LEVELING "CORE COMPETENCIES FOR INTERPROFESSIONAL

COLLABORATIVE PRACTICE" FOR LEARNERS

BY

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Abstract

Interprofessional education, where students from two or more health professions learn from, with, and about one another, is one approach to prepare health professional learners for the collaborative practice-ready workforce currently desired in health care. Collaborative, interprofessional practice is necessary to provide safe, high quality, accessible, patient-centered care with improved outcomes for individuals, families, and communities. A review of the literature related to interprofessional education, competency-based education, and use of interprofessional education competencies in curriculum design is provided. To guide educators in developing interprofessional education experiences for health professional learners, the "Core Competencies for Interprofessional Collaborative Practice" has been developed. Additionally, the University of Toronto Core Competencies Framework provides motivation for educators to level (i.e., beginning, intermediate, or advanced) appropriate learning activities for different learners, based on their developmental stage.

The purpose of this study was to gain consensus of interprofessional education experts on the leveling of interprofessional education competencies for health care learners using a Delphi approach. Eighteen panel experts completed the first round with 14 of the 18 completing the second and third rounds. All but one of the 39 Interprofessional Education Collaborative competencies were designated as beginning, intermediate, or advanced learners by experts in the field of interprofessional education.

The results of the Delphi study provide a blueprint that utilized a developmental approach for planned, leveled interprofessional education learning experiences. Educators may use the suggestions of this expert group to develop educational offerings that are

appropriate for different levels of learners, built on a developmental approach. Additionally, this study provides an important contribution to the interprofessional education literature, utilizing expert advice on the appropriate design of interprofessional learning opportunities for different levels of health professions learners.

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Chapter 1

Introduction

Dynamic changes in the healthcare system and increasingly complex patient care needs have brought into focus the need for quality in health care (Jensen, Harvan, & Royeen, 2009). Good patient outcomes and high-quality care are desired for all individuals, yet this goal is not always guaranteed or achieved (Institute of Medicine [IOM], 2003). Patient care suffers from lack of continuity and coordination of care, miscommunication, redundant and wasteful processes, and excess cost (IOM, 2003). To address these shortcomings, interprofessional care and practice is needed. To prepare a collaborative practice-ready workforce (World Health Organization, 2010), interprofessional education (IPE) and redesigned curricula to prepare health professionals is desired (Interprofessional Education Collaboration [IPEC] Expert Panel, 2011).

These new approaches that are needed to educate health professionals (Jensen et al., 2009) include the focus that IPE places on teams and teamwork, collaboration and communication, understanding roles and responsibilities, and attention to values and ethics. Health professions education for the future will require: curriculum review and revision; quality faculty prepared to teach effectively; coordination across the continuum of education; integration of accreditation, licensing, and certification processes; visionary leaders; reduced boundaries among and across professions; and a supportive culture (IOM, 2003). A challenge to developing this education includes a better understanding of the needed competencies for IPE education.

Problem and Significance

Interprofessional education (IPE) of health care professions students focuses on collaborative practice as a key to safe, high quality, accessible, patient-centered care that is desired for all individuals, families, communities, and populations (IPEC, 2011). Interprofessional education places students in deliberate learning opportunities in order to achieve interactive learning and promote team-based healthcare; it occurs "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (World Health Organization [WHO], 2010, p. 7). When students learn together, they are more likely to work effectively together in the future, which results in improved patient outcomes and increased professional satisfaction (Heale, Dickieson, Carter, & Wenghofer, 2013).

An IOM conference in 1972 first called for team-based education of health care professionals including allied health, dentistry, medicine, nursing, and pharmacy (IPEC, 2011). The conference considered how to address the needs of the health care workforce and the ability of the health care system to meet the needs of communities. In 1998, the Pew Health Professions Commission recommended interprofessional education of health care professionals, moving the health professions education closer to the practice of health care; Pew recognized the importance of matching education and practice realities. The IOM continued to focus on the needs of individuals, families, systems, communities, populations, and the nation as a whole; they again published recommendations for interprofessional education of health care professionals in 2000, 2001, and 2003 (Royeen, Jensen, & Harvan, 2009). Further recommendations came from the Agency for Healthcare Research and Quality (AHRQ) in 2008 with an emphasis on institutional

quality and safety. The passage of the Recovery and Reinvestment Act of 2009 and the Patient Protection and Affordable Care Act of 2010 further have stimulated new approaches to health care delivery, and thus new approaches to education of health care professionals (IPEC, 2011). In 2011, core competencies for interprofessional team-based training were published by the IPEC. In 2013, the Josiah Macy Jr. Foundation convened a conference of leaders in health professions education and health care delivery to discuss how they could connect great learning and great practice in order to improve health and reduce costs; recommendations for engagement, acceleration, reform, revision, and realignment of health care education and practice were given to achieve better care, better health, and lower costs (Josiah Macy Jr. Foundation, 2013; Thibault & Schoenbaum, 2013).

All of these recommendations will require a redesign of health professions education. This redesign necessitates bringing health care education out of the silos in which it has occurred (Aune & Olufsen, 2013) and bridging the "gap between current health professions training and actual practice needs and realities" (IPEC, 2011, p. 5). Critical attributes of this redesigned health professions education are values and ethics for interprofessional practice, understanding of roles and responsibilities, communication and collaboration, and teamwork (IPEC, 2011; Reeves, Tassone, Parker, Wagner, & Simmons, 2012). These critical attributes have been addressed through the development of "Core Competencies for Interprofessional Collaborative Practice", sponsored by the Interprofessional Education Collaborative in May 2011. These core competencies (see Appendix A) serve as the basic set of knowledge, skills, and attitudes necessary for health care professionals to function in an interprofessional health care setting (IPEC, 2011).

Competency-based education and the use of competencies as a means to design curriculum within health care professions education has increased in the recent past, yet educators responsible for curriculum design and development have lacked direction and guidance on how best to integrate competencies into their curricula and how to assess "success" within a competency-based educational program. Educators within the separate fields of nursing, medicine, and other health professions often have worked in separate silos; interprofessional mixing of curricular ideas has not been mainstreamed into most academic settings.

Educational leaders within academic medical centers need evidence to support innovative educational practices and teaching strategies for IPE that have been mandated for health professions education to improve the quality and outcomes of patient care. With recent attention on interprofessional preparation, it is imperative that IPE learning experiences be investigated as viable, reliable, and appropriate for different learners.

Purpose

The purpose of this study was to gain consensus on the leveling (i.e., beginning, intermediate, or advanced) of interprofessional education competencies using the Delphi approach. A blueprint for planned, leveled Interprofessional Education (IPE) learning experiences is provided for educators in the health professions. Participants were surveyed to determine what IPE competencies are appropriate for different health professions learners, within different phases of their educational programs of study.

Research Questions

The following research questions directed this study:

1. What competencies should be targeted or planned for students in the beginning phase of their program of study?
2. What competencies should be targeted or planned for students in the intermediate phase of their program of study?
3. What competencies should be targeted or planned for students at the advanced phase of their program of study?

Conceptual Framework

Identification of relevant areas of competence and the levels at which these competencies should be attained (Dulay, 2011; Seibert, 2008) is a focus for all IPE educators. While different labels may be used, such as beginning, intermediate, and advanced, competencies should be placed at the appropriate stage of learning for all health care professions students. The University of Toronto has utilized a developmental framework for the development of interprofessional education curriculum (IPEC, 2011). Figure 1-1 provides a pictorial adaptation of this framework. Within this framework, reflection, learning, and formative assessment are placed along a learning continuum. Knowledge, skills, and attitudes are defined within the context of collaboration, communication, and values/ethics for exposure, immersion, and competence levels. Exposure is equivalent to introduction within this framework, while immersion is equated to development. Competence, which is the last stage of provider preparation, results in a provider that is prepared for entry to practice.

The University of Toronto Core Competencies Framework provides a useful application of leveling appropriate learning activities for different health professions learners, based on their developmental stage. This framework relates to the current investigation in the following ways: (a) learning takes place along a continuum; (b) learners acquire knowledge, skills, and attitudes in a progressive, developmental manner with beginning, intermediate, and advanced levels; (c) placement of appropriate competencies for each level of learner is necessary; (d) competencies that include knowledge, skills, and attitudes for interprofessional collaboration, communication, and ethics are key components of this study; and (e) development of a competent practice-ready health care provider is the desired goal.

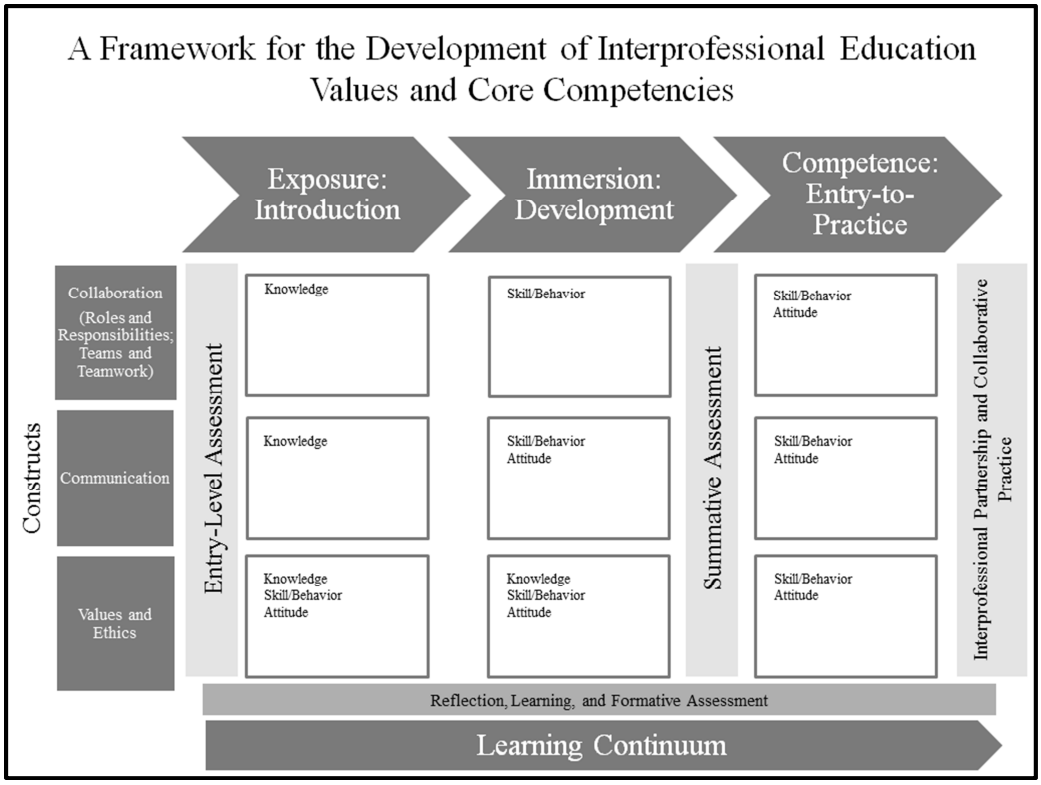

Figure 1-1. Pictorial model for developmentally leveled IPE competencies. Adapted from "University of Toronto Core Competencies Framework," by University of Toronto, Centre for Interprofessional Education, 2009, retrieved from http://www.ipe.utoronto.ca/std/docs/CoreCompetenciesDiagram2012.pdf. Copyright 2012 by the University of Toronto Centre for Interprofessional Education.

Definition of Terms

The following terms were derived from a synthesis of the IPE and health professions education literature. These terms are defined for the context of this study:

1. Level of learner: The level of knowledge and skills of each health professions student, based on a developmental progression of learning.
    a. Beginning: The early stages of learning, typically in the first year, or semester, of a student's program of study.
    b. Intermediate: The middle stage of learning of a student's program of study, which may last from one semester to several years, dependent upon the total length of time necessary for professional preparation.
    c. Advanced: The last stage of learning within a student's program of study, which is typically in the last year of professional preparation. Generally, this is when the student is heavily involved in practicum or clinical experiences.
2. Competencies: Competencies specify the level of knowledge, skills, and abilities or attitudes necessary for success in a given profession (Albanese, Mejicano, Mullan, Kokotailo, & Gruppen, 2008). Competencies, which often involve checklists of particular knowledge, skills, and attitudes related to work, are derived from standards and pre-defined expectations (Gurvis & Grey, 1995).
3. Competency-based education: Competency-based education defines the desired outcome of training (Carraccio, Wolfsthal, Englander, Ferentz, & Martin, 2002) and provides an outline of expected outcomes that learners should possess prior to completion of their training and education (Curran et al., 2011).

4. Educator: A teacher; someone prepared to teach, with training regarding educational theory, methodology, and practice (Farlex, n.d.).
5. Health professions: Professions that provide health care to individuals, families, communities, and/or populations. Professions may include: dentistry, medicine, nursing, pharmacy, social work, and the allied health professions (audiology, clinical lab science, dietetics and nutrition, health information management, occupational therapy, physical therapy, respiratory therapy, speech-language pathology, and ultrasound).
6. Interprofessional education (IPE): Education that includes "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (World Health Organization [WHO], 2010).
7. Leveling: The placement of learning content and/or competencies at the appropriate stage of learning for all students, i.e. "leveled learning experiences, focused on engaging students in the right activity for the right purpose at the right time" (Barton, Armstrong, Preheim, Gelmon, & Andrus, 2009, p. 314).
8. Program of study: A curricular plan developed for each type of profession or specialization that provides the necessary components of their education/preparation.

Assumptions

The following assumptions were made by the investigator for this study:

1. Each participant was honest when answering survey questions.
2. Each participant has the ability to read and understand the English language.
3. Health professions students are adult learners.

4. Health professions educators desire to provide quality education to learners.
5. Changes in the context of education and provision of health care services necessitate innovation in health care professions education.

Summary

A gap in the literature on developmentally-appropriate, leveled competencies related to IPE was identified and the significance of this problem was addressed. Very little direction has been provided to health professions educators on the development of curriculum that best is suited to different levels of learners. The purpose of this research study was addressed within this chapter. Three research questions have been presented to assist with closing the gap in the literature on leveling of IPE competencies. Definitions of research terms and assumptions pertinent to the study were also presented. A review of the literature related to IPE, competency-based education, and use of IPE competencies in curriculum design will be provided in Chapter Two. Chapter Three is a prepared manuscript on competency-based education. Chapter Four will present the research methodology and will also provide background and applicability on the use of the Delphi Method for survey research. A prepared manuscript on the Delphi method and application of a pilot study will comprise Chapter Five. Chapter Six will present the results, in the format of a publication-ready manuscript. Finally, Chapter Seven will provide a discussion of the research findings and implications of this study.

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Chapter 2

Review of the Literature

A review of the literature related to IPE, competency-based education, and use of IPE competencies in curriculum design is provided in Chapter Two. The purpose of this review of the literature is four-fold. Initially the current state of health care provider education in the United States is presented. Next, a review of definitions of competency and competency-based education as they apply to health professions education is provided. A presentation of competencies as directives in health care education and the application of competencies within a curriculum then are reviewed. Finally, the development and implementation of interprofessional education (IPE) competencies for health care is described.

Education of Health Care Providers

Trends in the practice and preparation of health care providers have resulted in educational changes. The patient safety movement, fiscal constraints on education and practice, emerging focus on interprofessional teamwork, increasing use of ambulatory settings for clinical education, and competency-based education and assessment have driven educators to provide innovative, cost-effective, and collaborative practice opportunities for learners (Keahey et al., 2012).

Mechanisms that affect curricular design and implementation include logistics and scheduling, program content, shared objectives, adult learning principles, learning methods, contextual learning, assessment, institutional support, and learning outcomes (World Health Organization [WHO], 2010). The closer the match between the context of learning and the actual context of practice, the more relevant the education will be and

the better able students will be to transfer learning to practice (Kurth, Irigoyen, & Schmidt, 2001).

Traditional models of educating health care professionals have been based on time; a learner was placed in a learning environment for some extended period of time and expected to "see" and gain enough experience by the end of that period to practice competently (Saucier et al., 2012). Critics of this method have raised concerns that not all learners are equal in terms of learning pace and that clinical exposure alone cannot guarantee the acquisition of knowledge, skills, and attitudes necessary for professional practice. Competency-based curriculum has been suggested as one means of assuring competence has been met within the health professions education.

Competence, Competency and Competencies

Competence and competency are very different concepts (Young et al., 2010). In layman's terms, competence is typically achieved through mastering competencies. It is important, though, to fully understand the difference between these concepts when applying them to education and curriculum development (Albanese et al., 2008).

Competence. Competence has been defined in lay terms as "the state of being adequately or well qualified" and "a specific range of skill, knowledge, or ability" (Farlex, 2013). Synonyms include proficiency, ability, skill, talent, expertise, and capability (Farlex, 2013).

For health care professionals, competence has been defined as "a simultaneous integration of the knowledge, skills, and attitudes that are required for performance in a designated role and setting" (Gurvis & Grey, 1995, p. 247). Although attitude is often a component included in the definition of competence, it is not always clearly stated in this

manner by all professions. In a comprehensive systematic review of the literature related to definitions of competence by health sciences educators, Fernandez et al. (2012) concluded that competence is composed of knowledge, skills, and other components. The other components vary across professions, including attitudes, values, abilities, judgments, qualities, character attributes, and personal characteristics. The sum of the components "enables someone to do something adequately or successfully" (Fernandez et al., 2012 p. 360). Fernandez et al. suggested that competence allows the professional to select or combine components in order to safely perform, while also guaranteeing to society that standards will be maintained.

In short, competence is an evaluation of one's performance in the work setting, the ability to put all of the pieces together to form the whole. Competence is reflected in one's capacity or ability to function in their job, while competency is sometimes defined as one's actual performance in a given situation (Young et al., 2010; Curran et al., 2011). Competency has been defined in many ways, but most definitions focus on the required knowledge, skills, and attitudes to function in a particular role (Albanese et al., 2008; Calhoun, Rowney, Eng, & Hoffman, 2005; Curran et al., 2011). For health care, The Joint Commission has described competency as "how well an individual integrates his or her knowledge, attitudes, skills, and behaviors in delivering care according to expectations" (as cited in Gurvis & Grey, 1995, p. 248). These expectations are socially relevant; health care practitioners are expected to demonstrate that they are qualified and capable of delivering care for society (Fernandez et al., 2012).

Competency and competencies. A competency is the capability to apply or use a set of related knowledge, skills, and abilities or attitudes required to successfully perform

functions or tasks in a defined setting (Albanese et al., 2008). Often this setting is a work environment or profession. Competencies specify the level of knowledge, skills, and abilities or attitudes necessary for success in a given profession. Competencies are sometimes likened to learning objectives, yet they are different. Learning objectives describe what a learner should be able to achieve at the end of a given time period; objectives describe what faculty want learners to know and competencies tell us how faculty can be certain they know it. "What distinguishes a competency from a goal or objective is that it focuses on the end-product of the instructional process, rather than on the instructional process itself, or that it embraces the larger picture rather than the content of a single course" (Albanese et al., 2008, p. 250).

