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An Exploratory Study of Pharmacists' Professional Learning

Kristina Wittsrtom

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**AN EXPLORATORY STUDY OF PHARMACISTS
PROFESSIONAL LEARNING**

by

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DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy
Organizational Learning and Instructional Technologies

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DEDICATION

This dissertation is dedicated to Grace and Leonard who
fostered a love of learning and encouraged its pursuit.

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*Those that know, do.
Those that understand, teach.
Aristotle*

I wish to express my gratitude to those who so willing share their experiences and wisdom by mentoring and teaching others. Your dedication to guiding, encouraging and inspiring new knowledge is most appreciated.

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ABSTRACT

Today's healthcare professional is challenged to stay current with increasingly complex therapeutic challenges, greater societal needs and expectations, and a public demand for the best possible care. Professional learning opportunities are needed to develop new knowledge, skills, or abilities to address specific matters encountered during professional practice. Professional learning opportunities must be relevant to a specific professional practice setting and promote change(s) in behavior, attitude, or practice before improvement in patient outcomes and population health can be realized. While much research has investigated professional learning specific to physicians, pharmacists have not been included. The purpose of this study was to identify how practicing pharmacists acquire professional learning. A theoretical model was developed to guide semistructured interviews of a stratified purposeful sample of practicing pharmacists in New Mexico. Pharmacists practicing in community, hospital and specialty settings in both rural and urban locations participated. Replication logic was used in this multiple case study to identify common factors that contribute to professional learning in practicing pharmacists. The study found no significant difference in (a) access or

availability of resources, (b) environmental conditions, or (c) individual learning as a result of practice setting or location. Participants provided strong examples of self-directed learning, a professional pride in lifelong learning and a professional responsibility to stay competent in their practice setting. The factors identified in this study supported the underlying propositions of the theoretical model. The study increases the understanding of how practicing pharmacists acquire professional learning and can be operationalized in more comprehensive quantitative studies. This research contributes to the understanding of professional learning and can be used to develop educational methods that lead to enhancement and support of more effective professional learning.

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CHAPTER ONE INTRODUCTION

Introduction to the Chapter

Pharmacists, like other healthcare professionals, complete an intense, focused, competency-based educational program before entering professional practice. However, no professional program can provide or develop all the skills, knowledge, abilities, and attitudes needed to practice. These require that the foundational education be combined with work experience and lifelong learning. Pharmacists have an ethical obligation and responsibility to remain competent in the ability to deliver patient services in accordance with contemporary standards and public expectations. This dissertation study investigates how practicing pharmacists acquire professional learning. Professional learning is defined as the formal or informal experience of seeking new knowledge, skills, or abilities to address specific matters encountered during professional practice that result in a change(s) in behavior, attitude, or practice.

The focus of this study is to examine the factors that contribute to professional learning and its transfer to daily professional practice. This first chapter provides a brief background to define the problem statement. The proposed theoretical model used to develop the research questions is followed by the significance of the study and its limitations and assumptions. Definitions of specific terms used in this presentation are included.

Background of the Study

While the art and practice of pharmacy is documented over many centuries, it is within the last 100 years that formal education, training and regulations for continuing education have evolved. Prior to World War II, professional healthcare leaders believed

that the national requirement of extensive pre-service education was sufficient for a lifetime of work when combined with some periodic voluntary updates. However, the post-war social changes, the advent of research-based knowledge, and advancing technology required that healthcare professionals adopt a lifelong learning approach to maintain and improve their professional practice knowledge and skills (Cervero, 2000). During the 1960s, the federal government expressed concerns of professional obsolescence; professional organizations questioned the efficacy of voluntary continuing professional education to maintain competence; and the public demanded that state regulatory agencies take steps to assure professional competence in healthcare. These events led to the adoption of mandatory continuing education for most healthcare practitioners. Even though no evidence existed to support mandatory continuing education as a method for sustaining professional competence, the requirement seemed to placate those with concerns (Vlasses, 2006).

Today's healthcare environment is still changing rapidly. Increasingly complex technology combined with greater societal needs and expectations has generated a demand for greater accountability from healthcare providers. The public wants assurances that the best possible care is being provided. An extensive literature review by the Institute of Medicine (IOM) found that while some methods of continuing education affect a positive change in healthcare professional behavior, there is a need for multiple learning opportunities and multiple methods of education to effectively impact professional performance (Institute of Medicine, 2010). The IOM report concludes that continuing education fails to deliver relevant information in a manner that prepares healthcare providers to provide high quality healthcare and assure patient safety.

