are patient specific monitoring plans implemented in your LTC facilities for patients with chronic constipation? (select only one)

○ 1 not at all ○ 2 ○ 3 ○ 4 ○ 5 very frequently

10. What are the barriers to implementing patient specific monitoring plans?

*** 11. How confident are you**

	not confident at all				somewhat confident					very confident
in your ability to manage patients with chronic constipation? (select only one)	○	○	○	○	○	○	○	○	○	○
that you are up-to-date in managing patients with chronic constipation? (select only one)	○	○	○	○	○	○	○	○	○	○

12. In your institution, do you have access to a consultant pharmacist?

- ○ Yes
- ○ No

*** 13. Please rate the effectiveness of the following options in managing chronic constipation. (select one for each choice)**

	Not at all effective				Somewhat effective				Extremely effective
Bulking agent (e.g., methylcellulose)	○	○	○	○	○	○	○	○	○
Stool softener (e.g., docusate)	○	○	○	○	○	○	○	○	○
Enemas (e.g., sodium phosphates)	○	○	○	○	○	○	○	○	○
Stimulant/irritant (e.g., bisacodyl)	○	○	○	○	○	○	○	○	○
Osmotic agents (e.g., mag citrate)	○	○	○	○	○	○	○	○	○
Lubricant (e.g., mineral oil)	○	○	○	○	○	○	○	○	○
Chloride channel activator (e.g., lubiprostone)	○	○	○	○	○	○	○	○	○

14. How frequently are these treatments utilized in patients at your LTC facility (if you do not work in a LTC facility, then please indicate how frequently you see these agents being used)? (select one for each choice)

	Not at all		Sometimes		Almost always
Bulking agent (e.g., methylcellulose)	○	○	○	○	○
Stool softener (e.g., docusate)	○	○	○	○	○
Enemas (e.g., sodium phosphates)	○	○	○	○	○
Stimulant/irritant (e.g., bisacodyl)	○	○	○	○	○
Osmotic agents (e.g., mag citrate)	○	○	○	○	○
Lubricant (e.g., mineral oil)	○	○	○	○	○
Chloride channel activator (e.g., lubiprostone)	○	○	○	○	○

15. In your institution, what percentage of patients who have chronic constipation use laxatives? (select only one)

- ○ Less than 20%
- ○ 21% - 40%
- ○ 41% - 60%
- ○ 61% - 80%
- ○ Greater than 81%

16. In your institution, what percent of patients with chronic constipation will require an enema? (select only one)

- ○ Less than 5%
- ○ 6% - 15%
- ○ 16% - 25%
- ○ 26% - 35%
- ○ Greater than 36%

17. In your estimation, what is the overall prevalence of fecal impaction in your institution? (select only one)

- Less than 2%
- 3% - 5%
- 6% - 10%
- 11% - 15%
- Greater than 15%

*** 18. How many patients with chronic constipation do you manage per week?**

*** 19. A. Do you manage patients in a LTC facility (e.g. nursing home)?**

- Yes
- No

20. B. If yes, what percentage of your time do you spend in a LTC practice setting?

21. C. If yes, how many years have you managed patients in a LTC practice setting?

Appendix F: Post Assessment - Control Group

1. Post-study knowledge assessment

Post-study knowledge assessment

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

*** 1. According to the ROME III criteria, constipation is categorized as chronic if the criteria are fulfilled for the last _____ months.**

- 2
- 3
- 6
- 12

*** 2. Increasing fluids improves symptoms of constipation in adequately hydrated patients.**

- True
- False

*** 3. Assessment of psychosocial disorders is a critical part of an evaluation for chronic constipation.**

- True
- False

*** 4. Polyethylene glycol (PEG) 3350 has demonstrated safety and efficacy in patients 65 years or older for up to _____ months.**

- 3
- 6
- 12
- 48

*** 5. _____ is the only medication specifically approved by the FDA for the treatment of chronic constipation in adults over the age of 65.**

- Lactulose
- Lubiprostone
- PEG
- Psyllium

* **6. Which of the following statements concerning opioid-induced constipation is true?**

- 70% of patients on long-term opioids develop constipation.
- Fiber and fluids usually are effective treatment for opioid-induced constipation.
- Laxatives should not be initiated until the patient has not had a BM for more than 3 days.
- When possible, the dose of opioids and other drugs that may cause constipation should be decreased or discontinued.