Albanese et al. (2008) proposed characteristics of competencies that should be included in the instructional or educational context. They conclude that competencies should: (a) focus on the performance of the end-product or goal of instruction; (b) reflect expectations that are an application of what is learned in the immediate educational program; (c) be expressible in terms of measurable behaviors or outcomes; (d) use a standard for judging competence that is not dependent upon the performance of other learners (akin to criterion-based versus norm-based); and (e) inform learners, as well as other stakeholders, about what is expected of them. Similarly, Gurvis and Grey (1995) recommend that educators include four essential components when constructing competencies. The components include: (a) competency statement, (b) critical behavior or criteria, (c) learning options, and (d) evaluation methods. When developing competencies, it is important for the educator to consider the outcome (What is desired? Will it make a difference in patient care? How will faculty know it was achieved?), the

category of competency (Generic? Profession/specialty-specific? Basic or advanced?), the learning domains (Psychomotor? Higher-level cognitive?), and the audience (Who are the competencies intended for?).

Competencies, that often involve checklists of particular knowledge, skills, and attitudes related to work, are derived from standards and pre-defined expectations (Gurvis & Grey, 1995). Alternatively, "the validation of competence should be broader than using a skills checklist" (Gurvis & Grey, 1995, p. 251). The educator clearly must articulate the measurable expectations of competence; this communication is vital for the learner and the evaluator. Competencies, thus, help to serve as a common language, assist with dialogue, promote collaboration, and inform interprofessional learning (Curran et al., 2011). Educators, and others that use competencies to assess professional performance, are able to provide directly observable indicators that professionals must meet (Reeves, Fox, & Hodges, 2009).

Figure 2-1 illustrates the inclusive nature of competencies in competency, as well as the inclusion of competency in overall competence. Knowledge, skill, and attitude competencies combine to provide a health care professional competency in a given situation or defined setting. Competence, then, is an overarching concept that includes the ability to fully function in a role or profession, regardless of the situation or setting. As an example, team-based communication competencies allow a nurse-midwife to practice competently in a situation where communication with other health care professionals is necessary, such as consultation with or referral to a collaborating physician. This consultation or referral may occur when a patient's condition falls outside the scope of the nurse-midwife's practice, at which time the nurse-midwife would need to rely on

communication competency to afford the patient quality care. Competence, then, would include all of the necessary competencies for the nurse-midwife to practice in any setting or situation and would include knowledge, skills, and attitudes related to all aspects of practice (teamwork, communication, inpatient care, outpatient care, core competencies for basic midwifery practice, etc.).

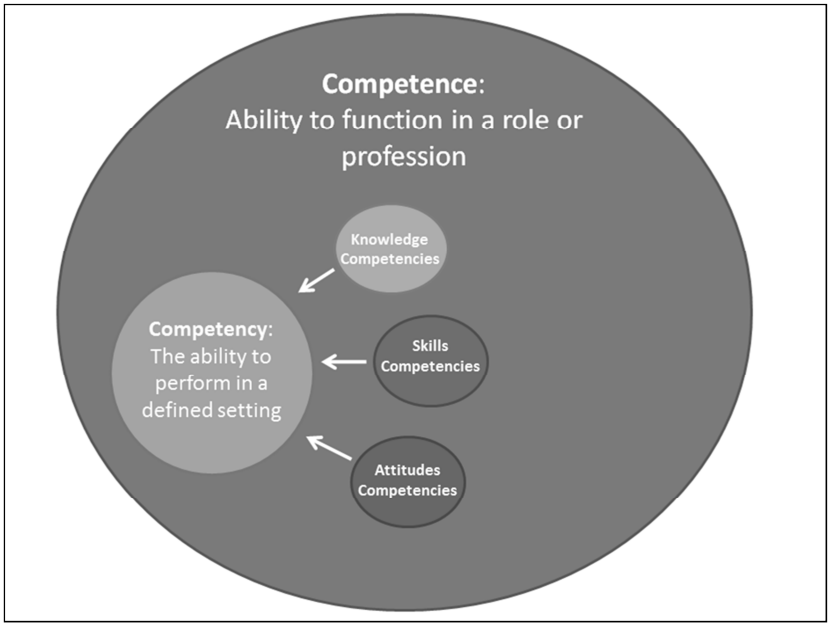

Figure 2-1. Pictorial display of competence, competency, and competencies. Knowledge, skill, and attitude competencies combine to provide a health care professional competency in a given situation or defined setting. Competence, then, is an overarching concept that includes the ability to fully function in a role or profession, regardless of the situation or setting.

Criticism of competency evaluation. Formal evaluation of competence is in opposition to the adult learning model, according to Bradshaw (1997). The adult learning model is focused on formative rather than summative evaluation/assessment (Bradshaw, 1997) and requires the health care professional to take personal responsibility for their own professionalism and competence, rather than relying on governing bodies and external evaluators (Bradshaw, 1998). Opponents to competence assessment for professionals have argued that "the product of the work of professionals is not amenable

to the same kind of standardization as say production line cars…standardization is, in effect, the opposite to professional standards" (Bradshaw, 1997, p. 351). Proponents, though, argue that prescribed standards and defined competencies offer confidence that the professional has the appropriate level of knowledge and skill to be a safe practitioner (Bradshaw, 1997; Bradshaw, 1998).

Talbot (2004) raised concerns about the difference between competence and understanding within health care education. He claimed that competence is dichotomous in nature, is monolayer, negates dialogue, is authoritarian, and is value-neutral, while understanding exists on many levels, embraces dialogue, is ever-changing, and is interested in values. Talbot summarized that understanding is necessary for evidence-based quality clinical health care practice and is not addressed or promoted within a competency-based education.

Competency-based Education

Competency-based educational models are widely implemented in health professions education (Harvan, Royeen, & Jensen, 2009). Driving forces for competency-based education in health professions include a focus on risk management, consumer rights, patient safety, communication and teamwork, and expansion of the workforce (Pimlott, 2011). A specific set of competencies may be addressed through well-tested teaching-learning methods, specific for individuals and/or teams, with the "overall goal being a competency-based education system that better prepares clinicians to meet the needs of patients and communities and the requirements of a changing health care system" (Jensen et al., 2009, p. 9).

Competency-based education defines the desired outcome of training (Carraccio, et al., 2002) and provides an outline of expected outcomes that learners should possess prior to completion of their training and education (Curran et al., 2011). Competency-based health professional education indicates to learners, faculty, and society what the defined end product is, measures whether the desired outcomes are achieved, and better identifies learners that experience difficulties in order to offer them remediation (Brightwell & Grant, 2013; Saucier et al., 2012). The learner is an active participant in the learning and emphasis is placed on learning within authentic clinical environments or contexts (Carraccio et al., 2002; Saucier et al., 2012); thus, competency-based instruction is best suited for adult learners, who tend to be self-directed and assume responsibility for their learning (Carraccio et al., 2002; Swing, 2010).

Curricular issues. "The concept of competence plays a key role in defining the outcomes of [health care curricula], what is to be assessed, the nature of the internal and external resources, and the way that these will be used to deliver appropriate health services" (Fernandez et al., 2012, p. 364). The use of competencies to drive curricular planning has several advantages, including: use of a common language, clarity, opening dialogue between professions, collaboration between educators, accountability, a guide for assessment, and informing interprofessional learning and ensuring relevance with practice (Curran et al., 2011). A competency-based perspective focuses on the end-product of the educational/instructional process; a competency-based curriculum is outcome-oriented and directs educational initiatives to focus on the components of practice in a particular situation (Saucier et al., 2012; Swing, 2010; Young et al., 2010). The concept of competence plays a key role in defining outcomes of health professions

education, planning for assessment of outcomes, how resources will be allocated, and ways in which health services will be delivered (Fernandez et al., 2012). Feedback and thorough evaluation processes are essential components of this curricular approach (Carraccio et al., 2002; Holmboe, Sherbino, Long, Swing, & Frank, 2010; Lenburg, Klein, Abdur-Rahman, Spencer, & Boyer, 2009). Learning styles of learners, as well as differing student abilities, may require additional guidance and/or support from faculty (Galambos & Curl, 2013).

Benefits and criticisms. Benefits of competency-based education, particularly for interprofessional health care education, include: (a) ensuring relevance of the curriculum to practice, (b) clarity, (c) accountability, and (d) a guide for assessment/evaluation of the learners and of the curriculum (Curran et al., 2011). The appeal of competency-based education is the establishment of consistent standards across varying settings (Pimlot, 2011; Reeves et al., 2009). There also is an emphasis on social and political accountability that has been reinforced through regulation of all health care professions (Brightwell & Grant, 2013; Woodhouse, Auld, Miner, Alley, Lysoby, & Livingood, 2010).

One criticism of competency-based education is that it is reductionistic (Fernandez et al., 2012; Reeves et al., 2009), in that it "limits the development of professional expertise to the acquisition of discrete, easily measurable practical skills" (Fernandez et al., 2012, p. 358). This measurability requires tasks to be broken down into observable chunks that can be identified by an objective observer; intra-observer variability can become a significant roadblock (Brightwell & Grant, 2013).

Assumptions. Brightwell and Grant (2013) propose that the basic assumption of the competency-based approach is that "an occupation can be broken down into smaller elements of defined knowledge and skills (competencies), and that achievement of an accepted level in each of these domains will lead to overall proficiency" (p. 107). Pimlott (2011) also raised concern that the educational model may be reductionistic; his argument is that we expect more than just competence with health care professionals. Brightwell and Grant (2013) have argued that competency-based education puts an emphasis on the minimum standard and discourages excellence. Talbot (2004) stated "there is great concern that this approach will limit the reflection, intuition, experience and higher order competence necessary for expert, holistic or well-developed practice" (p. 587).

In opposition to this, Swing (2010) has argued that competency-based education is not reductionistic; the progression from learning simple skills to applying complex capabilities is built over time. The health professions' competencies are typically complex cognitive or cognitive-perceptual in nature and "complex, higher-order skills are built from simpler ones" (p. 664). Repetition of simpler competencies and applying multiple competencies into a complex, organized activity strengthen bonds between components and increase the probability that the skills/competencies will be applied appropriately in a new situation at a future time.

An important component of competency-based education, though, is reflection; reflection is an essential skill for practitioners and is a helpful learning strategy within competency-based education. Reflection and self-regulation facilitate skill integration, thus negating the criticism of reductionistic behaviorism.

Concerns. An additional concern, or criticism, of competency-based education is the lack of clear competency outcomes or performance measures on which to judge competence. Lenburg et al. (2009) suggested that each competency should be converted to an outcome statement with precisely worded practice expectations. "Competence is established through predetermined specific criteria that define how good is good enough for any particular course, skill, or assignment" (p. 314).

Holmboe et al. (2010) have offered an additional set of recommendations related to competency assessment. Effective assessment should: (a) be continuous and frequent, (b) be based on a developmental perspective, (c) be based on actual work environments (clinical placements), (d) use assessment tools, (e) include qualitative approaches to assessment, and (f) draw upon the wisdom of a group and actively involve the trainee/learner. Assessment of competence should be robust, longitudinal, and comprehensive; competence "evaluation is more than the sum of its parts" (p. 680).

Curriculum development. A competency-based approach is necessary for curriculum development, implementation, and evaluation (Galambos & Curl, 2013). Educators may have difficulty in developing curricula that incorporate competencies that are appropriate for different levels of learners and integrating multiple competencies into the same curriculum. Health professions educators may need to meet multiple competencies within a curriculum—profession-specific competencies, competencies set by regulatory bodies, general health care provider competencies, and/or specialty area competencies (Reeves et al., 2009).

Educators have benefited from a sequential approach to skill and knowledge acquisition for health professions learners, based on a simple-to-complex developmental

progression (Barton et al., 2009; Calhoun et al., 2005). Leveling of learning experiences allows the learner to gain confidence and build upon previous knowledge, skills, and attitudes (Barton et al., 2009). The educator may be best served by considering at what level particular content, or competencies, should be taught (Seibert, 2008). Competencies may be measured for appropriate levels based on typical learner performance (Dulay, 2011) for knowledge, skills, and attitudes. Mapping competencies within a curriculum, and then identifying gaps in current and future program planning, may assist the educator with ensuring adoption and utilization of competency-based learning in all course offerings (Calhoun et al., 2005).

Within the arena of nursing education, Barton et al. (2009) performed a national Delphi survey to assess the developmental progression of knowledge, skills, and attitudes within the Quality and Safety Education for Nurses (QSEN) competencies. The QSEN competencies were designed for pre-licensure nursing education and contain six domains that include: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. The study indicated the "necessity to design teaching strategies that support competency development across the entirety of the curriculum" (p. 320). Progressive development of competencies, sustained exposure of content and reinforcement of foundational concepts were recommended by the experts surveyed.

Integration of competencies, through and across curricula, is challenging. It is important to note that "competency sets do not operate in isolation, just as many professional identities and responsibilities overlap in professional practice" (Woodhouse et al., 2010, p. E27). A crosswalk methodology is sometimes utilized to highlight

similarities and differences between multiple competency sets (Goldblatt et al., 2013); competency sets may differ in the level of ability or skill, the content, and/or complexity of competency statements. Woodhouse et al. (2010) found that several barriers or challenges may present themselves when attempting to integrate competency sets and include: (a) professional cultures may be assumed, yet not clearly articulated to others outside of the profession; (b) language differences may become very apparent due to age differences between competency sets; (c) the focus, purpose, and final product of competency sets may vary widely based on the reasons for development and/or primary purpose; and (d) lack of consistency in depth and scope of competency sets may impact their usefulness and/or comparability.

Interprofessional Education (IPE)

In 2011, the Interprofessional Education Collaborative (IPEC) convened an expert panel to develop core competencies that would cross all health care professions and provide defined outcomes for health professions students in order to practice interprofessionally in teams (Interprofessional Education Collaborative [IPEC] Expert Panel, 2011). The history of IPE, need for core competencies in IPE, description of the competency domains, and use of competency-based education for IPE are discussed below.

Interprofessional education (IPE) of health care professions students has received attention in the recent past due to an increased focus on collaborative practice as a key to safe, high quality, accessible, patient-centered care that is desired by all (Interprofessional Education Collaboration Expert Panel, 2011). Interprofessional education places students in deliberate learning opportunities in order to achieve interactive learning and promote

team-based healthcare; it occurs "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (WHO, 2010). When students learn together, they are more likely to work effectively together in the future, which results in improved patient outcomes and increased professional satisfaction (Heale et al., 2013).

The Institute of Medicine (IOM), Pew Health Professions Commission, Agency for Healthcare Research and Quality (AHRQ), and the WHO all have called for a redesign of health professions education (as cited in IPEC, 2011). This redesign necessitates bringing health care education out of the silos where it has occurred (Aune & Olufsen, 2013) and bridging the "gap between current health professions training and actual practice needs and realities" (IPEC, 2011, p. 5). Critical attributes of this redesigned health professions education are values and ethics for interprofessional practice, understanding of roles and responsibilities, communication and collaboration, and teamwork (IPEC, 2011; Reeves et al., 2012).

History of interprofessional education. In 1972, the IOM first called for team-based education of health care professionals including allied health, dentistry, medicine, nursing, and pharmacy (as cited in IPEC, 2011). The conference report considered how to address the needs of the health care workforce and the ability of the health care system to meet the needs of a community. In 1998, the Pew Health Professions Commission recommended interprofessional education of health care professionals, moving the health professions education closer to the practice of health care (as cited in IPEC, 2011). Pew recognized the importance of matching education and practice realities. The IOM continued to focus on the needs of individuals, families, systems, communities,

populations, and the nation as a whole. They again published recommendations for interprofessional education of health care professionals in 2000, 2001, and 2003 (as cited in Royeen et al., 2009).

Further recommendations came from the AHRQ in 2008 with an emphasis on institutional quality and safety. According to IPEC (2011) the passage of the Recovery and Reinvestment Act of 2009 and the Patient Protection and Affordable Care Act of 2010 further have stimulated new approaches to health care delivery, and thus new approaches to education of health care professionals. In 2011, core competencies for interprofessional team-based training were published by the IPEC. In 2012, the University of Minnesota was named the National Center for Interprofessional Practice and Education. This center "aims to create a transformational 'nexus' to incubate ideas, define the field, guide program development and research" (University of Minnesota, 2013, "National Center for Interprofessional Practice and Education").

In 2013, The Josiah Macy Jr. Foundation convened an IPE conference where participants reached a consensus on the joint vision for interprofessional education and practice, which read "We envision a healthcare system in which learners and practitioners across the professions are working collaboratively with patients, families, and communities and with each other to accomplish the Triple Aim" (Josiah Macy Jr. Foundation, 2013, p. 2). Three simultaneous drivers have been reported as the "Triple Aim" of health care delivery and include: "improving the patient's experience of care, improving the health of individuals and populations, and reducing the per capita cost of health care" (Josiah Macy Jr. Foundation, 2013, p. 1). The conference provided recommendations for immediate action in order to achieve this vision. The

recommendations include the following: (a) engage patients, families, and communities in the design, implementation, improvement, and evaluation of efforts to link IPE and collaborative practice; (b) accelerate the design, implementation, and evaluation of innovative models linking IPE and collaborative practice; (c) reform the education and lifelong career development of health professionals to incorporate interprofessional learning and team-based care; (d) revise professional regulatory standards and practices to permit and promote IPE and collaborative practice; and (e) realign existing resources to establish and sustain the linkage between IPE and collaborative practice (Josiah Macy Jr. Foundation, 2013; Thibault & Schoenbaum, 2013). To achieve the goal of high-quality and cost-effective care, academia and health care delivery organizations will need to work closely to foster teamwork through IPE (Thibault & Schoenbaum, 2013).

There has been a long history of recommendations given for IPE in the United States, yet little action had taken place until the last decade. While the U.S. was attempting to garner support and resources, other nations had great success with their implementation; Canada, Great Britain, and Australia all have made significant strides to train health professions students together in team-based learning environments (WHO, 2010).

The Framework for Action on Interprofessional Education and Collaborative Practice (Framework) has called for IPE as a means to prepare a "collaborative practice-ready health workforce" (WHO, 2010, p. 7) who is prepared to respond to health care needs of individuals, communities, and populations. This collaborative practice-ready individual should have training in an interprofessional team and should be competent to work collaboratively. The WHO Framework calls for health policy-makers, decision

makers, educators, health workers, community leaders, and health advocates to contextualize their current health care system, commit to implementing principles of IPE and collaborative practice, and champion the benefits of interprofessional collaboration (2010).