Improved patient outcomes can be expected when healthcare practitioners adopt new technologies and use evidence-based approaches. An effective change in professional practice requires that individual healthcare practitioners modify their approach to healthcare delivery. The modifications require professional learning (change in behavior, attitude or skill) before transfer to professional practice occurs. Extensive efforts have been made to modify learning interventions (continuing education activities) to produce the professional learning that results in changes in practice (Institute of Medicine, 2010; Marinopoulos, Dormain, Ratanawongsa, Wilson, Ashar & Magaziner, 2007; Moore, 2007). This study focuses on understanding professional learning as the first step in affecting a change in professional performance.

To identify factors that promote professional learning, one must understand how learners approach professional learning. Considerable research has been conducted on physician learning including the effectiveness of educational methods and techniques, as well as the processes that result in professional learning (Gagliardi, Wright, Victor, Brouwers & Silver, 2009; Jennett, Jones & Mast, 1994; Moore, 2007; Slotnik, 1999, 2000, 2001). In contrast, research on how pharmacists learn has not been widely investigated. Research specific to practicing pharmacists (not students of pharmacy) consists primarily of surveys that provide information about preferences of continuing education activities (Abel & Ruddy, 2008; Driesen, Simoens & Laekeman, 2008), factors influencing participation in continuing education activities (Fjortoft, 2006; Hanson, Bruskiwitz & DeMuth, 2007; Maio, Belazi, Goldfarb, Phillips & Crawford, 2003), or effectiveness of continuing education activities (Martin, Bruskiwitz, & Chewing, 2010; Patterson, 1999; Rouleau, Beauchesne & Laurier, 2007).

Research specific to how pharmacists learn the behavior, attitudes and skills necessary to make successful practice changes is limited in comparison to that of physicians. Because of differences in professional practice, it cannot be assumed that the studies investigating physician learning are readily transferable to pharmacists. Research on how pharmacists acquire professional learning is needed to better understand the educational needs that lead to successful professional development.

Problem Statement

No empirical research has been published investigating how practicing pharmacists acquire professional learning or what factors support pharmacists professional learning. Research is needed to document how pharmacists acquire professional learning.

Purpose of the Study

Professional learning must be presented in a manner that is relevant to professional practice. To do so, requires that educational providers and the pharmacy profession understand the factors that promote the pursuit of professional learning and its acquisition. The purpose of this exploratory study is to identify these factors. The results will be used to identify germane concepts and constructs that can be operationalized for use in more comprehensive quantitative studies of pharmacists' professional learning.

Theoretical Basis of the Study

My proposed theoretical model for this study combines the classic learning transfer models of Baldwin and Ford (1988) and Holton (1996) with that of Holland and Nimmo (1999a). Learning transfer is defined here as the effective and continuing application, generalizability, and maintenance of new knowledge and skills. The initial

work of Baldwin and Ford (1988) defines variable influences on the process of learning transfer. The influences are categorized into three factors: (a) learning characteristics, including motivation, ability and personality; (b) intervention design and delivery including aspects of practice relevance and appropriate content; and (c) the work environment including support and opportunity to use new knowledge and skills (Baldwin & Ford, 1988). Holton (1996) amended the model by distinguishing between learning and performance. He defines learning as an internal behavior motivated by the individual's decision to learn-or-not-learn. Individual performance, in contrast, is external, observable, and measurable. While the learning of new knowledge and skills may occur, development of professional learning occurs only when the three influences defined by Baldwin are present at appropriate levels and a change in behavior, attitude, or practice can be observed (Holton, 1996). These classic models have been well-studied in a variety of organizational training situations, predominantly from the viewpoint of human resource development.

Determining the process of learning is a greater challenge within the healthcare professions. The learning stimulus is more likely to be spontaneous, requiring prompt resolution. Learning is not always constructed using defined goals and objectives to develop action and evaluation. Professional learning is highly self-directed, with content, learning methods, and learning resources selected by the individual specifically for the purpose of improving knowledge, skills and attitudes as required by professional practice. The professional learning process, and the potential for learning transfer, occurs as a result of a blend of individual learning styles and the circumstances of professional practice (Caffarella, 1988).