* **7. Psyllium increases stool frequency.**

- True
- False

* **8. Constipation is more prevalent in men than women.**

- True
- False

* **9. _____ can worsen symptoms in patients with severe constipation.**

- Fiber
- Lactulose
- PEG
- Stool softeners

* **10. According to the Herz study (Fam Pract. 1996;13:156-159), _____ of patients describe constipation as a hard stool with no change in frequency.**

- 10%
- 25%
- 40%
- 50%

2. Post-study clinical survey

Post-study clinical survey

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

*** 1. How significant are the following risk factors for patients developing chronic constipation in the long-term care (LTC) facility setting?**

	Low Significance		Moderate significance		High significance
Limited mobility	○	○	○	○	○
Hypothyroidism	○	○	○	○	○
Inadequate diet (fluid, fiber)	○	○	○	○	○
History of myocardial infarction	○	○	○	○	○
Recent abdominal surgery	○	○	○	○	○
Length of time residing in a LTC facility	○	○	○	○	○

*** 2. Please rate the effectiveness of the following options in managing chronic constipation in LTC patients. (select one for each choice)**

	Not at all effective		Somewhat effective		Extremely effective
Bulking agents	○	○	○	○	○
Stool softeners	○	○	○	○	○
Enemas	○	○	○	○	○
Stimulants/irritants	○	○	○	○	○
Osmotic agents	○	○	○	○	○
Lubricants	○	○	○	○	○
Chloride channel activators	○	○	○	○	○

*** 3. How frequently are these treatments utilized in patients at your LTC facility (if you do not work in a LTC facility, then please indicate how frequently you see these agents being used)? (select one for each choice)**

	Not at all		Sometimes		Almost always
Bulking agents	○	○	○	○	○
Stool softeners	○	○	○	○	○
Enemas	○	○	○	○	○
Stimulants/irritants	○	○	○	○	○
Osmotic agents	○	○	○	○	○
Lubricants	○	○	○	○	○
Chloride channel activators	○	○	○	○	○

* **4. In your institution, what percent of patients have chronic constipation? (select only one)**

- Less than 5%
- 6% - 15%
- 16% - 25%
- 26% - 35%
- Greater than 36%

* **5. In your institution, what percent of patients who have chronic constipation use laxatives? (select only one)**

- Less than 20%
- 21% - 40%
- 41% - 60%
- 61% - 80%
- Greater than 81%

* **6. In your institution, what percent of patients with chronic constipation will require an enema? (select only one)**

- Less than 5%
- 6% - 15%
- 16% - 25%
- 26% - 35%
- Greater than 36%

* **7. In your estimation, what is the overall prevalence of fecal impaction in your institution? (select only one)**

- Less than 2%
- 3% - 5%
- 6% - 10%
- 11% - 15%
- Greater than 15%

* **8. How many patients with chronic constipation do you manage per week?**

* **9. A.) Do you manage patients in an LTC facility (e.g. nursing home)?**

- ○ No
- ○ Yes

* **10. B.) If yes, what percentage of your time do you spend in a LTC practice setting?**

* **11. C.) If yes, how many years have you managed patients in a LTC practice setting?**

3. Post-study clinical vignettes

Post-study clinical vignettes

Please choose the most appropriate answer to the following questions. There is only one right answer for each question.

* **1. From your perspective in working with patients in a LTC facility, to what extent does chronic constipation affect the patient's quality of life? (select only one)**

○ 1 not at all ○ 2 ○ 3 moderately ○ 4 ○ 5 significantly

Case # 1: A 78-year-old resident of a nursing home has had constipation over the last 5 months. She reports that she has not had a bowel movement in 4 days. Her stool is hard and lumpy, with some difficulty in evacuating her bowels. Last week she had to be disimpacted manually. She has limited mobility due to osteoporosis and a recent vertebral fracture. Her appetite is good and she consumes 80% of her regular diet. Her pain is well controlled with hydrocodone and acetaminophen given on an every six hour schedule, which allows her to participate in physical therapy. Other medications include calcium 1500 mg daily and vitamin D 800 IU daily.