The IPEC collaborative. Based on the initiatives of the WHO Framework and the multiple reports of the Institute of Medicine, the Interprofessional Education Collaborative (IPEC) was formed in 2009. A unique partnership of six health professions education associations came together to promote and encourage efforts that would advance IPE learning experiences and prepare future clinicians for team-based, patient-centered care (Interprofessional Education Collaborative, n.d., "About the IPEC"). Constituent organizations were the American Association of Colleges of Nursing (AACN), the American Association of Colleges of Osteopathic Medicine, the American Association of Colleges of Pharmacy, the American Dental Education Association, the Association of American Medical Colleges (AAMC), and the Association of Schools of Public Health (Goldblatt et al., 2013; Schmitt, Gilbert, Brandt, & Weinstein, 2013).

Interprofessional Education Competencies

In 2009, the IPEC expert panel developed competencies that identified individual learner-level interprofessional competencies in four domains: values and ethics of interprofessional practice, roles and responsibilities of interprofessional partners, communication, and teamwork for patient-centered care (IPEC, 2011). Interprofessional competencies in health care were defined by IPEC (2011) as an "integrated enactment of knowledge, skills, and values/attitudes that define working together across the

professions, with other health care workers, and with patients, along with families and communities, as appropriate to improve health outcomes in specific care contexts" (p. 2).

The core competencies were designed to help guide curricular revision from pre-licensure to continuing education for the professions (Schmitt et al., 2013). The competencies are intended to inform curriculum development in order to prepare practice-ready, competent health care practitioners. With this competency-based approach to IPE, an explicit framework is provided to initiate, develop, implement, and evaluate the processes and outcomes of IPE (Wood et al., 2009).

Prior to the IPEC competencies, the success of IPE was impeded by a lack of understanding of shared competencies between members of the health care education team and a lack of common vocabulary for teaching and learning (Verma, Paterson, & Medves, 2006). Education and health care experts called for common, complementary, and collaborative competencies (Verma et al., 2006) for all health care professionals to reduce role confusion, improve communication, and to develop team-based, collaborative practice.

Developing IPE competency-based approaches. Competency-based approaches to IPE have developed in parallel to competency-based approaches within the individual health professions (IPEC, 2011). An integrated approach to development of professional competence may be achieved through a common set of core competencies relevant across professions.

Barr (1998) made a case for competency-based interprofessional education that would enable students to move easily between and through professional and interprofessional components of their curriculum, including competencies that would be

common, complementary, and collaborative in nature. Common competencies are those that are held across and between different professions (Barr, 1998), but not necessarily all professions (IPEC, 2011). Complementary competencies distinguish one profession from another and also complement other professions (Barr, 1998); in other words, complementary competencies are held by the individual profession (IPEC, 2011). Collaborative competencies are those that each profession needs to collaborate within its own ranks, with other professions, with non-professionals, with organizations, with patients and families, and with the community (Barr, 1998). A planned progression of curricular activities to address common, complementary, and collaborative competencies would satisfy many needs, including the need to: (a) reposition interprofessional education in the mainstream of contemporary professional education; (b) enable students to relate professional and interprofessional studies coherently; (c) enable students to claim interprofessional courses as part of their professional education; (d) gain approval of validating/accrediting bodies; (e) attract support from employers; (f) compensate for deficits in existing models of IPE; (g) equip professionals for multidimensional collaboration; and (h) respond to government/regulatory calls for such collaboration (Barr, 1998, pp. 182-183).

The IPEC expert panel envisioned a framework that would allow educators to implement curriculum individualized to their own setting, with a guide provided by the competency domains and individual competencies (IPEC, 2011). Interprofessional learning activities would be shaped by stages of interprofessional learning, core interprofessional curriculum, and resources available (IPEC, 2011).

Leveling of IPE competencies. "Healthcare professional audiences, despite sharing a strong background in science, may present an instructional challenge" (Seibert, 2008, p. 157) as some learners have extensive knowledge of a subject while others are just beginning to explore the content. It is important for educators to use adult learning principles, as well as engagement principles, to deliver the content effectively (Schmitt et al., 2013). When to introduce IPE, as well as how to integrate IPE throughout various professional curricula, has been debated widely among educators and practicing health care professionals (Engum & Jeffries, 2012; Oandasan & Reeves, 2005).

Health professions students may obtain IPE through happenstance or informal learning opportunities, yet it is imperative that planned, robust educational interventions must occur at the interface of education and practice (Reeves et al., 2012). An IPE curriculum must assist the learner to gain knowledge and skills relevant for obtaining IPE competencies. Thus an interprofessional team of educators should collaborate to plan and implement activities that engage learners together with the goal of improving health for individuals and society (Ruebling et al., 2009). It is important for interprofessional activities to be embedded throughout the various programs' curricula, not added on to already full professional curricula.

The implementation of IPE within didactic and clinical curricula has been challenging (Doll et al., 2013). It is important for students learning together interprofessionally to be matched according to their level of knowledge and skills (Poirier & Wilhelm, 2013). While matching learners from multiple professions together, it also is important to place the learners in appropriate learning endeavors that they find relevant to practice (Greidanus, King, LoVerso, & Ansell, 2013; Oandason & Reeves, 2005).

Repeated IPE exposure, with an emphasis on developmental progression, is valuable in preparing learners for effective teamwork and communication (Doll et al., 2013; Engum & Jeffries, 2012; Greidanus et al., 2013; Ruebling et al., 2009).

Identification of relevant areas of competence and the levels at which these competencies should be attained (Dulay, 2011; Seibert, 2008) is a focus for all IPE educators. While different labels may be used, such as beginning, intermediate, and advanced, competencies should be placed at the appropriate stage of learning for all health care professions students. The University of Toronto has utilized a developmental framework for the development of interprofessional education curriculum (IPEC, 2011) (See Figure 1-1). Within this framework, reflection, learning, and formative assessment are placed along a learning continuum. Knowledge, skills, and attitudes are defined within the context of collaboration, communication, and values/ethics for exposure, immersion, and competence levels. Exposure is equivalent to introduction within this framework, while immersion is equated to development. Competence, which is the last stage of provider preparation, results in a provider that is prepared for entry to practice.

At the Medical University of South Carolina, a "learning spiral" framework was conceptualized to describe the ways in which teamwork competencies are built and ways of knowing are transformed. As students progress through the stages of the learning cycle (prepare, think, practice, and act), the students "acquire, apply, and demonstrate their interprofessional teamwork competencies in increasingly complex learning settings" (IPEC, 2011, p. 32). Similarly, the University of Minnesota has designed a curriculum that is staged for IPE. Didactic education occurs first, with simulated clinical experiences and actual clinical experiences to follow. The culmination of this learning for each

student is an interprofessional clinical practice experience within a hospital or community setting (IPEC, 2011).

The IPE core competencies provide a road map for faculty to implement IPE (Doll et al., 2012), yet the road map does not supply sufficient detail to direct educators on appropriate competencies for each level of learner. Health professions faculty need training and further direction to become effective interprofessional educators; the content and process of IPE are very different than the traditional academic content they teach (IPEC, 2011). Ideally, leveling of the core IPE competencies would "provide an initial blueprint, suggesting a developmental approach that might assure movement from beginning to intermediate to advanced levels of competency providing the opportunity for planned, leveled learning experiences, focused on engaging students in the right activity for the right purpose at the right time" (Barton et al., 2009, p. 314).

Research Using the Delphi Method

The Delphi method, a technique used to elicit opinions and develop consensus of experts in a given field, has been used widely to obtain subjective opinion and identify areas of consensus and divergence of opinion (Nworie, 2011). One or more reasons may necessitate use of the Delphi, such as, (a) when a problem does not lend itself to precise statistical analysis, (b) group meetings or face-to-face exchanges are not feasible, (c) communication is controversial or politically charged, and/or (d) heterogeneity of the group must be preserved (Stitt-Gohdes & Crews, 2004). The method is particularly useful when judgments are necessary and "group think" is preferred over individual thought (Nworie, 2011).

Education and healthcare are two fields that have embraced the Delphi methodology for research. Published Delphi studies have identified critical success factors, developed models, identified criteria for evaluation, identified success strategies, identified emerging issues, ranked characteristics of high-performing personnel, and identified and/or ranked competencies for education and/or practice (Skulmoski et al., 2007). Several dissertations for Doctor of Philosophy (PhD) graduates have used the Delphi method to investigate educational and workforce competencies. The focus of these Delphi studies have included the following: "knowledge, skills, and experiences needed by college graduates", "needed competencies", "knowledge, skills, and attitudes needed by entry-level positions", "set of learning outcomes for students in order to function in work", "competencies and supporting skills and knowledge", "initial curricular components necessary for preparation of graduate-level counselors", and "competencies required to be successful" (Skulmoski et al., 2007, pp. 17-20).

Within the field of healthcare education, Barton et al. (2009) published results of a national Delphi survey to assess the developmental progression of the Quality and Safety Education for Nurses (QSEN) competencies. For the QSEN Delphi study, experts were asked to indicate whether specific knowledge, skills, or attitude competencies should be introduced and/or emphasized in the beginning, intermediate, or advanced phases of nursing programs. The purpose of the QSEN study was to appropriately engage "nursing students in the right activity for the right purpose at the right time" (p. 314), based on a developmental approach with leveled learning experiences.

Pilot study. A pilot study for the dissertation research was completed in Fall 2013 at a Midwestern academic medical center. Further detail is provided in Chapter Four, under the subheading “Instrumentation”.

Summary

The use of competencies and competency-based education within health care professions education is widespread, with the number of professions using competency-based education increasing over the past two decades. In fact, the utilization of interprofessional competency-based education is recommended by a variety of health care professions educational associations, including medicine, nursing, dentistry, pharmacy, and public health. Educators must familiarize themselves with the definitions of competence, competency, and competencies, as it is imperative for competency-based professional education. Clear, concise use of a common language is imperative as interprofessional educators work together to design IPE curricula.

Competencies assist the educator with writing learning objectives, developing educational activities, integrating themes throughout the curriculum, and placing appropriate emphasis on core domains. A familiarity with adult learning theory and learner developmental stages are necessary for appropriate placement of the competencies within the curriculum. A tool that assists educators with leveling of competencies is desired, as it would provide a blueprint for curriculum design based on a developmental approach. Currently, no such tools exist for the “Core Competencies for Interprofessional Collaborative Practice". A Delphi study to gain consensus on the leveling of interprofessional education competencies for health care learners is necessary to obtain the necessary expert opinion.

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Chapter 3

Competency-Based Education and Competencies for Interprofessional Education: A Review of the Literature

This manuscript will be submitted to *Journal of Nursing Education* and is a comprehensive literature review of competency-based education in the health professions. The adoption of IPE and use of IPE competencies are included to assist nursing educators in understanding how to integrate these concepts into curricula.

Abstract

Nurse educators are tasked with designing curriculum that will meet the needs of patients, families, communities, populations, health care teams, and nurses themselves. Collaborative, interprofessional practice is necessary to provide safe, high quality, accessible, patient-centered care with improved outcomes for individuals, families, and communities. To guide educators, including nursing educators, in developing interprofessional education experiences for health professions learners, the "Core Competencies for Interprofessional Collaborative Practice" were developed. A comprehensive review of competencies, competence, and competency-based education are provided in this review of the literature to better understand their role in interprofessional education. The purpose of interprofessional education and the use of competencies for curricular design are presented. A call for tools to help nursing educators design appropriate, leveled learning opportunities is offered.

Keywords:

Competence, Competencies, Competency-based Education, Interprofessional education

Introduction

Nurse educators are tasked with designing curriculum that will meet the needs of patients, families, communities, populations, health care teams, and nurses themselves. Collaborative, interprofessional practice is necessary to provide safe, high quality, accessible, patient-centered care with improved outcomes for individuals, families, and communities. To guide educators, including nursing educators, in developing interprofessional education experiences for health professions learners, the "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011) were developed.

A review of definitions of competency and competency-based education as they apply to health professions education is provided in this review of the literature. A presentation of competencies as directives in health care education and the application of competencies within a curriculum are reviewed. Next, the development and implementation of interprofessional education (IPE) competencies for health care is described. Lastly, a call for tools to help nursing educators design appropriate, leveled learning opportunities is offered.

Competence, Competency and Competencies

Competence and competency are very different concepts (Young et al., 2010). In layman's terms, competence typically is achieved through mastering competencies. It is important, though, fully to understand the difference between these concepts when applying them to education and curriculum development (Albanese et al., 2008).

Competence. Competence has been defined in lay terms as "the state of being adequately or well qualified" and "a specific range of skill, knowledge, or ability"

(Farlex, 2013, “Competence”). Synonyms include proficiency, ability, skill, talent, expertise, and capability (Farlex, 2013).

For health care professionals, competence has been defined as "a simultaneous integration of the knowledge, skills, and attitudes that are required for performance in a designated role and setting" (Gurvis & Grey, 1995, p. 247). Fernandez et al. (2012) suggested that competence allows the professional to select or combine knowledge, skills, and other components in order to perform safely, while also guaranteeing to society that standards will be maintained.

In short, competence is an evaluation of one's performance in the work setting; the ability to put all of the pieces together to form the whole. Competence is reflected in one's capacity or ability to function in one’s job, while competency is sometimes defined as one's actual performance in a given situation (Young et al., 2010; Curran et al., 2011). For health care, The Joint Commission has described competency as "how well an individual integrates his or her knowledge, attitudes, skills, and behaviors in delivering care according to expectations" (as cited in Gurvis & Grey, 1995, p. 248). These expectations are socially relevant; health care practitioners are expected to demonstrate that they are qualified and capable of delivering care for society (Fernandez et al., 2012).

Competency and competencies. Competency is the capability to apply or use a set of related knowledge, skills, and abilities or attitudes required to successfully perform functions or tasks in a defined setting (Albanese et al., 2008). Often this setting is a work environment or profession. Competencies specify the level of knowledge, skills, and abilities or attitudes necessary for success in a given profession. "What distinguishes a competency from a goal or objective is that it focuses on the end product of the

instructional process, rather than on the instructional process itself, or that it embraces the larger picture rather than the content of a single course" (Albanese et al., 2008, p. 250).

Competencies, that often involve checklists of particular knowledge, skills, and attitudes related to work, are derived from standards and pre-defined expectations (Gurvis & Grey, 1995). Competencies, thus, help to serve as a common language, assist with dialogue, promote collaboration, and inform interprofessional learning (Curran et al., 2011). Educators, and others that use competencies to assess professional performance, are able to provide directly observable indicators that professionals must meet (Reeves, Fox, & Hodges, 2009).

Figure 3-1 illustrates the inclusive nature of competencies in competency, as well as the inclusion of competency in overall competence. Knowledge, skill, and attitude competencies combine to provide a health care professional competency in a given situation or defined setting. Competence, then, is an overarching concept that includes the ability to fully function in a role or profession, regardless of the situation or setting. As an example, team-based communication competencies allow a nurse-midwife to practice competently in a situation where communication with other health care professionals is necessary, such as consultation with or referral to a collaborating physician. This consultation or referral may occur when a patient's condition falls outside the scope of the nurse-midwife's practice, at which time the nurse-midwife would need to rely on communication competency to afford the patient quality care. Competence, then, would include all of the necessary competencies for the nurse-midwife to practice in any setting or situation and would include knowledge, skills, and attitudes related to all aspects of

practice (teamwork, communication, inpatient care, outpatient care, core competencies for basic midwifery practice, etc.).

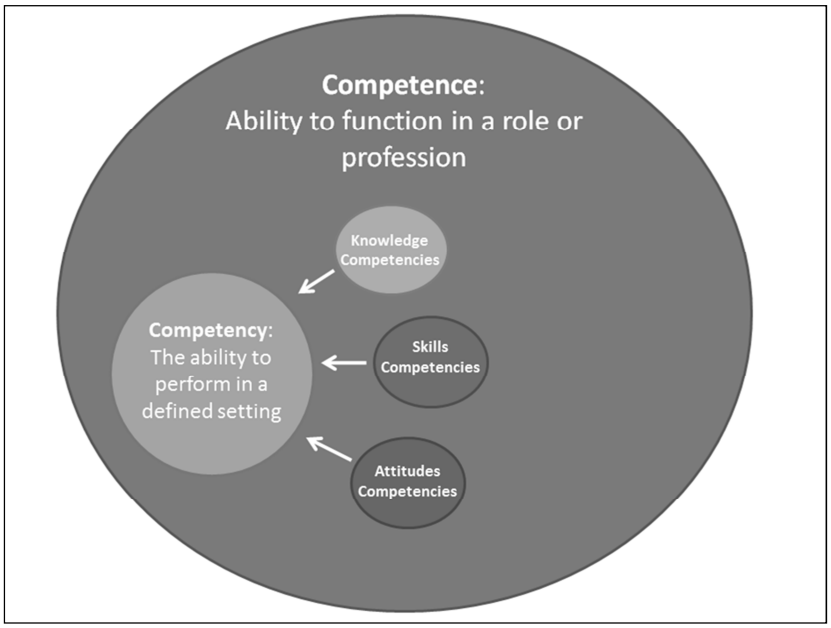

Figure 3-1. Pictorial display of competence, competency, and competencies. Knowledge, skill, and attitude competencies combine to provide a health care professional competency in a given situation or defined setting. Competence, then, is an overarching concept that includes the ability to fully function in a role or profession, regardless of the situation or setting.

Competency-based Education

Competency-based educational models are widely implemented in health professions education (Harvan, Royeen, & Jensen, 2009). Driving forces for competency-based education in health professions include a focus on risk management, consumer rights, patient safety, communication and teamwork, and expansion of the workforce (Pimlott, 2011). A specific set of competencies may be addressed through well-tested teaching-learning methods, specific for individuals and/or teams, with the "overall goal being a competency-based education system that better prepares clinicians to meet the needs of patients and communities and the requirements of a changing health care system" (Jensen et al., 2009, p. 9).

Competency-based education defines the desired outcome of training (Carraccio et al., 2002) and provides an outline of expected outcomes that learners should possess prior to completion of their training and education (Curran et al., 2011). Competency-based health professional education indicates to learners, faculty, and society what the defined end product is, measures whether the desired outcomes are achieved, and better identifies learners that experience difficulties in order to offer them remediation (Brightwell & Grant, 2013; Saucier et al., 2012). The learner is an active participant in the learning and emphasis is placed on learning within authentic clinical environments or contexts (Carraccio et al., 2002; Saucier et al., 2012). Thus, competency-based instruction is best suited for adult learners, who tend to be self-directed and assume responsibility for their learning (Carraccio et al., 2002; Swing, 2010).