Holland and Nimmo (1999a) propose a model of practice change specific to pharmacists. They blend factors from the classic human resource models with the circumstances of professional practice. The model has three basic conditions that must be met for a change in pharmacists' performance to occur. These are (a) learning resources that enable development of new knowledge and skills specific; (b) motivation to change including individual personality, attitude, professional expertise and self-directed learning ability; and (c) a practice environment supportive of the opportunity to practice the new knowledge and skills.

The theoretical model used in this study proposes three elements are necessary for professional learning. (See Figure 1-1). Resources (Holland & Nimmo, 1999a) is substituted for instructional/learning design (Baldwin & Ford, 1988; Holton, 1996). Environment is the practice setting. Individual factors include all nuances of the individual learner. These elements overlap—with each one influencing the others. Resources are influenced by environment; environment influences individual factors; individual factors influence type of practice *et cetera*. Professional learning is predicted to occur when the three elements are sufficiently present to promote a change in behavior, attitude or practice. A change in practice cannot occur without successful professional learning. This study will focus on the three elements that are theorized to promote professional learning.

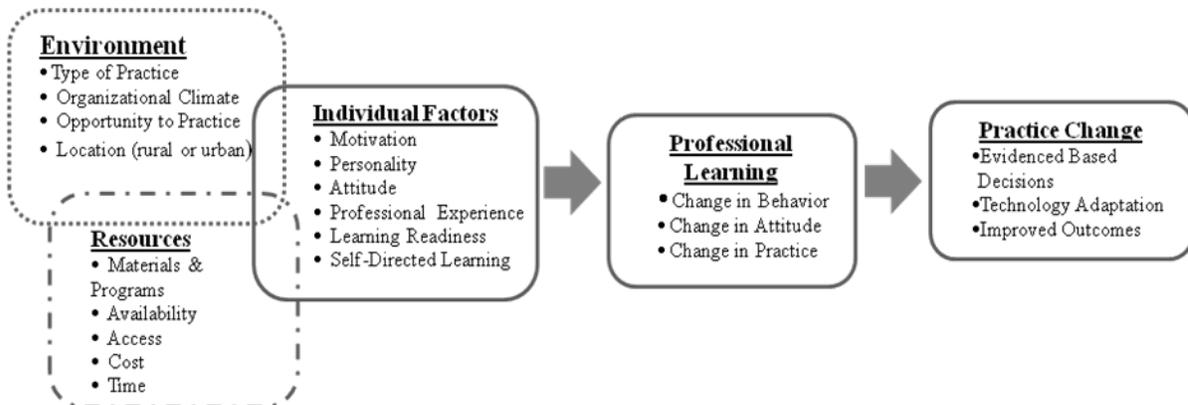


Figure 1-1. Theoretical Model of Practice Change

Explanation of Theoretical Model:

- Resources: Materials and programs specific to the learning needs must be readily available. The learner must know that these are available; have access to them; and know how to use the resources effectively. The cost of learning resources should be affordable. The learner must have adequate time to engage in learning.
- Environment: The type of professional practice may influence learning. A busy community practice pharmacist might have less time and access to fewer resources than a clinical specialist. In contrast, a highly specialized practitioner may find fewer opportunities or resources are available for professional learning. The climate of the work organization also influences learning. If work performance is measured by the number of prescriptions filled, then professional learning may suffer. The opportunity to learn new knowledge and skills must be present. Professional learning may be influenced by practice location, specifically urban versus rural. Access to a medical library may be an advantage to the urban practice. A rural practice may have a less diversified patient population and have less need for new knowledge or skills.

- Individual factors: Motivation and attitudes influence the decision to learn and vary with the individual. Willingness to change, perceived appropriateness of specific actions, or an ability to perform in a particular role as well as personality traits will influence the learning process. Professional expertise is used to select what needs to be learned and to identify when the learning is enough. A major addition to the classic model of learning transfer is the need for strong self-directed learning skills. A pharmacist must decide what needs to be learned as the need arises from daily practice.