* **2. The goal of therapy in this patient should be? (select only one)**

- ○ 1 bowel movement per week
- ○ 2 bowel movements per week
- ○ 3 bowel movements per week
- ○ A daily bowel movement

Case # 1 continued: An initial approach with a stimulant laxative was prescribed. The patient is no longer taking hydrocodone, and has tried fiber supplementation and stool softeners; however, she still has the same difficulty with her bowel movement and has required several enemas every few weeks.

* **3. Since your initial approach did not work, what would you do next? (select only one)**

- Oral mineral oil
- Oral polyethylene glycol
- Subcutaneous methylnaltrexone
- Enemas twice weekly

Case # 2: Ms. A is an 80-year-old woman recently hospitalized for Parkinson's disease. After her medications including levodopa/carbidopa 25/250 four times a day and adding entacapone 200 mg twice daily were adjusted, she has had moderate improvement in her rigidity. She is able to walk 50 feet with assistance, but is mostly bed or chair confined. She is transferred to the skilled care unit of your nursing home for further physical therapy. She has hypertension which is treated with verapamil 240 mg daily, clonidine 0.1 mg three times daily, and hydrochlorothiazide 50 mg, and receives venlafaxine 50 mg daily for depression. The hospital records indicate her last bowel movement was 3 days ago. Upon further questioning, she tells you that she had to strain and has had hard stools on almost half of her bowel movements over the past 4 months. Since arriving at the nursing home, she has not had a bowel movement in 2 days. Your examination of the abdomen shows no distention and decreased bowel sounds. The rectal examination shows no impaction and the stool is negative for blood. The remainder of the physical examination shows bradykinesia, but no cogwheeling or tremor. She has mild cognitive impairment. Blood pressure is 100/60.

* **4. Does this patient have chronic constipation? (select only one)**

- Yes
- No
- Unsure

* **5. What medical condition is most likely contributing to her constipation? (select only one)**

- Mild cognitive impairment
- Parkinson's disease
- Inactivity
- Hypertension

* **6. What would be the best approach to manage her constipation? (select only one)**

- Stool softener (e.g. docusate)
- Bulk fiber agent (e.g. psyllium)
- Stimulant/osmotic agent(e.g. bisacodyl, polyethylene glycol)
- Increased physical therapy

*** 7. Rate the importance of the barriers that prevent an interdisciplinary approach for monitoring a patient's treatment progress (select one for each item)**

	Not Important									Extremely Important
Inconsistent descriptions of constipation										
Lack of availability of a consultant pharmacist										
Restrictive protocols within a facility										
Lack of adequate training of auxiliary care personnel										
Inconsistent or unreliable descriptions of bowel movements										

Case # 3: Ms. J is a long-standing patient in your outpatient office. She has several chronic medical conditions including hypertension which is well controlled with an ACE inhibitor alone, diabetes mellitus which is controlled by diet, degenerative arthritis of the knees, and glaucoma which is treated by her ophthalmologist. Her current medication list includes lisinopril 40 mg daily, acetaminophen 650 mg at a frequency of about 2 per day, latanoprost 0.005% eye drops daily. Her main complaint is chronic constipation for 15 years. For this she has tried a number of different remedies. Increasing her dietary fiber has not worked, and she reports that she cannot consume the 30 grams of fiber daily that you recommended. She has also tried to increase her fluid intake. Currently, she is taking milk of magnesia 90 ml daily, but it is having no effect. She takes an enema of phosphosoda about twice weekly. Other over-the-counter laxatives have failed. Despite her attempts, she reports that she has fewer than 2 bowel movements per week with straining and a feeling of incomplete evacuation. You repeat your general physical examination, but there are no specific abnormal findings. A rectal examination shows no stool in the rectal vault. A complete blood count, electrolytes, serum creatinine, and serum calcium are within normal range, and her hemoglobin A1c is 5.9%. A plain film of the abdomen is unremarkable.