Curricular issues. The use of competencies to drive curricular planning has several advantages, including: use of a common language, clarity, opening dialogue between professions, collaboration between educators, accountability, a guide for assessment, informing interprofessional learning, and ensuring relevance with practice (Curran et al., 2011). A competency-based perspective focuses on the end product of the educational/instructional process; a competency-based curriculum is outcome oriented and directs educational initiatives to focus on the components of practice in a particular situation (Saucier et al., 2012; Swing, 2010; Young et al., 2010). The concept of competence plays a key role in defining outcomes of health professions education, planning for assessment of outcomes, how resources will be allocated, and ways in which health services will be delivered (Fernandez et al., 2012). Feedback and thorough evaluation processes are essential components of this curricular approach (Carraccio et

al., 2002; Holmboe, Sherbino, Long, Swing, & Frank, 2010; Lenburg, Klein, Abdur-Rahman, Spencer, & Boyer, 2009). Learning styles of learners, as well as differing student abilities, may require additional guidance and/or support from faculty (Galambos & Curl, 2013).

Benefits and criticisms. Benefits of competency-based education, particularly for interprofessional health care education, include: (a) ensuring relevance of the curriculum to practice, (b) clarity, (c) accountability, and (d) a guide for assessment/evaluation of the learners and of the curriculum (Curran et al., 2011). The appeal of competency-based education is the establishment of consistent standards across varying settings (Pimlot, 2011; Reeves et al., 2009). There also is an emphasis on social and political accountability that has been reinforced through regulation of all health care professions (Brightwell & Grant, 2013; Woodhouse, Auld, Miner, Alley, Lysoby, & Livingood, 2010).

One criticism of competency-based education is that it is reductionistic (Fernandez et al., 2012; Reeves et al., 2009), in that it "limits the development of professional expertise to the acquisition of discrete, easily measurable practical skills" (Fernandez et al., 2012, p. 358). This measurability requires tasks to be broken down into observable chunks that can be identified by an objective observer; intra-observer variability can become a significant roadblock (Brightwell & Grant, 2013).

An additional concern, or criticism, of competency-based education is the lack of clear competency outcomes or performance measures on which to judge competence. Lenburg et al., (2009) suggested that each competency should be converted to an outcome statement with precisely worded practice expectations. "Competence is

established through predetermined specific criteria that define how good is good enough for any particular course, skill, or assignment" (p. 314).

Holmboe et al. (2010) have offered an additional set of recommendations related to competency assessment. Effective assessment should: (a) be continuous and frequent, (b) based on a developmental perspective, (c) be based on actual work environments (clinical placements), (d) use assessment tools, (e) include qualitative approaches to assessment, and (f) draw upon the wisdom of a group and actively involve the trainee/learner. Assessment of competence should be robust, longitudinal, and comprehensive; competence "evaluation is more than the sum of its parts" (p. 680).

Curriculum development. A competency-based approach is necessary for curriculum development, implementation, and evaluation (Galambos & Curl, 2013). Educators may have difficulty in developing curricula that incorporate competencies that are appropriate for different levels of learners and integrating multiple competencies into the same curriculum. Health professions educators may need to meet multiple competencies within a curriculum—profession-specific competencies, competencies set by regulatory bodies, general health care provider competencies, and/or specialty area competencies (Reeves et al., 2009).

Educators have benefited from a sequential approach to skill and knowledge acquisition for health professions learners, based on a simple-to-complex developmental progression (Barton et al., 2009; Calhoun et al., 2005). Leveling of learning experiences allows the learner to gain confidence and build upon previous knowledge, skills, and attitudes (Barton et al., 2009). The educator best may be served by considering at what level particular content, or competencies, should be taught (Seibert, 2008). Competencies

may be measured for appropriate levels based on typical learner performance of knowledge, skills, and attitudes (Dulay, 2011). Mapping competencies within a curriculum, and then identifying gaps in current and future program planning, may assist the educator with ensuring adoption and utilization of competency-based learning in all course offerings (Calhoun et al., 2005).

Within the arena of nursing education, Barton et al. (2009) performed a national Delphi survey to assess the developmental progression of knowledge, skills, and attitudes within the Quality and Safety Education for Nurses (QSEN) competencies. The QSEN competencies were designed for pre-licensure nursing education and contain six domains that include: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. The study indicated the "necessity to design teaching strategies that support competency development across the entirety of the curriculum" (p. 320). Progressive development of competencies, sustained exposure of content and reinforcement of foundational concepts were recommended by the experts surveyed.

Integration of competencies, through and across curricula, is challenging. It is important to note that "competency sets do not operate in isolation, just as many professional identities and responsibilities overlap in professional practice" (Woodhouse et al., 2010, p. E27). A crosswalk methodology is sometimes utilized to highlight similarities and differences between multiple competency sets (Goldblatt et al., 2013); competency sets may differ in the level of ability or skill, the content, and/or complexity of competency statements.

Woodhouse et al. (2010) found that several barriers or challenges may present themselves when attempting to integrate competency sets and include: (a) professional cultures may be assumed, yet not clearly articulated to others outside of the profession; (b) language differences may become very apparent due to age differences between competency sets; (c) the focus, purpose, and final product of competency sets may vary widely based on the reasons for development and/or primary purpose; and (d) lack of consistency in depth and scope of competency sets may impact their usefulness and/or comparability.

Interprofessional Education (IPE)

In 2011, the Interprofessional Education Collaborative (IPEC) convened an expert panel to develop core competencies that would cross all health care professions and provide defined outcomes for health professions students in order to practice interprofessionally in teams (Interprofessional Education Collaborative [IPEC] Expert Panel, 2011). The history of IPE, need for core competencies in IPE, description of the competency domains, and use of competency-based education for IPE are discussed below.

Interprofessional education (IPE) of health care professions students has received attention in the recent past due to an increased focus on collaborative practice as a key to safe, high quality, accessible, patient-centered care that is desired by all (Interprofessional Education Collaboration Expert Panel, 2011). Interprofessional education places students in deliberate learning opportunities in order to achieve interactive learning and promote team-based healthcare; it occurs “when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health

outcomes" (WHO, 2010). When students learn together, they are more likely to work effectively together in the future, which results in improved patient outcomes and increased professional satisfaction (Heale et al., 2013).

The Institute of Medicine (IOM), Pew Health Professions Commission, Agency for Healthcare Research and Quality (AHRQ), and the WHO all have called for a redesign of health professions education (as cited in IPEC, 2011). This redesign necessitates bringing health care education out of the traditional silos where it has occurred (Aune & Olufsen, 2013) and bridging the "gap between current health professions training and actual practice needs and realities" (IPEC, 2011, p. 5). Critical attributes of this redesigned health professions education are values and ethics for interprofessional practice, understanding of roles and responsibilities, communication and collaboration, and teamwork (IPEC, 2011; Reeves et al., 2012).

The Framework for Action on Interprofessional Education and Collaborative Practice (Framework) has called for IPE as a means to prepare a "collaborative practice-ready health workforce" (WHO, 2010, p. 7) who is prepared to respond to health care needs of individuals, communities, and populations. This collaborative practice-ready individual should have training in an interprofessional team and should be competent to work collaboratively. The WHO Framework calls for health policy-makers, decision makers, educators, health workers, community leaders, and health advocates to contextualize their current health care system, commit to implementing principles of IPE and collaborative practice, and champion the benefits of interprofessional collaboration (2010).

The IPEC collaborative. Based on the initiatives of the WHO Framework and the multiple reports of the Institute of Medicine (IOM), the Interprofessional Education Collaborative (IPEC) was formed in 2009. A unique partnership of six health professions education associations came together to promote and encourage efforts that would advance IPE learning experiences and prepare future clinicians for team-based, patient-centered care (Interprofessional Education Collaborative, n.d., "About the IPEC"). Constituent organizations were the American Association of Colleges of Nursing (AACN), the American Association of Colleges of Osteopathic Medicine, the American Association of Colleges of Pharmacy, the American Dental Education Association, the Association of American Medical Colleges (AAMC), and the Association of Schools of Public Health (Goldblatt et al., 2013; Schmitt, Gilbert, Brandt, & Weinstein, 2013).

Interprofessional Education Competencies

In 2009, the IPEC expert panel developed competencies that identified individual learner-level interprofessional competencies in four domains: values and ethics of interprofessional practice, roles and responsibilities of interprofessional partners, communication, and teamwork for patient-centered care (IPEC, 2011). Interprofessional competencies in health care were defined by IPEC (2011) as an "integrated enactment of knowledge, skills, and values/attitudes that define working together across the professions, with other health care workers, and with patients, along with families and communities, as appropriate to improve health outcomes in specific care contexts" (p. 2).

The core competencies were designed to help guide curricular revision from pre-licensure to continuing education for the professions (Schmitt et al., 2013). The competencies are intended to inform curriculum development in order to prepare

practice-ready, competent health care practitioners. With this competency-based approach to IPE, an explicit framework is provided to initiate, develop, implement, and evaluate the processes and outcomes of IPE (Wood et al., 2009).

Prior to the IPEC competencies, the success of IPE was impeded by a lack of understanding of shared competencies between members of the health care education team and a lack of common vocabulary for teaching and learning (Verma, Paterson, & Medves, 2006). Education and health care experts called for common, complementary, and collaborative competencies (Verma et al., 2006) for all health care professionals to reduce role confusion, improve communication, and to develop team-based, collaborative practice.

Developing IPE competency-based approaches. Competency-based approaches to IPE have developed in parallel to competency-based approaches within the individual health professions (IPEC, 2011). An integrated approach to development of professional competence may be achieved through a common set of core competencies relevant across professions.

Barr (1998) made a case for competency-based interprofessional education that would enable students to move easily between and through professional and interprofessional components of their curriculum, including competencies that would be common, complementary, and collaborative in nature. Common competencies are those that are held across and between different professions (Barr, 1998), but not necessarily all professions (IPEC, 2011). Complementary competencies distinguish one profession from another and also complement other professions (Barr, 1998); in other words, complementary competencies are held by the individual profession (IPEC, 2011).

Collaborative competencies are those that each profession needs to collaborate within its own ranks, with other professions, with non-professionals, with organizations, with patients and families, and with the community (Barr, 1998). A planned progression of curricular activities to address common, complementary, and collaborative competencies would satisfy many needs, including the need to: (a) reposition interprofessional education in the mainstream of contemporary professional education; (b) enable students to relate professional and interprofessional studies coherently; (c) enable students to claim interprofessional courses as part of their professional education; (d) gain approval of validating/accrediting bodies; (e) attract support from employers; (f) compensate for deficits in existing models of IPE; (g) equip professionals for multidimensional collaboration; and (h) respond to government/regulatory calls for such collaboration (Barr, 1998, pp. 182-183).

The IPEC expert panel envisioned a framework that would allow educators to implement curriculum individualized to their own setting, with a guide provided by the competency domains and individual competencies (IPEC, 2011). Interprofessional learning activities would be shaped by stages of interprofessional learning, core interprofessional curriculum, and resources available (IPEC, 2011).

Leveling of IPE competencies. "Healthcare professional audiences, despite sharing a strong background in science, may present an instructional challenge" (Seibert, 2008, p. 157) as some learners have extensive knowledge of a subject while others are just beginning to explore the content. It is important for educators to use adult learning principles, as well as engagement principles, to deliver the content effectively (Schmitt et al., 2013). When to introduce IPE, as well as how to integrate IPE throughout various

professional curricula, has been debated widely among educators and practicing health care professionals (Engum & Jeffries, 2012; Oandasan & Reeves, 2005).

Health professions students may obtain IPE through happenstance or informal learning opportunities, yet it is imperative that planned, robust educational interventions must occur at the interface of education and practice (Reeves et al., 2012). An IPE curriculum must assist the learner to gain knowledge and skills relevant for obtaining IPE competencies; thus, an interprofessional team of educators should collaborate to plan and implement activities that engage learners together with the goal of improving health for individuals and society (Ruebling et al., 2009). It is important for interprofessional activities to be embedded throughout the various programs' curricula, not added on to already full professional curricula.

The implementation of IPE within didactic and clinical curricula has been challenging (Doll et al., 2013). It is important for students learning together interprofessionally to be matched according to their level of knowledge and skills (Poirier & Wilhelm, 2013). While matching learners from multiple professions together, it also is important to place the learners in appropriate learning endeavors that they find relevant to practice (Greidanus, King, LoVerso, & Ansell, 2013; Oandason & Reeves, 2005). Repeated IPE exposure, with an emphasis on developmental progression, is valuable in preparing learners for effective teamwork and communication (Doll et al., 2013; Engum & Jeffries, 2012; Greidanus et al., 2013; Ruebling et al., 2009).

Identification of relevant areas of competency and the levels at which these competencies should be attained (Dulay, 2011; Seibert, 2008) is a focus for all IPE educators. While different labels may be used, such as beginning, intermediate, and

advanced, competencies should be placed at the appropriate stage of learning for all health care professions students. The University of Toronto has utilized a developmental framework for the development of interprofessional education curriculum (IPEC, 2011). Within this framework, reflection, learning, and formative assessment are placed along a learning continuum. Knowledge, skills, and attitudes are defined within the context of collaboration, communication, and values/ethics for exposure, immersion, and competence levels. Exposure is equivalent to introduction within this framework, while immersion is equated to development. Competence, which is the last stage of provider preparation, results in a provider that is prepared for entry to practice.

At the Medical University of South Carolina, a "learning spiral" framework was conceptualized to describe the ways in which teamwork competencies are built and ways of knowing are transformed. As students progress through the stages of the learning cycle (prepare, think, practice, and act), the students "acquire, apply, and demonstrate their interprofessional teamwork competencies in increasingly complex learning settings" (IPEC, 2011, p. 32). Similarly, the University of Minnesota has designed a curriculum that is staged for IPE. Didactic education occurs first, with simulated clinical experiences and actual clinical experiences to follow. The culmination of this learning for each student is an interprofessional clinical practice experience within a hospital or community setting (IPEC, 2011).

The IPE core competencies provide a road map for faculty to implement IPE (Doll et al., 2012); yet the road map does not supply sufficient detail to direct educators on appropriate competencies for each level of learner. Health professions faculty need training and further direction to become effective interprofessional educators; the content

and process of IPE are very different than the traditional academic content they teach (IPEC, 2011). Ideally, leveling of the core IPE competencies would "provide an initial blueprint, suggesting a developmental approach that might assure movement from beginning to intermediate to advanced levels of competency providing the opportunity for planned, leveled learning experiences, focused on engaging students in the right activity for the right purpose at the right time" (Barton et al., 2009, p. 314).

Summary

The use of competencies and competency-based education within health care professions education is widespread, with the number of professions using competency-based education increasing over the past two decades. In fact, the utilization of interprofessional competency-based education is recommended by a variety of health care professions educational associations, including medicine, nursing, dentistry, pharmacy, and public health. Educators must familiarize themselves with the definitions of competence, competency, and competencies, as it is imperative for competency-based professional education. Clear, concise use of a common language is imperative as interprofessional educators work together to design IPE curricula.

Competencies assist the educator with writing learning objectives, developing educational activities, integrating themes throughout the curriculum, and placing appropriate emphasis on core domains. A familiarity with adult learning theory and learner developmental stages are necessary for appropriate placement of the competencies within the curriculum. A tool that assists educators with leveling of competencies is desired, as it would provide a blueprint for curriculum design based on a developmental approach.

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Chapter 4

Methods

This study, using an interesting and innovative research strategy, provides helpful information for IPE educators that plan and design learning activities. In Chapter Four, a review of the study's purpose and research questions are presented. The study's methods include a description of the research design as well as the sample and sample selection. Additionally, data collection procedures are presented with detailed description of each step in the research process. Data management and analysis (description of the Delphi method) are presented and the chapter concludes with the ethical considerations for the research.

Purpose and Research Questions

The purpose of this study was to gain consensus on the leveling of interprofessional education competencies for health care learners using a Delphi approach. The results of the Delphi study provide a blueprint, utilizing a developmental approach, for planned, leveled IPE learning experiences.

The study addressed the following research questions:

1. What competencies should be targeted or planned for students at the beginning of their program of study?
2. What competencies should be targeted or planned for students in the intermediate phase of their program of study?
3. What competencies should be targeted or planned for students at the advanced phase of their program of study?

Research Approach and Design

This study used a Delphi method to gain consensus on the leveling of interprofessional core competencies as a blueprint for faculty to implement interprofessional education (IPE) initiatives. The Delphi method uses structured surveys to collect information from experienced and knowledgeable participants with an attempt to achieve consensus through several rounds of feedback and communication (Barton et al., 2009; Keeney et al., 2011).

For this study, the experts surveyed were key stakeholders and curricular IPE experts from IPE advisory boards or expert panels. The participants were surveyed in three rounds. The initial survey consisted of demographic items and a list of the 39 IPE competencies (See Appendix B). Participants were asked to rate each competency as appropriate for learners in the beginning, intermediate, or advanced phase of their program of study. Subsequent surveys were built upon information in the prior round(s), providing information to the expert participants in the form of feedback regarding group agreement or disagreement on individual competencies.

Setting and Sample

A purposive (nonprobability) sample was used for the study, as the expertise and experience of the participants are desired characteristics for the Delphi method (Keeney et al., 2011). Experts in the field are surveyed in order for their judgments to be recorded when uncertain and incomplete knowledge exists (European Commission, 2006) or to deal with a complex problem (Barton et al., 2009). The sample was recruited from the IPEC Expert Panel, MedEdPORTAL®-IPEC Advisory Committee, and the National Advisory Council for the National Center for Interprofessional Practice and Education.

The expert panel, advisory committee, and advisory council are comprised of experienced health professions educators and practice partners. These team members have been influential in the planning and development of IPE opportunities nationally and represent the breadth of professions typically included in IPE design, implementation, and evaluation. Experts came from the fields of dentistry, nursing (undergraduate and graduate advanced practice), medicine (allopathic and osteopathic), pharmacy, physical therapy, physician assistant, and social work/social welfare. Additionally, experts represent the professional and stakeholder specializations of accreditation, business, education, industry, journalism, and quality improvement. The participants' expertise and experience informed the completion of each round of the survey methodology.

IPEC Expert Panel. The IPEC Expert Panel consists of representatives from the six participating organizations, who came together to develop core competencies for interprofessional collaborative practice. The charge for the expert panel was to: (a) recommend a common core set of competencies relevant across the six professions to address the essential preparation of clinicians for interprofessional collaborative practice, and (b) recommend learning experiences and educational strategies for achieving the competencies and related objectives

The participating organizations included: the American Association of Colleges of Nursing, the American Association of Colleges of Osteopathic Medicine, the American Association of Colleges of Pharmacy, the American Dental Education Association, the Association of American Medical Colleges, and the Association of Schools of Public Health (IPEC, 2011). Twelve experts participated in the core

competency development process and were included in the pool of participants for this sample.

MedEdPORTAL®-IPEC Advisory Committee. The Association of American Medical Colleges (AAMC), as a partner in the IPEC, was awarded funding by the Josiah Macy Jr. Foundation to begin an IPE portal in support of the IPEC Core Competencies report. "This initiative is designed to create a national clearinghouse of competency-linked learning resources for interprofessional education and models of team-based or collaborative care" (AAMC, 2013, para 1).