When these three factors are present at appropriate levels, it is predicted that learning will occur (Baldwin & Ford, 1988; Holton, 1996; Holland & Nimmo, 1999a). The simple acquisition of learning (awareness of something not known before) is not the ultimate goal. When the learning results in a change in behavior, attitude or practice, then meaningful professional learning has occurred (Webster-Wright, 2009).

The results from this study will determine if this model is supported and identify the factors that contribute to successful professional learning in pharmacists. Once identified, these factors can be used to develop more quantitative studies to investigate how practicing pharmacists acquire professional learning.

Design of the Study

The purpose of this study was to identify factors that support or impede the pursuit of professional learning by practicing pharmacists. Because no empirical studies on this topic could be located, an exploration of relevant factors was needed to assist in theory building. Semistructured interviews of practicing pharmacists were used to identify potential factors that support the pursuit of professional learning. This qualitative

investigation used replication logic in a multiple-case study to test the theoretical model and identify those factors that promote or hinder practicing pharmacists development of professional learning. Yin (2009) suggests that such an approach is appropriate when examining contemporary activities over which the investigator has little or no control, and when the objective of the research is to explain or explore phenomenon. Chapter 3 provides a detailed discussion of methods used in this study.

Research Questions

1. How do practicing pharmacists acquire professional learning?
2. What factors promote or hinder professional learning in practicing pharmacists?

Significance of the Study

The results of this study have several potential benefits for practicing pharmacists, pharmacy educators, regulators and commercial entities. Research on the professional learning of pharmacists beyond anecdotal descriptions of continuing education activities and delivery methods has not been published. The lack of empirical research sustains the maintenance of mandatory continuing education as a condition of license renewal. Constructive strategies are needed to move professional education from the delivery of simplistic continuing education to the development and recognition of more complex professional learning. Before such strategies can be developed, it is necessary to identify the factors that support and promote professional learning. This study begins to define those factors and enables the development of a robust quantitative study of pharmacists professional learning.

This research contributes to the detailed understanding of elements that support or impede practicing pharmacists' pursuit of professional learning. An improved

understanding of these factors can be used by educational organizations to provide improved quality programs that lead to enhancement and support of more effective professional learning. Regulatory agencies can develop alternatives to mandatory continuing education for relicensure. Pressure can be brought to bear on commercial entities whose operating strategies deliberately block any attempt at professional learning.

Assumptions and Limitations

Assumptions

A fundamental assumption of this study was that there are common, identifiable factors that support how pharmacists acquire professional learning. Differences in practice settings or locations may exist, but some common barriers were anticipated.

Limitations

The study includes only a small stratified purposeful sample of practicing pharmacists in the state of New Mexico. Motivation and other individual characteristics that define a lifelong learner capable of self-directed learning as a means to maintain current and innovative professional practices are not expected to be universally applicable to all pharmacists.

This is an initial investigation of the contributing concepts and constructs of professional learning. The study serves only as a beginning and cannot be generalized beyond the individuals interviewed.

Organization of Dissertation

This dissertation contains four additional chapters in addition to this first introductory chapter.

Chapter Two: Literature Review. This chapter looks at recent literature concerning aspects of continuing education, professional development and professional learning in healthcare professions. A review of professional learning and resulting practice change theories as well as theoretical aspects of self-directed learning will be laid as a foundation for the research. A review of available literature on multiple case-studies using replication logic is provided to frame the method of the study.

Chapter Three: Methods. This chapter presents the methods and design of the qualitative multi-case research. Aspects of transcript analysis, coding and analysis within and across the subgroups will be delineated.

Chapter Four: Results. The findings from individual interviews were used to generate data to address the research questions and propositions presented. A summary of the findings and the analyses are presented.

Chapter Five: Summary and Discussion. This chapter discusses the findings and their implications and applications in understanding more about pharmacists professional learning. Limitations encountered in the study as well as recommendations for use of the finding in additional research are presented. A discussion of the significance of study concludes the chapter.

Definition of Terms

Continuing Education or Continuing Professional Education (CE or CPE).

Formal definition.

Continuing education for the profession of pharmacy is a structured educational activity designed or intended to support the continuing development of pharmacists and/or pharmacy

technicians to maintain and enhance their competence. Continuing pharmacy education (CPE) should promote problem-solving and critical thinking and be applicable to the practice of pharmacy.