*** 8. How would you treat this patient? (select only one)**

- Initiate an oral stimulant (e.g. bisacodyl) and a rectal suppository
- Initiate an oral type-2 chloride channel activator (e.g. lubiprostone)
- Initiate a subcutaneous mu-receptor antagonist (e.g. methylnaltrexone)
- Increase the frequency of enemas until her bowel movements improve

*** 9. How frequently are patient specific monitoring plans implemented in your LTC facilities for patients with chronic constipation? (select only one)**

1 not at all 2 3 4 5 very frequently

*** 10. What are the barriers to implementing patient specific monitoring plans?**

* **11. How confident are you**

	not confident at all				somewhat confident					very confident
In your ability to manage patients with chronic constipation? (select only one)										
that you are up-to-date in managing patients with chronic constipation? (select only one)										

* **12. In your institution, do you have access to a consultant pharmacist?**

- Yes
- No

* **13. Please rate the effectiveness of the following options in managing chronic constipation. (select one for each choice)**

	Not at all effective		Somewhat effective		Extremely effective
Bulking agent (e.g., methylcellulose)					
Stool softener (e.g., docusate)					
Enemas (e.g., sodium phosphates)					
Stimulant/irritant (e.g., bisacodyl)					
Osmotic agents (e.g., mag citrate)					
Lubricant (e.g., mineral oil)					
Chloride channel activator (e.g., lubiprostone)					

* **14. How frequently are these treatments utilized in patients at your LTC facility (if you do not work in a LTC facility, then please indicate how frequently you see these agents being used)? (select one for each choice)**

	Not at all		Sometimes		Almost always
Bulking agent (e.g., methylcellulose)	○	○	○	○	○
Stool softener (e.g., docusate)	○	○	○	○	○
Enemas (e.g., sodium phosphates)	○	○	○	○	○
Stimulant/irritant (e.g., bisacodyl)	○	○	○	○	○
Osmotic agents (e.g., mag citrate)	○	○	○	○	○
Lubricant (e.g., mineral oil)	○	○	○	○	○
Chloride channel activator (e.g., lubiprostone)	○	○	○	○	○

* **15. In your institution, what percentage of patients who have chronic constipation use laxatives? (select only one)**

- ○ Less than 20%
- ○ 21% - 40%
- ○ 41% - 60%
- ○ 61% - 80%
- ○ Greater than 81%

* **16. In your institution, what percent of patients with chronic constipation will require an enema? (select only one)**

- ○ Less than 5%
- ○ 6% - 15%
- ○ 16% - 25%
- ○ 26% - 35%
- ○ Greater than 36%

* **17. In your estimation, what is the overall prevalence of fecal impaction in your institution? (select only one)**

- Less than 2%
- 3% - 5%
- 6% - 10%
- 11% - 15%
- Greater than 15%

* **18. How many patients with chronic constipation do you manage per week?**

* **19. A. Do you manage patients in a LTC facility (e.g. nursing home)?**

- Yes
- No

* **20. B. If yes, what percentage of your time do you spend in a LTC practice setting?**

* **21. C. If yes, how many years have you managed patients in a LTC practice setting?**

4. Post-survey Online Satisfaction Tool

Post-survey Online Satisfaction Tool

Please choose the most appropriate answer to the following questions.

* **1. How important was taking these CE activities to you?**

- Not important
- Somewhat important
- Important
- Very important

* **2. Why did you take this/these class(es)?**

- CE hours required for license
- CE hours required for certification
- CE hours required by employer
- Personal growth

* **3. My primary computer access is from:**

- Home
- Work
- Library
- Other

* **4. On the scale, please rate the following:**

	Very Good			Poor
Was access to this/these CE program (s) via the Internet adequate?				

* **5. On the scale, please rate the following:**

	Very Good			Poor	Did Not Use
Was technical support adequate (Helpdesk, Log-in problems, Navigation, etc.)					
Were the login instruction given, course information, and navigation structure easy to use and understand?					

* **6. If your online course was not available, would you take this course as a face-to-face continuing education activity?**

- No
- Yes

* **7. Participation in a discussion or chat group was available.**

- No
- Yes

* 8. Satisfaction Survey

	Strongly Disagree			Strongly Agree	N/A
The CE program(s) facilitated my learning					
I received timely feedback on the successful or unsuccessful completion of the program(s)					
I am very satisfied with this/these online CE program(s)					
Completion of the post-tests associated with this/these online CE program(s) facilitated my learning					
I would like to take other online CE programs(s)					
The learning activities in this/these CE program(s) required application of problem solving skills which facilitated my learning					
This/these online CE program(s) did not meet my learning needs					
I would recommend this/these program(s) to others					
I learned as much in this online course as compared to a face-to-face course					
I feel online CE programs are as effective as face-to-face courses					