The Advisory Committee provides strategic planning and guidance for the initiative. Membership is comprised of 11 representatives from health professions education programs, including medicine, physical therapy, public health and health professions, pharmacy, advanced practice nursing, dentistry, and physician assistant.

National Advisory Council for the National Center for Interprofessional Practice and Education. The National Center for Interprofessional Practice and Education is funded by the Health Resources Services Administration (HRSA) to lead, coordinate and study "the advancement of collaborative, team-based health professions education and patient care as an efficient model for improving quality, outcomes and cost" (University of Minnesota, 2013, "About Us"). The National Advisory Council includes 17 members representative of health professions education, patient care, quality improvement, healthcare industry/business, professional certification/accreditation, and philanthropic foundations.

"The national advisory council provides independent, expert advice and guidance—grounded in the broad perspectives and experiences of its members—to

advance the field of interprofessional practice and education. Members of the council are strategic thought partners, collaborators and catalysts for action" (University of Minnesota, 2013, "National Advisory Council", para 1).

Sample size. Forty experts were identified from the expert pools. Of these, invitations were sent to 34 individuals that had available contact information. Contact information for individual experts was obtained through a search of the Google® search engine, professional organization websites, LinkedIn Corporation© connections, and reaching out to a known expert in the pool to facilitate contact.

Invitations to participate in this study were sent to members of the three organizations. For subsequent rounds of the study, an *a priori* decision was made to send surveys only to those individuals that had completed the prior round. Those individuals that had completed the prior round(s) had knowledge of the survey construction and their leveling of the competencies.

Delphi Method in Health Research

The Delphi Method, or Delphi Technique, has been used to elicit opinions and develop consensus of experts in a given field since the 1950s (Keeney, Hasson, & McKenna, 2011). The method was originally conceived of and used by the Rand corporation as a forecasting tool in the military to predict long-range trends (Keeney et al., 2011; Stitt-Gohdes & Crews, 2004). Since that time, the method has been used in many fields to "collect and distill the anonymous judgments of experts using a series of data collection and analysis techniques interspersed with feedback" (Skulmoski, Hartman, & Krahn, 2007, p. 1).

The Delphi Method is an iterative process of staged surveys and feedback that attempt to achieve consensus of a group on an important issue (Keeney et al., 2011). It is important to note the underlying premise of the method is the assumption that group opinion is more valid than an individual opinion (Keeney et al., 2011); ultimately, the method is a means to structure group communication and obtain opinion (Stitt-Gohdes & Crews, 2004). The method is not intended to determine causality, but is intended to facilitate communication.

There are no specific guidelines on the use of the Delphi methodology for research (Keeney et al., 2011). Despite this lack of official opinion or guideline, the method does have some generally accepted steps in collecting opinions and obtaining consensus (See Figure 4-1).

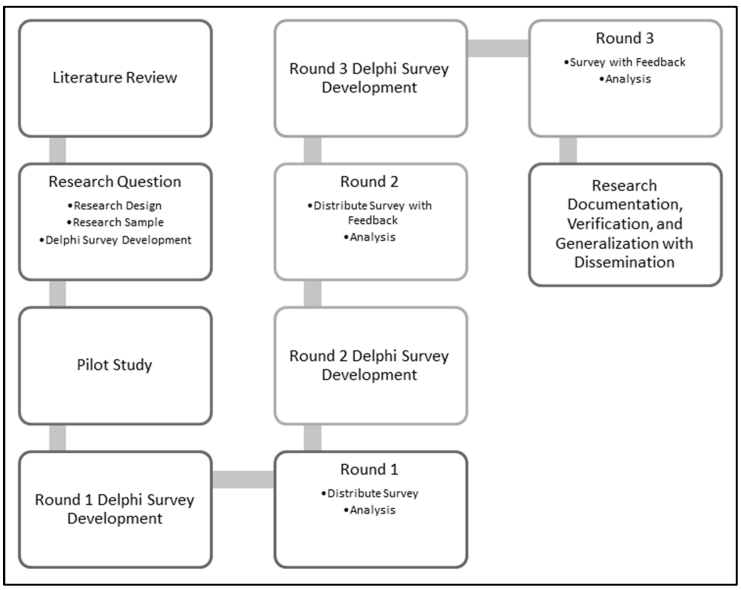

Figure 4-1. Pictorial display of the Delphi process. Steps are outlined for a study that uses three rounds of data collection.

A group of experts is selected as participants/respondents for the survey. In a classical Delphi, the first round of the survey may include open-ended, qualitative questions which will direct future rounds of the survey. In a modified Delphi, the expert

panel is provided pre-selected issues/questions, upon which to make a judgment, that may have been developed based on a review of the literature, focus groups, interviews, or other input from stakeholders (Keeney et al., 2011). The first questionnaire is distributed to the group and responses are collected (Round One). Upon receipt of the responses, the opinions are analyzed appropriately using quantitative or qualitative means. If a pre-set level of consensus is achieved on any item(s) in Round One, the item(s) is/are eliminated from future rounds.

For Round Two, another survey is distributed to the group of experts that includes feedback from Round One on any items that have not met consensus. Feedback typically includes statistical measures of central tendency or percent agreement for options on the survey. This next survey round allows the expert to use information from peers and their own previous opinion to respond to those items that did not achieve a pre-set level of consensus in the first round. Upon receipt of Round Two questionnaires, the researcher again will analyze responses for convergence or divergence of opinions.

A third questionnaire is developed for Round Three that incorporates feedback from the prior rounds; again, this questionnaire is distributed to the group of experts (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). Typically, no more than three rounds are necessary for achievement of group consensus, although further rounds could be carried out if necessary (Keeney et al., 2011; Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). An audit trail is kept by the researcher for any decisions that are made regarding inclusion in the expert panel, number of experts desired in the expert panel (sample size), level of consensus desired,

appropriateness of further research rounds, and amount of information shared with experts in the form of feedback (Skulmoski et al., 2007).

Strengths and weaknesses. Strengths of the Delphi method include anonymity for participants where participants can share their feelings freely, ease of use compared to convening a face-to-face conference, flexibility for use in a wide array of fields, and efficient collection of expert opinion (Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). As with any research method, there are some weaknesses with the Delphi method. The lack of universal guidelines contributes greatly to the weaknesses (Keeney et al., 2011); there are no recommendations for the size of the expert panel, level of consensus desired, or absolute number of rounds required (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007). True anonymity is difficult to achieve (Keeney et al., 2011), attrition may be quite high (Nworie, 2011), and the process can be quite lengthy (Nworie, 2011; Stitt-Gohdes & Crews, 2004). Electronic mailing and use of internet-based survey tools have alleviated some of the difficulties encountered by the researcher and participants related to time commitment, cost, and fatigue (Skulmoski et al., 2007).

Subject selection criteria and sample size justification. Inclusion in the expert panel is based on the requirement of expertise (Skulmoski et al., 2007). Participants should meet the following requirements: (a) knowledge and experience with the issues included in the study, (b) capacity and willingness to participate, (c) sufficient time to participate, and (d) effective communication skills (Keeney et al., 2011; Skulmoski et al., 2007).

There is no direction on the number of experts to include in a representative sample, and as such the size of Delphi expert panels varies considerably (Keeney et al.,

2011; Skulmoski et al., 2007). Sample sizes have ranged from under 15 to thousands of participants (Keeney et al., 2011; Nworie, 2011). When sample sizes have been recommended, anywhere from "8 to 12", "10 to 50", or "300 to 500" participants have been suggested (Keeney et al., 2011, p. 22). In general, a larger sample size is recommended, although sample sizes larger than 30 have rarely improved results (Keeney et al., 2011). Diversity in the expert panel is typically viewed as an asset, as it lends depth and breadth of perspectives to the issue (Nworie, 2011).

Desired level of consensus. The desired level of consensus should be determined prior to initiation of the study (Keeney et al., 2011). There are no guidelines on what level of consensus is required, although some general recommendations range from a simple majority (> 50%) to 100% (Keeney et al., 2011; Stitt-Gohdes & Crews, 2004).

Response rate. "No specific guidelines exist for an acceptable response rate for Delphi studies" (Keeney et al., 2011, p. 53). Because of the demanding nature of the Delphi technique, attrition rates are increased due to fatigue, distractions between rounds, and/or disillusionment with the process (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007). Generally, a 70% response rate is recommended to maintain rigor; however, "achieving this requires considerable effort" (Keeney et al., 2011, p. 53). Suggested methods to increase response rates include: assistance from an influential or endorsed individual, making initial contact via phone or mail prior to the invitation to participate, using a modified Delphi approach with close-ended statements, setting deadlines for participation, use of reminders, and providing monetary incentives (Hsu & Sandford, 2007a).

Procedures and Data Collection

Following IRB approval at a Midwestern academic medical center, electronic surveys were sent to prospective participants via Vovici® software. The surveys included consent for study participation. Surveys were sent to all prospective participants in rounds, with each round building off the previous data collected. Rounds continued until consensus was achieved. Consistent with other Delphi studies, this study was completed in three rounds; typically three rounds, or iterations, are sufficient to collect information and reach consensus (Hsu & Standford, 2007b; Keeney et al., 2011). At least two rounds are necessary, as feedback is provided to participants from one round to the next to inform their completion of the survey (European Commission, 2006; Hsu & Standford, 2007b).

Competencies for IPE were used for the Delphi study (See Appendix A, IPEC, 2011). The competencies were listed with their four competency domains, with a total of 39 competencies to be evaluated for appropriate learning level. An initial request for participation and round one survey were sent to 34 experts. Agreement to participate in the study, and accessing of the survey by participants, indicated consent. Appendix C includes the invitation and informed consent letter.

The Vovici® survey software was used to send reminders periodically to participants that had not yet completed the survey round. Additionally, the following methods were used to increase response rates: (a) personalized reminders to participants via email with individualized requests for each expert's opinion and contribution, (b) delaying deadlines for survey completion based on requests from individual participants,

and (c) use of "Read Receipt" tracking mechanism on personalized email communication.

Round one. In round one, an introductory letter, informed consent, and the initial survey were electronically mailed to potential participants. A listing of competencies was included with a request to level them as beginning, intermediate, or advanced learning. Additionally, demographic data were collected at that time to better describe the expert panel. Appendix B contains the round one survey.

Round two. In round two, a review of the items was summarized by the investigator based on the information provided in the first round. Areas of agreement and disagreement were identified and shared with participants that completed the first round of the survey. Two-thirds agreement on appropriate level of each competency was desired. Competencies that had at least 67% agreement between participants were eliminated from the second round of survey collection. Those competencies that had not achieved 67% consensus were listed again with a request to level them as beginning, intermediate, or advanced learning. Participants were provided with the results from the prior round's leveling percentages (e.g., 32% ranked the competency as beginning level, 56% ranked the competency as intermediate level, and 12% ranked the competency as advanced level). The feedback provided assistance and informed the participants on the current round of leveling.

Round three. In round three, again a review of the items was summarized by the investigator based on the information provided in the second round for participants that completed both previous rounds of the survey. Areas of agreement and disagreement again were identified and competencies that had achieved at least 67% agreement were

eliminated from this round three of the survey collection. Feedback was provided as previously stated. Typically, consensus is reached in the third round, but iterations or rounds may continue until the set level of consensus is achieved (Barton et al., 2009; Hsu & Standford, 2007b; Keeney et al., 2011).

Instrumentation

A researcher-created survey (See Appendix B) was developed for each round of the modified Delphi technique based on the progressive, developmental attainment of competency and the "University of Toronto Core Competencies Framework". The survey was fashioned after the Barton et al. (2009) study that leveled QSEN competencies for nursing education.

The survey began with four demographic questions that allowed for description of the sample. Demographic questions included: (a) profession represented, (b) years of association with education and/or training of health professions, (c) membership in one or more of the expert teams, and (d) level of learner taught (if applicable). The demographic questions were included in each round of the survey.

The survey then proceeded with leveling of the 39 IPEC *Core Competencies for Interprofessional Collaborative Practice* (IPEC, 2011) (See Appendix A). Each competency was listed within their respective competency domains of Teams and Teamwork (12 items), Values and Ethics (10 items), Roles and Responsibilities (9 items), and Interprofessional Communication (8 items). Participants were asked to indicate the appropriate level of learner as beginning, intermediate, or advanced. Each round of the study revealed modifications in the survey; only those competencies that did not reach the desired level of consensus (67%) were carried forward in subsequent rounds.

The survey was sent electronically to all members of the expert panel, along with an introductory letter that also served as consent (See Appendix C). Completion and submission of the questionnaire/survey implied consent. If a participant was unable to complete the survey in one sitting, their information was saved by the Vovici® software and they were able to return to the survey. Vovici® comprehensive survey software was used for data collection (Verint, 2013).

Data Management

Electronic surveys were managed via Vovici® software. The Vovici® software provides the researcher with distribution services, panel/participant management, and collection of data (Verint, 2013). The data from each survey/questionnaire round will be maintained in a secured file at the university site for 15 years as required by the research review board and then destroyed.

Data Analysis

Simple descriptive statistics and percentages were used for analysis in this Delphi study. The data analysis consisted of the following general steps: preparation of the data set, calculation of simple descriptive statistics for each competency (variable) and interpretation of results.

Data preparation began with identifying missing data or incomplete surveys. Descriptive statistics were computed for demographic variables to determine representativeness of the sample. Frequencies and percentages of agreement were calculated for each competency to determine level of consensus (Keeney et al., 2011; Nworie, 2011). Responses from previous rounds of data collection were shared with participants in order to provide feedback from other contributors; this use of the Delphi

method facilitates consensus-building. When competencies reached the 67% consensus threshold, they were removed from further survey rounds.

Ethical Considerations

All data collected for the study are maintained in a secure manner. Data stored on computer files are password protected. There were no anticipated risks or direct benefits to study participants. A determination of designation as "Exempt Review of Human Subject Research" was requested and granted by the institutional review board (IRB).

The Delphi technique includes quasi-anonymity (Keeney et al., 2011). Expert panel members and their responses are known to the investigator. Each participant may be identified by the researcher on each round of the survey, as it is important to provide feedback to only those participants that have completed each round. Inclusion in the expert panel may also be known to participants, as inclusion in this expert group is achieved by only a few individuals; however, expert panel members cannot attribute responses to any one expert. The quasi-anonymity was disclosed to participants upon invitation to participate in the study.

Informed consent was included in an invitation to participate. The “Invitation to Participate and Informed Consent” document (See Appendix C) was developed in collaboration with the institutional IRB at the researcher’s university consistent with the exempt nature of the study. The invitation and consent included: (a) designation as an expert in the field of study, (b) purpose of the research, (c) basic description of the Delphi technique, (d) voluntary nature of participation, (e) estimated timeframe for completion, (f) online survey software, (g) quasi-anonymity, (h) contact information for the researcher, and (i) indication of implied consent. Consent was implied when the

participant “clicks the link” embedded within the introductory electronic mail and began the online survey.

Summary

The study used a Delphi method to answer the research questions. Chapter Four has provided the methodology of this study. The population of interest is IPE educators and the sample population was a panel of expert IPE educators in the United States. Sample selection and detailed data collection procedures were identified. The quantitative instrument used within the study is presented. Finally, information related to data management, analysis, and ethical considerations are explained.

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Chapter 5

The Delphi Method for Consensus-Building: An Application for Interprofessional Education Competencies

This manuscript will be submitted to the *Journal of Research in Interprofessional Practice and Education* and presents an overview of the Delphi method for research. Additionally, an application of the method is offered utilizing a pilot study that leveled the IPE competencies for learners.

Abstract

The Delphi method for research is an iterative process that develops consensus on a topic of interest. A thorough review of the methodology of Delphi research is offered here along with an interprofessional education application of the methodology. To guide educators in developing interprofessional education experiences for health professions learners, the "Core Competencies for Interprofessional Collaborative Practice" were developed by the Interprofessional Education Collaborative. The purpose of this pilot study was to gain consensus of interprofessional education experts on leveling of interprofessional education competencies, which means identifying the placement of learning content and/or competencies at the appropriate stage of learning, for health care learners using a Delphi approach. The results of the pilot Delphi study provide a blueprint, utilizing a developmental approach, for planned, leveled interprofessional education learning experiences at one Midwestern university.

Keywords:

Competencies, Delphi approach, Delphi method, Interprofessional education, Pilot study

Introduction

The Delphi Method, or Delphi Technique, has been used to elicit opinions and develop consensus of experts in a given field since the 1950s (Keeney, Hasson, & McKenna, 2011). The method was originally conceived of and used by the Rand Corporation as a forecasting tool in the military to predict long-range trends (Keeney et al., 2011; Stitt-Gohdes & Crews, 2004). Since that time, the method has been used in many fields to "collect and distill the anonymous judgments of experts using a series of data collection and analysis techniques interspersed with feedback" (Skulmoski, Hartman, & Krahn, 2007, p. 1).

The Delphi Method is an iterative process of staged surveys and feedback that attempt to achieve consensus of a group on an important issue (Keeney et al., 2011). It is important to note that the underlying premise of the method is the assumption that group opinion is more valid than an individual opinion (Keeney et al., 2011). Ultimately, the method is a means to structure group communication and obtain opinion (Stitt-Gohdes & Crews, 2004). The method is not intended to determine causality, but is intended to facilitate communication.

Delphi Methodology

Description of the Research Process

There are no specific guidelines on the use of the Delphi methodology for research (Keeney et al., 2011). Despite this lack of official opinion or guideline, the method does have some generally accepted steps in collecting opinions and obtaining consensus (See Figure 5-1).

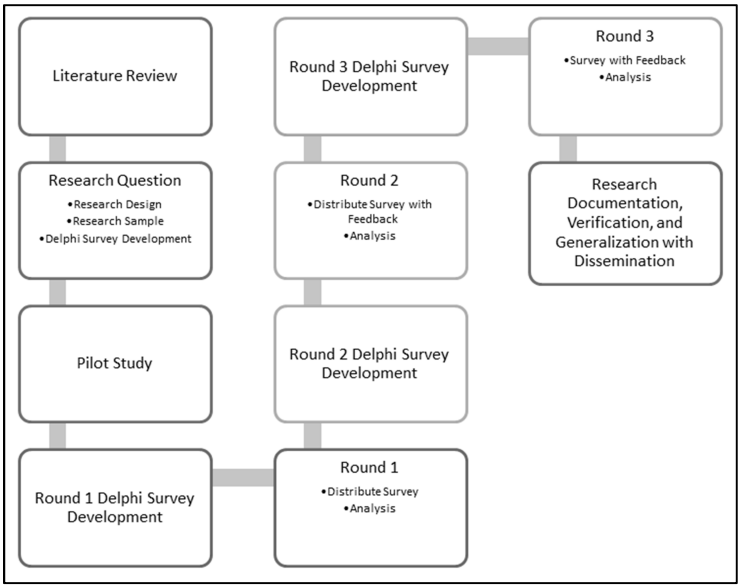

Figure 5-1. Pictorial display of the modified Delphi process. Steps are outlined for a study that uses three rounds of data collection.