Recognizing that all of the below mentioned items are important, identify what you feel is the number one criteria for a satisfying online experience: (rank order these items: 1= most important, 2= moderately important, 3= least important, and finally please comment)

* 9. Course content, design, and structure

* 10. Facilitator-learner interaction

* 11. Learner-learner interaction

Appendix G. Additional Post-Assessment - CoP Group

* 8. Interactivity Survey

	Strongly Disagree			Strongly Agree
The online discussion board provided opportunity for problem solving with other professionals				
The online discussion board provided opportunity for critical thinking with other professionals				
The online discussion board was a waste of time				
The facilitator was an active member of the discussion group offering direction to posted comments				
The non-educational aspects of this website (discussions, links, etc.) facilitated my learning				
This website created a sense of community among professionals				
In this website, I was able to share my viewpoint with fellow professionals				
In this website the facilitator continuously encouraged communication				
In this website I was able to ask for clarification from a fellow professional when needed				
I received timely (within 24-48 hours) feedback from others				
These online CE programs(s) encouraged participants to discuss ideas and concepts covered with other participants				
Although I could not see the facilitator, I always felt his/her presence				

Appendix H. Control Group and CoP Group Communiqués

CONTROL GROUP COMMUNIQUES

INVESTIGATOR EMAIL BLAST #1

Dear: _____

Thank you for your interest in participating in my research study. Your information has been reviewed and accepted for inclusion in the study.

You have been assigned the following user name and password.

User name: STUDYHOLMANX@GMAIL.COM

Password: NPXXXXXX

Please note and secure this user name and password as they will be used as your login for educational activities. Please note, you have been preregistered for most of the educational programs. To ensure confidentiality and security, only your first and last names were registered so that CE certificates could be automatically populated and printed at your computer. The email account that was used was the one seen in the user name above. No one, except me as the investigator, has a record of your real email address. A few programs may take you to another website that will require you to complete a registration to ensure that you receive credit for completing continuing education activities. Please use the username above as your email address in these sites.

This study will consist of the following phases:

- **Phase 1** – *Pre-study information gathering*

Please follow this link PRE-STUDY SURVEY to complete a survey of demographic questions, knowledge assessment questions, and clinical vignettes. This may take up to 20 minutes.

- **Phase 2** – *Online continuing education*

Please follow this link EDUCATIONAL PROGRAM LIST to gain access to a website that will contain certified CE activities which you are able to complete if you choose. Note, as additional CE activities are added to the site you will receive an email announcing the addition. The site will be available for a period of 4-6 months. You may access the site as often as you wish.

- **Phase 3** – *Post-study information gathering*

At the end of the study you will receive an email directing you to a survey of knowledge assessment questions, clinical vignettes, satisfaction items. This may take up to 30 minutes.

If you have any questions concerning the research study, please call me at (904) 264-0674 or email me at M.Holman@AKHealthcare.com.

Sincerely,
Helen Mimi Holman, MS, RN-BC, CCMEP

INVESTIGATOR EMAIL BLAST #2

Dear _____,

This is a friendly reminder to access and complete the pre-study survey at the following link:
PRE-STUDY SURVEY

If you have already completed this, thank you.

Sincerely,
Helen "Mimi" Holman, MS, RN-BC, CCMEP

INVESTIGATOR EMAIL BLAST #3

As we are entering the last few weeks of my DNP project, I want to thank everyone for their willingness to participate in my student research. I know that for busy clinicians, finding time in their day to contribute to my study is often difficult. Your support and time is greatly appreciated!

The continuing education activities will be open to you as study participants until August 15th. After that date, I will be sending you the link to the post-assessment and survey. This will be available until the end of August. Once that is completed, all that is left is the data analysis. Should anyone want an executive summary of the results, I would be glad to provide it.

To ensure that I have enough data (as you know, data is everything!) please take the time within the next 3 weeks to ensure that you have completed at least 2 continuing education programs. Remember, the programs are certified for continuing education credit. If you have any problems accessing the programs at this time, please contact me and I will troubleshoot any issues.