Participants/respondents are selected from a group of experts for the survey. In a classical Delphi, the first round of the survey may include open-ended, qualitative questions that will direct future rounds of the survey. In a modified Delphi, the expert panel is provided pre-selected issues/questions, upon which to make a judgment; the issues/questions may have been developed based on a review of the literature, focus groups, interviews, or other input from stakeholders (Keeney et al., 2011). The first questionnaire is distributed to the group and responses are collected (Round One). Upon receipt of the responses, the opinions are analyzed appropriately using quantitative or qualitative means. In most cases, a pre-set level of consensus is identified prior to the survey. If the pre-set level of consensus is achieved on any item(s) in Round One, the item(s) is/are eliminated from future rounds.

For Round Two, another survey is distributed to the group of experts that includes feedback on any items that may not have met consensus from Round One. Feedback to the group typically includes statistical measures of central tendency or percent agreement

for the different response options on the survey. Round Two allows the expert to use information from peers and their own previous opinion to respond to those items that did not achieve a pre-set level of consensus in Round One. Upon receipt of Round Two questionnaires, the researcher again will analyze responses for convergence or divergence of opinions.

A third questionnaire is developed for Round Three that incorporates feedback from the prior rounds; again, this questionnaire is distributed to the group of experts (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). Typically, no more than three rounds are necessary for achievement of group consensus, although further rounds could be carried out if necessary (Keeney et al., 2011; Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). An audit trail is kept by the researcher for any decisions that are made regarding inclusion of members in the expert panel, the number of experts desired in the expert panel (sample size), level of consensus desired, appropriateness of further research rounds, and amount of information shared with experts in the form of feedback (Skulmoski et al., 2007).

Duration of Survey Methodology

Typically three rounds, or iterations, are sufficient to collect information and reach consensus (Hsu & Standford, 2007b; Keeney et al., 2011). At least two rounds are necessary, as feedback is provided to participants from one round to the next to inform their completion of the survey (European Commission, 2006; Hsu & Standford, 2007b). Typically, consensus is reached in the third round, but iterations or rounds may continue until the set level of consensus is achieved (Barton et al., 2009; Hsu & Standford, 2007b; Keeney et al., 2011).

Subject Selection Criteria and Sample Size Justification

Inclusion in the expert panel is based on the requirement of expertise (Skulmoski et al., 2007). Participants should meet the following requirements: (a) knowledge and experience with the issues included in the study, (b) capacity and willingness to participate, (c) sufficient time to participate, and (d) effective communication skills (Keeney et al., 2011; Skulmoski et al., 2007).

There is no direction on the number of experts to include in a representative sample, and as such the size of Delphi expert panels varies considerably (Keeney et al., 2011; Skulmoski et al., 2007). Sample sizes have ranged from under 15 to thousands of participants (Keeney et al., 2011; Nworie, 2011). When sample sizes have been recommended, anywhere from "8 to 12", "10 to 50", or "300 to 500" participants have been suggested (Keeney et al., 2011, p. 22). In general, a larger sample size is recommended, although sample sizes larger than 30 have rarely improved results (Keeney et al., 2011). Diversity in the expert panel is typically viewed as an asset, as it lends depth and breadth of perspectives to the issue (Nworie, 2011).

Desired Level of Consensus

The desired level of consensus should be determined prior to initiation of the study (Keeney et al., 2011). There are no guidelines on what level of consensus is required, although some general recommendations range from a simple majority (> 50%) to 100% (Keeney et al., 2011; Stitt-Gohdes & Crews, 2004).

Response Rate

According to Keeney and colleagues (2011), there are not any specific guidelines that exist for an acceptable response rate for Delphi studies. Because of the demanding

nature of the Delphi technique, attrition rates are increased due to fatigue, distractions between rounds, and/or disillusionment with the process (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007). Generally, a 70% response rate is recommended to maintain rigor; however, achieving this goal may take considerable effort (Keeney et al., 2011).

Strengths and Weaknesses

Strengths of the Delphi method include anonymity for participants where participants can share their feelings freely; ease of use compared to convening a face-to-face conference; flexibility for use in a wide array of fields; and efficient collection of expert opinion (Skulmoski et al., 2007; Stitt-Gohdes & Crews, 2004). As with any research method, there are some weaknesses with the Delphi method. The lack of universal guidelines contributes greatly to the weaknesses (Keeney et al., 2011); there are no recommendations for the size of the expert panel, level of consensus desired, or absolute number of rounds required (Keeney et al., 2011; Nworie, 2011; Skulmoski et al., 2007). True anonymity is difficult to achieve (Keeney et al., 2011), attrition may be quite high (Nworie, 2011), and the process can be quite lengthy (Nworie, 2011; Stitt-Gohdes & Crews, 2004). Electronic mailing and use of internet-based survey tools have alleviated some of the difficulties encountered by the researcher and participants related to time commitment, cost, and fatigue (Skulmoski et al., 2007).

Pilot Study

A pilot study that provides an application of the interesting and innovative research strategy, was completed in Fall 2013 at a Midwestern academic medical center. The purpose of this study was to gain consensus on the leveling of interprofessional

education (IPE) competencies for health care learners using a Delphi approach. The results of the Delphi study provide a blueprint that utilized a developmental approach for planned, leveled IPE learning experiences. The study addressed the following research questions:

1. What competencies should be targeted or planned for students at the beginning of their program of study?

2. What competencies should be targeted or planned for students in the intermediate phase of their program of study?

3. What competencies should be targeted or planned for students at the advanced phase of their program of study?

Methods

Sample. Campus IPE experts were surveyed regarding leveling of IPE competencies for health professions learners. Experts were identified from the Core Planning Team and Curriculum Team on the campus. Twenty experts were invited to participate, with 13 completing the first two rounds successfully (65% response rate) and 12 completing the third round successfully (60% response rate).

Procedures. Following IRB approval at a Midwestern academic medical center, electronic surveys were sent to prospective participants via Vovici® software. The surveys included consent for study participation and were sent to all prospective participants in rounds, with each round building off the previous data collected.

Instrumentation. A researcher-created survey was developed for each round of the modified Delphi technique based on the progressive, developmental attainment of competency and the "University of Toronto Core Competencies Framework". The survey

was fashioned after the Barton et al. (2009) study that leveled Quality and Safety Education for Nursing (QSEN) competencies for nursing education. Forty competencies were evaluated for appropriate learning level (i.e., basic, intermediate, and advanced) within four competency domains (i.e., Teams and Teamwork, Values and Ethics, Roles and Responsibilities, and Interprofessional Communication).

The survey began with demographic questions that allowed for description of the sample. Demographic questions included: (a) profession represented, (b) years of association with education and/or training of health professions, and (c) membership in one or more of the expert teams.

The survey proceeded with leveling of the 40 IPE competencies adopted by the university. The 39 "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011) were previously adapted by this university for their IPE programs; one competency from the original IPEC competencies was separated into two competencies as the curriculum team felt that it allowed for more precise measurement and evaluation. Each competency was listed within their respective competency domains of Teams and Teamwork, Values and Ethics, Roles and Responsibilities, and Interprofessional Communication. Participants were asked to indicate the appropriate level of learner as beginning, intermediate, or advanced. Each round of the study revealed modifications in the survey; only those competencies that did not reach the desired level of consensus were carried forward in subsequent rounds.

Data collection. Three rounds of data collection were required for consensus to be achieved by the participants. Each round is described.

Round one. In round one, an introductory letter, informed consent, and the initial survey were electronically mailed to potential participants. A listing of the 40 competencies was included with a request to level them as beginning, intermediate, or advanced learning. Additionally, demographic data were collected at this time to better describe the expert panel.

Round two. In round two, items were summarized by the investigator based on the information provided in the first round. Areas of agreement and disagreement were identified and shared with expert participants that completed the first round of the survey. Two-thirds agreement (67%) on the appropriate level for each competency was desired. Competencies that had at least 67% agreement between expert participants were eliminated from this round of the survey collection. Those competencies that had not achieved 67% consensus again were listed with a request to level them as beginning, intermediate, or advanced learning. Participants also were provided with the results from the prior round's leveling percentages (e.g., 32% ranked the competency as beginning level, 56% ranked the competency as intermediate level, and 12% ranked the competency as advanced level). The feedback assisted and informed the expert participants for round two of leveling.

Round three. In round three, again a review of the items was summarized by the investigator based on the information provided in the second round and given to the expert participants who had completed both previous rounds of the survey. Areas of agreement and disagreement again were identified and competencies that had achieved at least 67% agreement were eliminated from round three of the survey collection. Feedback was provided as previously stated.

Data analysis. Simple descriptive statistics and percentages were used for analysis in this Delphi study. Descriptive statistics were computed for demographic variables to determine representativeness of the sample. Frequencies and percentages of agreement were calculated for each competency to determine level of consensus (Keeney et al., 2011; Nworie, 2011). Responses from previous rounds of data collection were shared with participants in order to provide feedback from other contributors; this use of the Delphi method facilitates consensus-building. When competencies reached the 67% consensus threshold, they were removed from further survey rounds.

Ethical considerations. The Delphi technique includes quasi-anonymity (Keeney et al., 2011). Expert panel members and their responses are known to the investigator. Each participant may be identified by the researcher on each round of the survey, as it is important to provide feedback to only those participants that have completed each round. Inclusion in the expert panel also may be known to participants, as inclusion in this expert group is achieved by only a few individuals; however, expert panel members cannot attribute responses to any one expert. The quasi-anonymity was disclosed to participants upon invitation to participate in the study.

Results

Thirteen expert participants completed the first round, with 13 participants completing the second round, and 12 participants completing the third round. The response rate for the initial round was 65%. Rounds two of the survey had a 100% continued participation rate and round three of the survey had a 92.3% continued participation rate. Experts represented the professions of allied health/health professionals (physical therapy, occupational therapy, and respiratory therapy), medicine, nursing,

pharmacy, health informatics, library sciences, and graduate medical education. A majority of participants (53.8%) reported being associated with the education and training of health professions for greater than 6 years, representing undergraduate education, master's education, doctoral education, and post-professional training. Representation of the expert pools was as follows: 54.5% campus IPE Core Planning Team and 45.5% campus IPE Curriculum Team.

Instead of the 39 "Core Competencies for Interprofessional Collaborative Practice" recommended by IPEC (2011), forty IPE competencies that were adopted by the university (and based on the IPEC competencies) were leveled by the experts. In the round one survey, 14 of the 40 competencies achieved 67% consensus. In the round two survey, an additional 18 competencies achieved the desired level of consensus. In the round three survey, seven competencies achieved the desired level of consensus. One competency did not reach the desired level of consensus. See Table 5-1 to 5-4 for results of the leveling for each competency domain and the study round in which consensus was obtained. See Appendix D for grouping of the competencies by appropriate level of learning (beginning, intermediate, or advanced).

Fifteen of the IPE competencies were selected for beginning level learners. For the intermediate level of learning, 13 IPE competencies were identified. The advanced level of learning contains 11 IPE competencies. Each of the levels of learning is represented within each of the four competency domains.

Table 5-1

Values and Ethics Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus Was Reached
	Beginning	Intermediate	Advanced	
VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.	X 100%			1
VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	X 91.7%			1
VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.	X 83.3%			1
VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.	X 91.7%			2
VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.		X 75.0%		3
VE6. Develop a trusting relationship with patients, families, and other team members.	X 83.3%			2
VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.	X 75.0%			2
VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.			X 83.3%	1
VE9. Act with honesty and integrity in relationships with patients, families, and other team members.	X 75.0%			1
VE10. Maintain competence in one's own profession appropriate to scope of practice.			X 83.3%	3

Table 5-2

Roles and Responsibilities Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus Was Reached
	Beginning	Intermediate	Advanced	
RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.	X 66.7%			2
RR2. Recognize one's limitations in skills, knowledge, and abilities.	X 83.3%			2
RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.		X 83.3%		1
RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.		X 91.7%		2
RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.			X 66.7%	1
RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.		X 66.7%		1
RR7. Create purposeful interdependent relationships with other professions to improve care and advance learning.			X 75.0%	2
RR8. Engage in continuous professional and interprofessional development to enhance team performance.			X 66.7%	2
RR9. Use unique and complementary abilities of all members of the team to optimize patient care.			X 66.7%	2

Table 5-3

Interprofessional Communication Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus Was Reached
	Beginning	Intermediate	Advanced	
CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.	X 75.0%			3
CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.		X 66.7%		2
CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.		X 66.7%		2
CC4. Listen actively, and encourage ideas and opinions of other team members.	X 100%			2
CC5. Give timely, sensitive, instructive feedback to others about their performance on the team.			X 75.0%	2
CC6: Respond respectfully as a team member to feedback from others.	X 81.8%			1
CC7. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.		X 72.7%		1
CC8. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships.	Did NOT reach consensus			N/A
CC9. Communicate consistently the value of high functioning teams in patient-centered and community-focused care.		X 66.7%		2

Table 5-4

Teams and Teamwork Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus Was Reached
	Beginning	Intermediate	Advanced	
TT1. Describe the process of team development and the roles and practices of effective teams.	X 83.3%			1
TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.		X 69.2%		2
TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.		X 83.3%		1
TT4. Integrate the knowledge and experience of other professions—appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.			X 66.7%	1
TT5. Apply leadership practices that support collaborative practice and team effectiveness.			X 69.2%	2
TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.		X 75.0%		3
TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.		X 92.3%		2
TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.	X 92.3%			2

(continued)

Competency	Appropriate Level of Learning			Round in Which Consensus Was Reached
	Beginning	Intermediate	Advanced	
TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.			X 83.3%	3
TT10. Use available evidence to inform effective teamwork and team-based practices.	X 66.7%			3
TT11. Perform effectively on teams and in different team roles in a variety of settings.		X 75.0%		3
TT12. Serve as a leader and catalyst to transform interprofessional based team care.			X 100%	1

One competency did not reach the 67% consensus threshold; this was Interprofessional Communication competency eight, “Recognize how one’s own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships”. It should be noted that this competency did achieve a 58.3% agreement that the competency was appropriate at the advanced level of learning (54.5% rated as advanced in first round, 58.3% rated as advanced in second round, and 58.3% rated as advanced in the final round of the survey).

Discussion

The results of this modified Delphi pilot study support the appropriate use of the Delphi method for leveling competencies for different health professions learners at the beginning, intermediate, and advanced level of learning. The research methodology was completed in three rounds over a 2-month time period. Results, including the leveling of the IPE competencies, were shared with the campus IPE group at a meeting held after the study was completed. During this meeting, informal feedback regarding the survey administration, survey construction, and the Delphi research process were sought. Participants of the pilot study reported ease of use of the survey methodology and instrument, as well as appreciation of the Delphi process. Participants found it helpful to see other’s feedback as they completed the subsequent rounds of the survey. One suggestion was offered to improve the survey construction by including a definition of “learner”, although discussion amongst the group of participants did not result in consensus regarding this suggestion.

This study does contain some limitations. The initial response rate was relatively low (65%). While low response rates are typical of survey methodology, the researcher did utilize numerous strategies identified within the literature to increase response and continuation rates. Methods suggested and utilized to increase response rates included: (a) assistance from an influential or endorsed individual, (b) making initial contact via phone or mail prior to the invitation to participate, (c) using a modified Delphi approach with close-ended statements, (d) setting deadlines for participation, and (e) use of reminders (Hsu & Sandford, 2007a).

This pilot study also was comprised of a convenience sample of IPE experts at one Midwestern university setting. The results should not be generalized to all IPE educators and/or academic settings.

Implications and Future Research

Identification of appropriate IPE competencies for different levels of learners will assist the health professions educator in writing learning objectives, designing appropriate learning strategies, and developing appropriate evaluation methods based on learner level within their health professions education.

None of the four IPE competency domains may be isolated to one stage of a learner's development as they should be considered as a continuum of learning rather than discrete levels. Thus, an IPE educator and/or curricular team may utilize competencies across the domains within educational offerings appropriate for each level of learner. It should be noted that the IPE experts were asked to identify in which level of learning that each competency should be emphasized. Revisiting the concepts included

within the competency domains at the higher levels of learning should serve to reinforce learning and affirm competence.

Future research will include a national Delphi survey of IPE experts to level the "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011) for health professions learners. Additional research should investigate characteristics of beginning, intermediate, or advanced learner within different health professions; whether there are differences between health professions in how a beginning, intermediate, or advanced learner is defined; and how IPE competencies should be integrated with profession and specialty-specific practice competencies.

Conclusion

The Delphi method is a useful research tool for gaining consensus of recognized experts in a field of study. Identification and publication of method guidelines would assist the novice researcher in completing a Delphi study. This application of the method has demonstrated an appropriate fit between the research questions and methodology.

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Chapter 6

Leveling "Core Competencies for Interprofessional Collaborative Practice" for Learners: A National Delphi Study

This manuscript will be submitted to *Journal of Interprofessional Care* and represents the overall report of research including the findings, discussion, and implications for education and future research.

Abstract

Interprofessional education, where students from two or more health professions learn from, with, and about one another, is one approach to prepare health professions learners for the collaborative practice-ready workforce currently desired in health care. Collaborative, interprofessional practice is necessary to provide safe, high quality, accessible, patient-centered care with improved outcomes for individuals, families, and communities. To guide educators in developing interprofessional education experiences for health professions learners, the "Core Competencies for Interprofessional Collaborative Practice" has been developed. The purpose of this study was to gain consensus of interprofessional education experts on the leveling of interprofessional education competencies for health care learners using a Delphi approach. The results of the Delphi study provide a blueprint, utilizing a developmental approach, for planned, leveled interprofessional education learning experiences.

Keywords:

Competence, Competencies, Delphi approach, Interprofessional education

Introduction

Dynamic changes in the healthcare system and increasingly complex patient care needs have brought into focus the need for quality in health care (Jensen, Harvan, & Royeen, 2009). Good patient outcomes and high-quality care are desired for all individuals, yet this goal is not always guaranteed or achieved (Institute of Medicine [IOM], 2003). Patient care suffers from lack of continuity and coordination of care, miscommunication, redundant and wasteful processes, and excess cost (IOM, 2003). To address these shortcomings, interprofessional care and practice is needed. To prepare a collaborative practice-ready workforce (World Health Organization, 2010), interprofessional education (IPE) and redesigned curricula is needed to prepare health professionals (Interprofessional Education Collaboration [IPEC] Expert Panel, 2011).

One such redesign has been the use of IPE competencies to drive curricula. The use of competencies and competency-based education within programs for educating health professionals is widespread, with the number of professions using IPE or professional competencies for competency-based education increasing over the past two decades (Brightwell & Grant, 2013; Carraccio, Wofsthal, Englander, Ferentz, & Martin, 2002; Harvan, Royeen, & Jensen, 2009). Currently, the utilization of interprofessional competency-based education also is recommended by a variety of health care professions educational associations, including medicine, nursing, dentistry, pharmacy, and public health (Barr, 1998; Curran et al., 2011; IPEC, 2011; Pimlott, 2011).