Once again…thank you for your time and attention to this.
The link to the programs: EDUCATIONAL PROGRAM LIST
Username: STUDYHOLMANX@GMAIL.COM
Password: NPXXXX

Sincerely,
Helen Mimi Holman, MS, RN-BC
UNF Student Investigator
m.holman@akhealthcare.com

INVESTIGATOR EMAIL BLAST #4

Dear _____,

Thank you for taking the time to participate in my research study. We are now coming to a close. The site will be available to you until the end of the month, Monday, August 31st. If you have not already done so, please complete at least 2 of the activities PRIOR to completing the post-assessment. Please complete the post-assessment by September 7th.

Please click on the following link to complete the post-assessment.
Post-survey

Once again, I sincerely appreciate everyone's support through this project.
Sincerely,
Mimi Holman, MS, RN-BC, CCMEP
UNF Student

INVESTIGATOR EMAIL BLAST #5

Dear_____,
It is now Monday, August 31st and the second phase of my research project is now complete. Thank you.

To complete the third and final phase, I need you to complete the post assessment (link below). This post-assessment will be open to you until September 7th.
Please click on the following link to complete the post-assessment.
Post-survey

I would appreciate it if you could return an email to me and let me know when you have completed the assessment.

Once again, I sincerely appreciate everyone's support through this project.

Sincerely,
Mimi Holman, MS, RN-BC, CCMEP
UNF Student

CoP GROUP COMMUNIQUES

INVESTIGATOR EMAIL BLAST #1

Dear: _____,

Thank you for your interest in participating in my research study. Your information has been reviewed and accepted for inclusion in the study. You have been assigned the following user name and password.
ID/User name: STUDYHOLMANX@GMAIL.COM
Password: NPXXXXX

Please note and secure this user name and password as they will be used as your login for educational activities. Please note, you have been preregistered for most of the educational programs. To ensure confidentiality and security, only your first and last names were registered so that CE certificates could be automatically populated and printed at your computer. The email account that was used was the one listed in the user name above. No one, except me as the investigator and your online moderator, has a record of your real email address. A few programs may take you to another website that will require you to complete a registration to ensure that you receive credit for completing continuing education activities. Please use the username above as your email address in these sites.
This study will consist of the following phases:

- **Phase 1** – *Pre-study information gathering*

Please follow this link PRE-STUDY SURVEY[hyperlink] to complete a survey of demographic questions, knowledge assessment questions, and clinical vignettes. This may take up to 20 minutes.

- **Phase 2** – *Online continuing education*

Please follow this link EDUCATIONAL PROGRAM LIST [hyperlink] to gain access to a website that will contain certified CE activities which you are able to complete if you choose. Note, as additional CE activities are added to the site you will receive an email announcing the addition. The site will be available for a period of 4-6 months. You may access the site as often as you wish.

- **Phase 3** – *Post-study information gathering*

At the end of the study you will receive an email directing you to a survey of knowledge assessment questions, clinical vignettes, satisfaction items. This may take up to 30 minutes.
If you have any questions concerning the research study, please call me at (904) 264-0674 or email me at M.Holman@AKHealthcare.com[hyperlink].

Sincerely,

Helen Mimi Holman, MS, RN-BC, CCMEP

FACILITATOR EMAIL BLAST #1

Welcome to E-IMPACCT!

Hello, my name is Kay Fullwood, RN, MN, ARNP and I will be serving as your online facilitator for this community of practice. I will be checking in with you throughout the course of this project and alerting you to new content and resources available.

Please take a moment to become acquainted with the website and community.

Please note that you have been pre-registered for most of the online activities that originate through Medical Communications Media. You may access these programs by entering the username and password provided for you from the study's investigator.

Have fun exploring the site EDUCATIONAL PROGRAM LIST[hyperlink] . On this site we also have a Forum where we can discuss patient care issues. I look forward to communicating with you.

Kay FF

FACILITATOR EMAIL BLAST #2

Hello again from Kay, your E-IMPACCT online facilitator.