Competencies assist the educator with writing learning objectives, developing educational activities, integrating themes throughout the curriculum, and placing appropriate emphasis on core domains (Albanese, Mejicano, Mullan, Kokotailo, &

Gruppen, 2008; Galambos & Curl, 2013). In essence, the competencies provide faculty with guidance in their work.

A familiarity with adult learning theory and learner developmental stages are necessary for appropriate placement of the competencies within the curriculum (Carraccio et al., 2002; Swing, 2010). Adult learners tend to be self-directed and responsible for their learning process, which is ideal with the use of competency-based education (Carraccio et al., 2002). Providing feedback on performance and allowing for learner reflection are critical components of adult learning theory and scaffolding, where the learner improves upon performance with guidance and support from an educator (Swing, 2010). Guidance and support is reduced as the learner progresses through learning stages (Swing, 2010).

A tool that assists educators with assigning competencies at the appropriate level (e.g., beginning, intermediate, and advanced) is desired, as it would provide a blueprint for curriculum design based on a developmental approach (Barton, Armstrong, Preheim, Gelmon, & Andrus, 2009; Calhoun, Rowney, Eng, & Hoffman, 2005; Seibert, 2008). Currently, no such tools exist for the "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011). A Delphi study to gain consensus on the leveling of interprofessional education competencies for health care learners was necessary to obtain the necessary expert opinion.

Methods

A modified Delphi study to gain consensus on leveling IPE competencies for learners was carried out in the United States from May to August 2014. It consisted of three rounds of quasi-anonymous self-administered electronic surveys.

Participants

A purposive (nonprobability) sample was used for the study, as the expertise and experience of the participants are desired characteristics for the Delphi method (Keeney, Hasson, & McKenna, 2011). Expert participants were recruited from the Interprofessional Education Collaborative (IPEC) Expert Panel, MedEdPORTAL®-IPEC Advisory Committee, and the National Advisory Council for the National Center for Interprofessional Practice and Education.

The expert pool consisted of members of the expert panel, the advisory committee, and the advisory council that are comprised of experienced health professions educators and practice partners. These members of the panel/committee/council have been influential in the planning and development of IPE opportunities nationally and represent the breadth of professions typically included in IPE design, implementation, and evaluation. Experts came from the fields of dentistry, nursing (undergraduate and graduate advanced practice), medicine (allopathic and osteopathic), pharmacy, physical therapy, physician assistant, and social work/social welfare. Additionally, experts represent the professional and stakeholder specializations of accreditation, business, education, industry, journalism, and quality improvement.

Forty experts were identified from the expert pools; of these, invitations to participate were sent to 34 individuals that had contact information available. Contact information for individual experts was obtained through use of the Google® search engine, professional organization websites, LinkedIn Corporation© connections, and reaching out to a known expert in the pool to facilitate contact.

The participants' expertise and experience informed the completion of each round of the survey methodology. For subsequent rounds of the study, an *a priori* decision was made to send surveys only to those individuals that had completed the prior round. Those individuals that had completed the prior round(s) had knowledge of the survey construction and their leveling of the competencies.

Data Collection

A researcher-created online survey was developed for each round of the modified Delphi technique based on the progressive, developmental attainment of competency and the "University of Toronto Core Competencies Framework" (IPEC, 2011). The survey was fashioned after the Barton et al. (2009) study that leveled Quality and Safety Education for Nurses (QSEN) competencies for nursing education.

The survey began with four demographic questions that allowed for description of the sample. Demographic questions included: (a) profession represented, (b) years of association with education and/or training of health professions, (c) membership in one or more of the expert teams, and (d) level of learner taught (if applicable). The demographic questions were included in each round of the survey.

The survey then proceeded with leveling of the 39 IPEC "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011). Each competency was listed within their respective competency domains of Teams and Teamwork (12 items), Values and Ethics (10 items), Roles and Responsibilities (9 items), and Interprofessional Communication (8 items). Participants were asked to indicate the appropriate level of learner as "beginning", "intermediate", or "advanced".

Subsequent rounds of the study included modifications in the survey; only those competencies that did not reach the desired level of consensus were carried forward in subsequent rounds. Those competencies that had not achieved 67% consensus were listed again with a request to level them as “beginning”, “intermediate”, or “advanced” learning. Participants were provided with the results from the prior round’s leveling percentages (e.g., 32% ranked the competency as beginning level, 56% ranked the competency as intermediate level, and 12% ranked the competency as advanced level). The feedback provided assistance and informed the participants on the current round of leveling.

Vovici® comprehensive survey software was used for data collection (Verint, 2013). The introductory survey was sent electronically to 34 members of the expert panel, along with an introductory letter. Completion and submission of the questionnaire/survey implied consent. If a participant was unable to complete the survey in one sitting, their information was saved by the Vovici® software and they were able to return to the survey. Each survey round was available for three to six weeks; each survey round was closed after a final reminder was sent.

Data Analysis

Simple descriptive statistics and percentages were used for analysis in this Delphi study. The data analysis consisted of the following general steps: preparation of the data set, calculation of simple descriptive statistics for each competency (variable) and interpretation of results.

Data preparation began with identifying missing data or incomplete surveys. Descriptive statistics were computed for demographic variables to determine

representativeness of the sample. Frequencies and percentages of agreement were calculated for each competency to determine level of consensus (Keeney et al., 2011; Nworie, 2011). Responses from previous rounds of data collection were shared with participants in the next round in order to provide feedback from other contributors; this use of the Delphi method facilitates consensus-building. When competencies reached the 67% consensus threshold, they were removed from further survey rounds.

Ethical Considerations

All data collected for the study were maintained in a secure manner. There were no anticipated risks or direct benefits to study participants. A determination of designation as "Exempt Review of Human Subject Research" was requested and granted by the Midwestern medical center institutional review board (IRB). Informed consent was obtained from each participant.

The Delphi technique includes quasi-anonymity (Keeney et al., 2011). The quasi-anonymity was disclosed to participants upon invitation to participate in the study. Expert panel members and their responses are known to the investigator. Each participant may be identified by the researcher on each round of the survey, as it is important to provide feedback to only those participants that have completed each round. Inclusion in the expert panel also may be known to other participants, as inclusion in this expert group is achieved by only a few individuals. However, expert panel members cannot attribute responses to any one expert.

Results

Eighteen expert participants completed the first round, with 14 participants completing the second and third rounds. The response rate for the initial round was

52.9%. Rounds two and three of the survey had a 77.8% continued participation rate. Participants represented the professions of allied health/health professionals (physical therapy, occupational therapy, etc.), dentistry, medicine, nursing, pharmacy, social work, psychology, public health, and health professions education. All participants reported being associated with the education and training of health professions for greater than 6 years, representing undergraduate education (6.7%), master's education (26.7%), doctoral education (60.0%), and post-professional training (53.3%). Representation of the expert pools was as follows: 42.9% IPEC Expert Panel, 35.7% MedEdPORTAL-IPEC Advisory Committee, and 50% National Advisory Council for the National Center for Interprofessional Practice and Education (experts may belong to more than one expert pool).

In the first round survey, 16 competencies achieved 67% consensus. In the second round survey, an additional 18 competencies achieved the desired level of consensus. In the third and final round of the survey, four of the remaining five competencies achieved the desired level of consensus. See Appendix E for grouping of the competencies by appropriate level of learning (beginning, intermediate, or advanced).

Twelve of the IPE competencies were selected for beginning level learners; each of the four competency domains is represented in the beginning level of learning. For the intermediate level of learning, 13 IPE competencies were identified and represent each of the four competency domains. The advanced level of learning contains 13 IPE competencies and represents the Values and Ethics, Roles and Responsibilities, and Teams and Teamwork competency domains. The Interprofessional Communication competency domain did not have any competencies identified at the advanced level of

learning. See Tables 6-1 through 6-4 for leveling of each of the IPE competencies within their competency domain.

Table 6-1

Values and Ethics Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus was Reached
	Beginning	Intermediate	Advanced	
VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.	X			1st
VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	X			1st
VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.	X			2nd
VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.	X			1st
VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.		X		2nd
VE6. Develop a trusting relationship with patients, families, and other team members.		Consensus Not Obtained		
VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.	X			2nd
VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.			X	3rd
VE9. Act with honesty and integrity in relationships with patients, families, and other team members.	X			1st
VE10. Maintain competence in one's own profession appropriate to scope of practice.			X	2nd

Table 6-2

Roles and Responsibilities Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus was Reached
	Beginning	Intermediate	Advanced	
RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.	X			2nd
RR2. Recognize one's limitations in skills, knowledge, and abilities.	X			2nd
RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.			X	1st
RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.		X		1st
RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.			X	2nd
RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.		X		1st
RR7. Create purposeful interdependent relationships with other professions to improve care and advance learning.			X	2nd
RR8. Engage in continuous professional and interprofessional development to enhance team performance.			X	2nd
RR9. Use unique and complementary abilities of all members of the team to optimize patient care.			X	2nd

Table 6-3

Interprofessional Communication Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus was Reached
	Beginning	Intermediate	Advanced	
CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.		X		2nd
CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.		X		1st
CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.		X		1st
CC4. Listen actively, and encourage ideas and opinions of other team members.	X			1st
CC5. Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback from others.		X		3rd
CC6. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.	X			2nd
CC7. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships.		X		2nd
CC9. Communicate consistently the value of high functioning teams in patient- centered and community-focused care.		X		1st

Table 6-4

Teams and Teamwork Competencies

Competency	Appropriate Level of Learning			Round in Which Consensus was Reached
	Beginning	Intermediate	Advanced	
TT1. Describe the process of team development and the roles and practices of effective teams.	X			1st
TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.			X	3rd
TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.		X		1st
TT4. Integrate the knowledge and experience of other professions—appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.		X		1st
TT5. Apply leadership practices that support collaborative practice and team effectiveness.			X	2nd
TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.			X	3rd
TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.			X	2nd
TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.	X			2nd
TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.			X	2nd
TT10. Use available evidence to inform effective teamwork and team-based practices.		X		1st

(continued)

Competency	Appropriate Level of Learning			Round in Which Consensus was Reached
	Beginning	Intermediate	Advanced	
TT11. Perform effectively on teams and in different team roles in a variety of settings.		X		2nd
TT12. Serve as a leader and catalyst to transform interprofessional based team care.			X	1st

One competency did not reach the pre-set 67% consensus threshold within this study. Values and Ethics competency six, "Develop a trusting relationship with patients, families, and other team members", did not achieve the 67% consensus threshold. It should be noted, though, that this competency did achieve a 64.3% agreement that the competency was appropriate at the intermediate level of learning (50% rated as intermediate in first round, 57.1% rated as intermediate in second round, and 64.3% rated as intermediate in the final round of the survey).

Discussion

The results of the modified Delphi study support the leveling of competencies for different learners at different levels in their educational program. Identification of appropriate IPE competencies for different learners will assist the health professions educator in writing learning objectives, designing appropriate learning strategies, and developing appropriate evaluation methods based on learner level within their health professions education.

Within this study, none of the four IPE competency domains could be isolated to one stage of a learner's development. Thus, an IPE educator and/or curricular team may utilize competencies across the domains within educational offerings at the appropriate level for each learner. Although no Interprofessional Communication competencies were identified at the advanced level, it would be inappropriate to assume that the IPE experts deemed interprofessional communication as too "simple" or "below" the advanced level. Rather, it should be noted that the IPE experts were asked to identify in which level of learning that each competency should be emphasized. Revisiting the concepts included within the Interprofessional Communication domain at the advanced level would serve to

reinforce learning and affirm competence. Since interprofessional communication would be a competency that requires continued learning and reinforcement, other aspects of communication needed at the advanced level would be an important consideration.

Limitations

The study contains some limitations. The initial response rate and continuation response rates for the Delphi method were relatively low. While low response rates are typical of survey methodology, the researcher did utilize numerous strategies identified within the literature to increase response and continuation rates. Strategies suggested and utilized to increase response rates included: (a) assistance from an influential or endorsed individual, (b) making initial contact via phone or mail prior to the invitation to participate, (c) using a modified Delphi approach with close-ended statements, (d) setting deadlines for participation, and (e) use of reminders (Hsu & Sandford, 2007a). Despite the low response rates, each of the expert groups was well-represented and a broad variety of health professions participated in the study. Additionally, experienced health professionals involved in the education of health professions learners were utilized to provide generalizable information for IPE educators across the country.

Missing from this study are recommendations of strategies or learning activities to help students gain these IPE competencies. An important next step will include research on theory-based approaches for developing these competencies.

Conclusions

The results of this Delphi study utilized a developmental approach to provide a blueprint for planned, leveled, interprofessional education learning experiences. Further research could explore the following questions: (a) How are beginning, intermediate, or

advanced learner defined?; (b) How are beginning, intermediate, or advanced learners for each profession defined?; (c) How could faculty integrate the IPE competencies with professional competencies required for each individual profession along with the specialty competencies within different fields?; (d) Which strategies or learning activities are appropriate for developing IPE competencies?, and (e) How is competency determined?

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Chapter 7

Summary

This study has explored the leveling of IPE competencies for learners at different stages, or levels, of their learning. Using a modified Delphi method, recognized experts in the field of IPE were surveyed to gain consensus on the appropriate leveling of competencies for health professions learners. This chapter will present a summary of findings, study limitations and strengths, detailed discussion of implications, and recommendations for future research. Three manuscripts have been developed to disseminate the work and findings of this dissertation study; the manuscripts will be summarized below to describe their purpose and importance to the field of health professions education and IPE.

Chapter Three's manuscript, "Competency-Based Education and Competencies for Interprofessional Education: A Review of the Literature", is a comprehensive review of the literature on competency-based education and its' impact on IPE. Definitions of competency and competency-based education, as they apply to health professions education, are provided for the reader. Additionally, a presentation of competencies as directives in health care education and the application of competencies within a curriculum are then reviewed. Finally, the development and implementation of IPE competencies for health care is described. The use of competency-based education within the health professions is common, with the adoption of such curricula increasing. Interprofessional competency-based education, and the use of IPE competencies to guide education, is recommended by a variety of health care professions educational associations.

In Chapter Four, a manuscript is offered that provides the reader an overview of the Delphi method as a research technique. An application of the Delphi method is presented, utilizing the work of a pilot study that preceded this dissertation research. The manuscript, "The Delphi Method for Consensus-Building: An Application for Interprofessional Education Competencies", presents a summary of the Delphi method and how this technique was applied to ascertain consensus on the leveling of IPE competencies at a Midwestern university. The research application supplies educators with a beginning understanding of how the Delphi method may be used within educational research to ascertain consensus.

The manuscript in Chapter Six presents the research findings of this dissertation study. "Leveling 'Core Competencies for Interprofessional Collaborative Practice' for Learners: A Delphi Study" will be submitted to the prominent IPE journal, *Journal of Interprofessional Care*. The results of this study are an important contribution to the IPE education literature, providing expert advice on the appropriate design of IPE learning opportunities for different levels of health professions learners. All but one of the 39 IPEC competencies were designated for beginning, intermediate, or advanced learners by experts in the field of IPE. Educators may use the suggestions of this expert group to develop educational offerings that are appropriate for different levels of learners, built on a developmental approach.

Discussion

Within the current study, none of the four IPE competency domains could be isolated to one stage of a learner's development. Thus, an IPE educator and/or curricular team may utilize competencies across the domains within educational offerings at the

appropriate level for each learner. See Table 7-1 for the distribution of competencies by domain across the designated appropriate levels of learning.

Table 7-1

Competency Distribution by Appropriate Level of Learning

Competency Domain	Beginning	Intermediate	Advanced
Values and Ethics	6	1	2
Roles and Responsibilities	2	2	5
Interprofessional Communication	2	6	0
Teams and Teamwork	2	4	6

Given the research purpose, to gain consensus on the leveling (i.e., beginning, intermediate, or advanced) of interprofessional education competencies, it is within reason to assume the competencies designated at a lower level of learning are "prerequisite" to the higher level competencies. That assumption may be challenged, though, by the research questions that asked which competencies should be targeted or planned for students in the beginning, intermediate, and advanced phases of their program of study. Targeting and/or planning competency placement within educational offerings does not imply that competency is achieved within a single offering; thus, it would be prudent of the educator to ensure repetition of IPE competencies throughout a plan of study.

It is interesting that one competency did not achieve the predetermined level of consensus within the three rounds of this modified Delphi study. This competency did come relatively close to the predetermined level of 67%; the competency achieved a

58.3% agreement that the competency was appropriate at the advanced level of learning. The predetermined level of consensus was arbitrarily set by the researcher, based on a range of recommendations found in the literature (Keeney et al., 2011; Stitt-Gohdes & Crews, 2004). Some individuals could argue that a different level of consensus may have yielded different results, such as all competencies achieving consensus. Additionally, it would be wise to look at the competency in detail to determine if there are characteristics of the written statement; complexity of the knowledge, attitudes, and/or skills within the competency; and targeted level of learner for the competency that may have contributed to the lack of consensus.

While limited to the purpose of this study and capabilities of the Delphi research method, further inquiry may be warranted for the modified Delphi method as it relates to the number of rounds needed to reach consensus. Competencies designated for the advanced level of learning required more survey rounds to reach the predetermined level of consensus. See Table 7-2 for the number of leveled competencies that achieved consensus within each round of the survey methodology.

Table 7-2

Survey Rounds Completed to Reach Consensus for Each Level of Learning

Appropriate Level of Learning	Round in Which Consensus Was Reached		
	First	Second	Third
Beginning	8	4	0
Intermediate	8	4	1
Advanced	2	7	4

As with the competency that did not achieve consensus, it is difficult to know why the advanced level competencies required more rounds of surveys to achieve consensus. The researcher has considered complexity of the written competency statements, complexity of the evaluation method(s) necessary for advanced competencies, and a potential desire of participants to designate beginning and intermediate level competencies before finalizing advanced level competencies as possible reasons for this phenomenon. Without asking participants directly about this finding, it is impossible to determine why this occurred.

Comparison of Pilot Study and Current Study

The pilot study detailed in the fifth chapter of this dissertation was intended as a feasibility study for the national Delphi dissertation study. Findings of the two studies were relatively similar, with all but one competency in each study reaching consensus. Both studies also placed competencies within each domain across multiple levels of learning. The Delphi method was successfully utilized to level the IPEC competencies for different stages or phases of health care learner development.

Individual competencies were recommended for placement in the different levels of learning (i.e., beginning, intermediate, or advanced) by experts in both studies. In-depth analysis between the two studies was not performed, but a cursory review did reveal slight differences between the two studies. The eventual placement of each competency was slightly different between the two studies. Out of a total of 39 competencies, only eight (20.5%) competencies performed differently between the two studies. See Table 7-3 for comparison of competency placement between the two studies.

Table 7-3

Competency Distribution by Level of Learning For Pilot and Current Studies

Competency Domain	Levels of Learning for Pilot and Current Studies					
	Beginning		Intermediate		Advanced	
	Pilot	Current	Pilot	Current	Pilot	Current
Values and Ethics	7	6	1	1	2	2
Roles and Responsibilities	2	2	3	2	4	5
Interprofessional Communication	3	2	4	6	1	0
Teams and Teamwork	3	2	5	4	4	6

There were slight differences noted by the researcher for the two groups of expert participants. The pilot study surveyed curricular IPE experts at a Midwestern academic medical center. These pilot study experts were predominately faculty educators of health professions students, responsible for implementation of curriculum through direct instruction. The current study experts were nationally-recognized experts within health professions education. These current study experts were often high-ranking education leaders within their respective health professions, either in professional organizations and/or within their own universities.

Limitations of the Study

The initial response rate and continuation rates for the Delphi method were relatively low. While low response rates are typical of survey methodology, the researcher did utilize numerous strategies identified within the literature to increase initial response and continuation rates. Methods suggested in the literature to increase response

rates included: assistance from an influential or endorsed individual, making initial contact via phone or mail prior to the invitation to participate, using a modified Delphi approach with close-ended statements, setting deadlines for participation, use of reminders, and monetary incentives (Hsu & Sandford, 2007a). Each of these methods was used by the researcher, excluding the use of monetary incentives. Response rates increased with each individualized electronic communication sent by the researcher, while rates did not increase with use of reminders sent within the electronic survey software. The researcher found personalized, individualized communication with participants useful to build interest in the research study and to remind participants of survey deadlines.

It is possible that results of the study may have been different had the sample size and/or participation rates been increased. The researcher utilized sound Delphi method techniques in determining the sample size, study methodology, recruitment measures, and retention measures (Keeney et al., 2011).

It is difficult to establish reliability and validity in Delphi studies (Keeney et al., 2011). Sample selection, research design, and the consensus process adopted are unique to each study. In response to concerns about reliability and validity, it has been suggested that additional research to validate or refine the findings should be undertaken. For this study, using a modified Delphi technique, close-ended statements and clear description of the decision-making process related to the study design were utilized. The research questions of this study do not lend themselves to a need for replication; the research questions are not generating IPE competencies, rather they are asking for agreement of appropriate level for learners. Reliability of the sample is demonstrated in selection of

recognized expert participants, variability within the sample pool, and use of a moderate-sized sample. Use of an electronic platform to gain consensus also lends reliability; group think and face-to-face bias are avoided (Keeney, Hasson, & McKenna, 2011).

Strengths of the Study

Trustworthiness has been suggested as a more appropriate gauge of rigor for the Delphi method (Keeney, Hasson, & McKenna, 2011). Trustworthiness is comprised of credibility, dependability, transferability, and confirmability. The ongoing iterations of the survey methodology, combined with feedback, demonstrate credibility and dependability. Transferability is demonstrated through the use of this research methodology with other competency-leveling studies. Confirmability is maintained through "detailed description of the Delphi collection and analysis process" (Keeney, Hasson, & McKenna, 2011, p. 103) and use of an audit trail throughout the study.

A broad variety of health professions participated in the study, including allied health professions, dentistry, medicine, nursing, and pharmacy, with each of the expert groups well-represented. Experienced health professionals involved in the education of health professions learners were utilized to provide generalizable information for IPE educators across the country.

Additionally, and most importantly, the experts surveyed in this study agree that the IPE competencies could be placed within different levels of learning for health professions learners. The modified Delphi method was appropriate and useful to gain reliable consensus on appropriate level of learning for the "Core Competencies for Interprofessional Collaborative Practice" (IPEC, 2011; Keeney et al., 2011). It is important to remember that the Delphi method "does not produce any right or wrong

answers or any definitive answers; instead, it produces valid expert opinion" (Keeney et al., 2011, p. 9).

Implications for Practice and Research

The results of this Delphi study provide a blueprint, utilizing a developmental approach, for planned, leveled IPE learning experiences. Educators are given lists of competencies that have been deemed appropriate for beginning, intermediate, or advanced learners. When designing or developing an IPE learning opportunity, the educator may select appropriate competencies to address from these lists of competencies. If developing a series of learning opportunities, which may build off of one another, the educator would be able to draw from the different lists using competencies across the IPE domains. For a beginning level event, the educator would use one or more of the IPE competencies from the beginning list; such as VE4 for Values and Ethics, RR2 for Roles and Responsibilities, CC4 for Interprofessional Communication, and TT8 for Teams and Teamwork. For an intermediate event, the educator would use the intermediate competencies. And, for the advanced event, the educator could pull from the list of advanced competencies.

Further research is indicated for competency-based education and IPE. Extending the current research could explore the following questions: (1) How do we define a beginning, intermediate, or advanced learner?; and (2) Are beginning, intermediate, or advanced learners defined differently for each profession? Additionally, future research is needed to explain how educators will integrate the IPE competencies with professional competencies within each individual profession and specialty competencies within different fields. For example, how do nurse-midwifery educators integrate the "Core

Competencies for Basic Midwifery Practice", the QSEN competencies, and IPEC competencies? Lastly, it is important that research explore how competency is determined.

Conclusion

The results of this modified Delphi study support the appropriate use of leveling competencies for different learners. Identification of appropriate IPE competencies for different learners will assist the health professions educator in writing learning objectives, designing appropriate learning strategies, and developing appropriate evaluation methods based on learner level within their health professions education.

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Appendix A

Core Competencies for Interprofessional Collaborative Practice

General Competency Statement-VE. Work with individuals of other health professions to maintain a climate of mutual respect and shared values.

Specific Values/Ethics Competencies:

VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.

VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.

VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.

VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.

VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.

VE6. Develop a trusting relationship with patients, families, and other team members.

VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.

VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.

VE9. Act with honesty and integrity in relationships with patients, families, and other team members.

VE10. Maintain competence in one's own profession appropriate to scope of practice.

General Competency Statement-RR. Use the knowledge of one's own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served.

Specific Roles/Responsibilities Competencies:

RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.

RR2. Recognize one's limitations in skills, knowledge, and abilities.

RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.

RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.

RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.

RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.

RR7. Forge interdependent relationships with other professions to improve care and advance learning.

RR8. Engage in continuous professional and interprofessional development to enhance team performance.

RR9. Use unique and complementary abilities of all members of the team to optimize patient care.

General Competency Statement-CC. Communicate with patients, families, communities and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease.

Specific Interprofessional Communication Competencies:

CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.

CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.

CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.

CC4. Listen actively, and encourage ideas and opinions of other team members.

CC5. Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback from others.

CC6. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.

CC7. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships.

CC8. Communicate consistently the importance of teamwork in patient- centered and community-focused care.

General Competency Statement-TT. Apply relationship-building values and principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective and equitable.

Specific Team and Teamwork Competencies:

TT1. Describe the process of team development and the roles and practices of effective teams.

TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.

TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.

TT4. Integrate the knowledge and experience of other professions— appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.

TT5. Apply leadership practices that support collaborative practice and team effectiveness.

TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.

TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.

TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.

TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.

TT10. Use available evidence to inform effective teamwork and team-based practices.

TT11. Perform effectively on teams and in different team roles in a variety of settings.

TT12. Serve as a leader and catalyst to transform interprofessional based team care.

Reference:

Interprofessional Education Collaborative Expert Panel. (2011). *Core competencies for interprofessional collaborative practice: Report of an expert panel*. Washington, D.C.: Interprofessional Education Collaborative.

Appendix B

Round One Modified Delphi Survey

Please answer the following questions for demographic purposes.

1. Which profession do you represent primarily?
    a. Allied Health/Health Professions, please specify: _____
    b. Dentistry
    c. Medicine
    d. Nursing
    e. Pharmacy
    f. Social Work
    g. Other, please indicate: _____

2. How many years have you been associated with education/training of health professions?
    a. 0-2 years
    b. 3-5 years
    c. 6-10 years
    d. More than 10 years
    e. N/A

3. I am/have been a member of (check all that apply):
    a. IPEC Expert Panel
    b. MedEdPORTAL-IPEC Advisory Committee
    c. National Advisory Council for the National Center for Interprofessional Practice and Education
    d. Other, please indicate: _____

4. If you are an educator, which level of learner do you teach (check all that apply)?
    a. Undergraduate
    b. Masters
    c. Doctoral
    d. Post-professional training
    e. N/A

For each of the competencies listed below in the Values and Ethics Competency Domain, please indicate which level of learner is most appropriate.

Where in the curriculum should this competency be emphasized for learners?

- At the beginning phase of their program?
- At the intermediate phase of their program?
- At the advanced phase of their program?

Competency	Appropriate Level of Learning		
	Beginning	Intermediate	Advanced
VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.			
VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.			
VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.			
VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.			
VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.			
VE6. Develop a trusting relationship with patients, families, and other team members.			
VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.			
VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.			
VE9. Act with honesty and integrity in relationships with patients, families, and other team members.			
VE10. Maintain competence in one's own profession appropriate to scope of practice.			

For each of the competencies listed below in the Roles and Responsibilities Competency Domain, please indicate which level of learner is most appropriate.

Where in the curriculum should this competency be emphasized for learners?

- At the beginning phase of their program?
- At the intermediate phase of their program?
- At the advanced phase of their program?

Competency	Appropriate Level of Learning		
	Beginning	Intermediate	Advanced
RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.			
RR2. Recognize one's limitations in skills, knowledge, and abilities.			
RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.			
RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.			
RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.			
RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.			
RR7. Forge interdependent relationships with other professions to improve care and advance learning.			
RR8. Engage in continuous professional and interprofessional development to enhance team performance.			
RR9. Use unique and complementary abilities of all members of the team to optimize patient care.			

For each of the competencies listed below in the Interprofessional Communication Competency Domain, please indicate which level of learner is most appropriate.

Where in the curriculum should this competency be emphasized for learners?

- At the beginning phase of their program?
- At the intermediate phase of their program?
- At the advanced phase of their program?

Competency	Appropriate Level of Learning		
	Beginning	Intermediate	Advanced
CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.			
CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.			
CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.			
CC4. Listen actively, and encourage ideas and opinions of other team members.			
CC5. Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback from others.			
CC6. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.			
CC7. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships.			
CC8. Communicate consistently the value of high functioning teams in patient- centered and community-focused care.			

For each of the competencies listed below in the Teams and Teamwork Competency Domain, please indicate which level of learner is most appropriate.

Where in the curriculum should this competency be emphasized for learners?

- At the beginning phase of their program?
- At the intermediate phase of their program?
- At the advanced phase of their program?

Competency	Appropriate Level of Learning		
	Beginning	Intermediate	Advanced
TT1. Describe the process of team development and the roles and practices of effective teams.			
TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.			
TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.			
TT4. Integrate the knowledge and experience of other professions— appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.			
TT5. Apply leadership practices that support collaborative practice and team effectiveness.			
TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.			
TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.			
TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.			
TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.			
TT10. Use available evidence to inform effective teamwork and team-based practices.			
TT11. Perform effectively on teams and in different team roles in a variety of settings.			
TT12. Serve as a leader and catalyst to transform interprofessional based team care.			

Appendix C

Invitation and Informed Consent Letter

Dear Colleague,

You are being asked to participate in a research study entitled "Leveling Interprofessional Education Competencies for Learners." The study is conducted by Cara Busenhart, doctoral student at the University of Kansas School of Nursing. You are being asked to take part in this study because you are an Interprofessional Education expert. About 40 IPE experts will be surveyed.

The purpose of this Delphi study is to gain consensus on the leveling of interprofessional education competencies. The study involves serial rounds of questions to electronically gain consensus about the appropriate leveling of IPE competencies for different levels of learners. The researcher hopes that the information obtained in this study will help in providing a blueprint for IPE curriculum based on a developmental approach.

Your voluntary participation will last approximately 15 to 30 minutes for each round of the survey/questionnaire. If you are unable to complete the survey in one sitting, your information will be saved by the Vovici® software and you will be able to return to your survey. Your participation will involve...

- **Completion of an online survey via Vovici® software that will record your opinions regarding appropriate leveling of IPE competencies for health professions learners.**
- **More than 1 round of survey/questionnaire may be requested of you. A round will consist of completing an online questionnaire, which will record your opinions. It is anticipated that two to three rounds will be sufficient to reach consensus.**
- **You will be asked a short series of questions regarding your demographic information such as health profession, teaching experience, and role with IPE.**

You are free to give only the information you choose. The survey is anonymous to others, but the investigator will be able to link your individual responses to you. Individual responses will not be used in any publication or presentation.

I appreciate your participation. If you have questions about the survey, please do not hesitate to contact me by e-mail at cbusenhart@kumc.edu. If you wish to speak with me by phone, you may contact me at (913) 588-3354.

You are not required to sign this consent form; completion of the attached questionnaire/survey implies your consent.

You may now print a copy of the consent form to keep for your records.

Appendix D

Pilot Study Results: Beginning, Intermediate, and Advanced Levels of Learning

Beginning Level Interprofessional Education Competencies for Pilot Study

Competency	% Agreement	Round in Which Consensus was Reached
VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.	100.0	1
VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	91.7	1
VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.	83.3	1
VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.	91.7	2
VE6. Develop a trusting relationship with patients, families, and other team members.	83.3	2
VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.	75.0	2
VE9. Act with honesty and integrity in relationships with patients, families, and other team members.	75.0	1
RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.	66.7	2
RR2. Recognize one's limitations in skills, knowledge, and abilities.	83.3	2
CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.	75.0	3
CC4. Listen actively, and encourage ideas and opinions of other team members.	100.0	2
CC6: Respond respectfully as a team member to feedback from others.	81.8	1
TT1. Describe the process of team development and the roles and practices of effective teams.	83.3	1
TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.	92.3	2
TT10. Use available evidence to inform effective teamwork and team-based practices.	66.7	3

Intermediate Level Interprofessional Education Competencies for Pilot Study

Competency	% Agreement	Round in Which Consensus was Reached
VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.	75.0	3
RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.	83.3	1
RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.	91.7	2
RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.	66.7	1
CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.	66.7	2
CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.	66.7	2
CC7. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.	72.7	1
CC9. Communicate consistently the value of high functioning teams in patient- centered and community-focused care.	66.7	2
TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.	69.2	2
TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.	83.3	1
TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.	75.0	3
TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.	92.3	2
TT11. Perform effectively on teams and in different team roles in a variety of settings.	75.0	3

Advanced Level Interprofessional Education Competencies for Pilot Study

Competency	% Agreement	Round in Which Consensus was Reached
VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.	83.3	1
VE10. Maintain competence in one's own profession appropriate to scope of practice.	83.3	3
RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.	66.7	1
RR7. Create purposeful interdependent relationships with other professions to improve care and advance learning.	75.0	2
RR8. Engage in continuous professional and interprofessional development to enhance team performance.	66.7	2
RR9. Use unique and complementary abilities of all members of the team to optimize patient care.	66.7	2
CC5. Give timely, sensitive, instructive feedback to others about their performance on the team.	75.0	2
TT4. Integrate the knowledge and experience of other professions— appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.	66.7	1
TT5. Apply leadership practices that support collaborative practice and team effectiveness.	69.2	2
TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.	83.3	3
TT12. Serve as a leader and catalyst to transform interprofessional based team care.	100.0	1

Appendix E

Current Study Results: Beginning, Intermediate, and Advanced Levels of Learning

Beginning Level Interprofessional Education Competencies

Competency	% Agreement	Round in Which Consensus was Reached
VE1. Place the interests of patients and populations at the center of interprofessional health care delivery.	78.6	1
VE2. Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	85.7	1
VE3. Embrace the cultural diversity and individual differences that characterize patients, populations, and the health care team.	85.7	2
VE4. Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.	71.4	1
VE7. Demonstrate high standards of ethical conduct and quality of care in one's contributions to team-based care.	85.7	2
VE9. Act with honesty and integrity in relationships with patients, families, and other team members.	100.0	1
RR1. Communicate one's roles and responsibilities clearly to patients, families, and other professionals.	85.7	2
RR2. Recognize one's limitations in skills, knowledge, and abilities.	100.0	2
CC4. Listen actively, and encourage ideas and opinions of other team members.	73.3	1
CC6. Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict.	85.77	2
TT1. Describe the process of team development and the roles and practices of effective teams.	80.0	1
TT8. Reflect on individual and team performance for individual, as well as team, performance improvement.	85.7	2

Intermediate Level Interprofessional Education Competencies

Competency	% Agreement	Round in Which Consensus was Reached
VE5. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.	85.7	2
RR4. Explain the roles and responsibilities of other care providers and how the team works together to provide care.	71.4	1
RR6. Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.	71.4	1
CC1. Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.	71.4	2
CC2. Organize and communicate information with patients, families, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible.	73.3	1
CC3. Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions.	66.7	1
CC5. Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback from others.	78.6	3
CC7. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships.	85.7	2
CC9. Communicate consistently the value of high functioning teams in patient- centered and community-focused care.	66.7	1

(continued)

Competency	% Agreement	Round in Which Consensus was Reached
TT3. Engage other health professionals—appropriate to the specific care situation—in shared patient-centered problem-solving.	66.7	1
TT4. Integrate the knowledge and experience of other professions— appropriate to the specific care situation—to inform care decisions, while respecting patient and community values and priorities/ preferences for care.	66.7	1
TT10. Use available evidence to inform effective teamwork and team-based practices.	80.0	1
TT11. Perform effectively on teams and in different team roles in a variety of settings.	78.6	2

Advanced Level Interprofessional Education Competencies

Competency	% Agreement	Round in Which Consensus was Reached
VE8. Manage ethical dilemmas specific to interprofessional patient/population centered care situations.	71.4	3
VE10. Maintain competence in one's own profession appropriate to scope of practice.	71.4	2
RR3. Engage diverse healthcare professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific patient care need.	71.4	1
RR5. Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.	85.7	2
RR7. Create purposeful interdependent relationships with other professions to improve care and advance learning.	85.7	2
RR8. Engage in continuous professional and interprofessional development to enhance team performance.	92.9	2
RR9. Use unique and complementary abilities of all members of the team to optimize patient care.	71.4	2
TT2. Develop consensus on the ethical principles to guide all aspects of patient care and team work.	85.7	3
TT5. Apply leadership practices that support collaborative practice and team effectiveness.	100.0	2
TT6. Engage self and others to constructively manage disagreements about values, roles, goals, and actions that arise among healthcare professionals and with patients and families.	92.9	3
TT7. Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.	71.4	2
TT9. Use process improvement strategies to increase the effectiveness of interprofessional teamwork and team-based care.	78.6	2
TT12. Serve as a leader and catalyst to transform interprofessional based team care.	86.7	1