I hope you have had an opportunity to explore the community of practice site. I encourage you to look at the number of CME/CE activities that are available to you. The link is located at the top of the blue bar on the E-IMPACCT Portal site. These programs are provided free of charge and are offered by a variety of providers and sponsors. To ensure proper CE credit is awarded, certain web information is captured by the credit provider and is subject to their privacy policies. This information includes at least: (1) name, (2) address, (3) phone numbers, (4) professional license number, (5) email address, (6) universal resource locator (URL) arriving from, and (7) IP address. After successful completion of the requirements of the posted educational activities, you will be able to view and print a certificate of completion. Activities may vary and be certified for *AMA PRA Category 1* ™, American Academy of Nurse Practitioner (AANP), or American Nurses Credentialing Center Commission on Accreditation (ANCC).

Please join me on the forum! I would enjoy discussing cases or issues you might have within your work area relating to the care of elderly patients suffering from chronic constipation.

Kay FF

FACILITATOR EMAIL BLAST #3

From: Kay Fullwood, RN, MN, ARNP, E-IMPACCT Online Facilitator

When you are logged into the E-IMPACCT site, check out the clinical topics and case studies located through the "Current Topics" and "Current Cases" links on the left hand bar of your screen. Case scenarios or short discussions are offered with reference lists. Let me know what you think about these through the discussion board on our community site: RESEARCH PROJECT FORUM [hyperlink].

Kay FF

FACILITATOR EMAIL BLAST #4

To:
From: Kay Fullwood, RN, MN, ARNP, E-IMPACCT Online Facilitator
kayfully@comcast.net[hyperlink]

We are a few weeks into this online adventure, so now might be a good time to see how you are doing. Let me know if you are experiencing any difficulties with the site and I will pass this info on to the investigator. I would also like to invite you to post questions, comments, or cases on the FORUM[hyperlink].
As this is a time-limited research study, please take this opportunity to ensure that you have completed the pre-survey. If you know you did, there is no need to do it again. This is just a friendly reminder of the three phases of the research study:

- **Phase 1** – *Pre-study information gathering*

Please follow this link PRE-STUDY SURVEY[hyperlink] to complete a survey of demographic questions, knowledge assessment questions, and clinical vignettes. This may take up to 20 minutes.

- **Phase 2** – *Online continuing education*

Please follow this link EDUCATIONAL PROGRAM LIST[hyperlink] to gain access to a website that will contain certified CE activities which you are able to complete if you choose. Note, as additional CE activities are added to the site you will receive an email announcing the addition. The site will be available for a period of 4-6 months. You may access the site as often as you wish.

- **Phase 3** – *Post-study information gathering*

At the end of the study you will receive an email directing you to a survey of knowledge assessment questions, clinical vignettes, satisfaction items. This may take up to 30 minutes.

In order to ensure a successful research project, please participate in at least 2 activities over the next few months.

E-IMPACCT[hyperlink] has a great way for keeping track of the different programs and activities available to you. Click on the "Program Checklist" link

on the left-hand bar of your screen. In addition, there is a link to an educational transcript of programs taken through this site. Click on "CME Tracker" located on the top blue bar of your screen. To return to the site, click on the E-IMPACCT portal located on the left-hand bar.

Looking forward to working with you,

Kay FF

FACILITATOR EMAIL BLAST #5

To:
From: Kay Fullwood, RN, E-IMPACCT Online Facilitator
kayfully@comcast.net [hyperlink]

Do you need a patient guide to give your patient suffering from chronic constipation? Find a printer–ready patient education tool through the "Patient Guide" link on the website E-IMPACCT[hyperlink].

You can find other resources as well by clicking on "Resources" and "Tool Kit". This kit is a curriculum tool designed to be used as material for Inservices. These materials include a flip card, CDROM with slide presentation and clinical reference cards. Check it out and let me know what you think.

Email me back with any issues, questions, or topic suggestions - would love to hear from you!

Kay FF

INVESTIGATOR EMAIL BLAST #2

Hello Study Participant,

Thank you again for agreeing to participate in my DNP project which utilizes online education on the topic of chronic constipation in the elderly. The project will continue through the summer, and I am writing today to once again gain your support of this project. While the project has been going well, I still have a few participants that have yet to enter and complete the pre-survey. As the pre-surveys are anonymous, I do not know who has, and who has not.

If you have not already done so (and you should do it prior to taking any of the courses), please follow this link to access the survey.
PRE-STUDY SURVEY[hyperlink]

I am also requesting that each participant access and complete **at least two** of the educational activities prior to the end of the study (scheduled for August 2009).

EDUCATIONAL PROGRAM LIST [hyperlink]

Once the study period has been completed, I will ask you to complete the project post-survey. Then I will have the data needed to complete the project.
If you are having any difficulty with the site, please let me know.
I sincerely appreciate your support and effort in this capstone project. It is always a pleasure working with a fellow nurse!

Sincerely,

Mimi Holman
Helen M. Holman, MS, RN-BC, CCMEP, UNF DNP student

FACILITATOR EMAIL BLAST #6

To:
From : Kay Fullwood, RN, MN, ARNP
E-IMPACCT Online Facilitator
www.elderlyconstipation.org[hyperlink]

Hello to all of you participating in this research. I hope the summer is finding you well.

By now, I hope you had lots of time to get to know the community of practice and all it has to offer. I hope you have taken advantage of some of its tools and resources.

Interested in finding out about key meetings dealing with seniors? Check out the "Upcoming Events" link on the left hand side of your screen. This page has links to the organizations so that you can find out more or register.

Just a reminder – This study is scheduled to end the middle of August. To ensure the investigator sufficient data, please remember to complete at least 2 available CE programs.

If you have any problems accessing the activities, please email the investigator m.holman@akhealthcare.com[hyperlink], and she will provide any technical support you may need.

Thanks to all,
KFF

INVESTIGATOR EMAIL BLAST #3

Dear ____,

As we are entering the last few weeks of my DNP project, I want to thank everyone for their willingness to participate in my student research. I know that

for busy clinicians, finding time in their day to contribute to my study is often difficult. Your support and time is greatly appreciated!

The continuing education activities will be open to you as study participants until August 15th. After that date, I will be sending you the link to the post-assessment and survey. This will be available until the end of August. Once that is completed, all that is left is the data analysis. Should anyone want an executive summary of the results, I would be glad to provide it.

To ensure that I have enough data (as you know, data is everything!) please take the time within the next 3 weeks to ensure that you have completed at least 2 continuing education programs. Remember, the programs are certified for continuing education credit. If you have any problems accessing the programs at this time, please contact me and I will troubleshoot any issues.

Once again…thank you for your time and attention to this.
The link to the community of practice: ElderlyConstipation.org[hyperlink]

Sincerely,

Helen Mimi Holman, MS, RN-BC
UNF Student Investigator

INVESTIGATOR BLAST #4

Dear _____;

It is now Monday, August 31st and the second phase of my research project is now complete. Thank you.

To complete the third and final phase, I need you to complete the post assessment (link below). If you did not have an opportunity to complete a CE program, but did visit the community of practice, please complete the assessment for me. This post-assessment will be open to you until September 7th.

Please click on the following link to complete the post-assessment.
Post-survey[hyperlink]

I would appreciate it if you could return an email to me and let me know when you have completed the assessment.

Once again, I sincerely appreciate everyone's support through this project.

Sincerely,
Mimi Holman, MS, RN-BC, CCMEP

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Vita

Helen Mary Holman was born in on .

After completing high school at Golden High School, Golden, Colorado in 1971, she attended the University of Northern Colorado School of Nursing from 1972-1976 and graduated with a Bachelor of Science degree in Nursing. From 1974-1976, she attended the University of Colorado Health Sciences Center, Denver, Colorado and graduated with a Master of Science degree preparing her as a clinical specialist in medical-surgical nursing. She taught on the faculty of the Presbyterian-St. Luke's School of Nursing in Denver, Colorado from 1983 through 1986, and the Medical University of South Carolina in Charleston, South Carolina throughout 1989. She served as adjunct instructor with the University of North Florida from 1997-2000 and Jacksonville University from 2001-2003, both located in Jacksonville, Florida.

Outside of her teaching experience, she served in various education and administrative positions within long-term care facilities and hospitals in Loveland, Colorado, Denver, Colorado, Charleston, South Carolina and Orange Park, Florida. From 1995 through 1996, she served as Chief Nursing Officer for Orange Park Medical Center in Orange Park, Florida. Since 1997 she has owned and operated *AKH Inc., Advancing Knowledge in Healthcare*, a company providing continuing education programs and consulting for health care professionals.

In the fall of 2007, she entered the Graduate School at the University of North Florida, Brooks College of Health in Jacksonville, Florida pursuing a Doctor of Nursing Practice degree.