(Accreditation Council for Pharmacy Education, 2009)

Alternative definition. A structured, formal learning event developed and presented by an organization as an educational event for pharmacists. Usually as episodic information updates delivered in a didactic manner with separation of learner engagement from authentic work experiences. (Webster-Wright, 2009)

Formal learning. A learning activity in which both the learning objectives and the structure of the learning process are determined by someone other than the learner (Mocker & Spear, 1982).

Learning. The process by which knowledge and skills are acquired, or when existing knowledge or skills are used in a new context.

Learning transfer. The effective and continuing application, generalizability and maintenance of new knowledge and skills as demonstrated by a change in behavior, attitude, or performance.

Non-formal learning. A learning activity in which the learner decides what is to be learned, but seeks assistance in how to achieve the desired learning (Mocker & Spear, 1982). An activity, without externally imposed criteria, specifically initiated with an intention to learn. Dimensions include implicit learning, deliberative learning and reactive learning. (Eraut, 2000)

Pattern-Matching. An analytical step in generalization at the level of theory (rather than empirical data). Compares an empirically based pattern with a predicted one.

Contributes to internal validity. (Yin, 2009, pp.136-141)

Practicing pharmacist. A registered pharmacist who spends not less than 75% of work time providing pharmacy services to patients.

Professional learning. A lived experience of continuing to learn as a professional that results in a change in behavior, attitude or practice. Professional learning is a self-directed, active, situated, social, and constructed learning experience. (Webster-Wright, 2009)

Or

The formal or informal experience of seeking new knowledge, skills or abilities to address specific matters encountered during professional practice that results in a change(s) in behavior, attitude or practice.

Propositions. An educated guess at the possible outcomes of the study, derived from the literature and theories, that serves to focus the data collection, determine the directions and scope of the study and form the foundation for a conceptual structure or framework. Equates to hypotheses of quantitative research.

PubMed. A database maintained by the United States National Library of Medicine and the National Library of Medicine that includes references, abstracts and full-text articles on life science and biomedical topics.

Replication Logic. An alternative to the sampling logic used in multiple-case studies. Analogous to multiple experiments in that the results of each case are compared with other cases and with the proposed theory. Cases are selected to (1) predict similar results

(literal replication), or (2) predict contrasting results with anticipated explanations (theoretical replication) (Bergen & While, 2000; Eisenhardt & Graebner, 2007; Kohn, 1997; Rowley, 2002; Yin, 1999).

Self-directed learning. A process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes (Knowles, 1975).

CHAPTER TWO LITERATURE REVIEW

Introduction to the Chapter, Part I

Pharmacists, like other healthcare professionals, complete an intense, focused, competency-based educational program before entering professional practice. However, no professional program can provide or develop *all* the skills, knowledge, abilities, and attitudes needed for practice. These require that the foundational education be combined with work experience and lifelong learning. This chapter will review representative literature investigating the components and processes of effective professional learning with an emphasis of pharmacist professional learning followed by a review of the literature on case study methods. The chapter is presented in two parts. The first part reviews the literature applicable to the research questions including review and discussion of professional learning and the three elements: resources, environment and individual factors introduced in Chapter 1. The second part of the chapter reviews the literature on the selected research method.

Professional Learning

What is required for professional learning to occur? The professional development of healthcare practitioners is expected to result in a change in behavior, attitude or practice that leads to improvements in patient healthcare and outcomes. Does professional learning result in expected changes? Under what conditions? How is change measured? What models are proposed for professional learning?

A search of PubMed used “learning transfer AND education AND outcomes NOT disease” and located 282 articles. The majority of these were continuing medical education activities or disease/patient outcomes with only 32 articles specific to learning

aspects of professional healthcare continuing education. A search of Academic Research Complete netted only 36 hits for “learning transfer”. In contrast, a search for “training transfer NOT children NOT students NOT animals” found nearly 1,000 articles. The majority of research on learning transfer in adults is generated from Human Resource Development (HRD) and measures the training effectiveness within organizations.

Organizational HRD training is an investment in human resources predetermined to change behavior or performance in an individual. The content of the training is usually selected and developed with little input from participants and is often a regulatory requirement. Not surprisingly, only about 50% of training investments result in organizational or individual improvements (Saks, 2002, as cited in Burke & Hutchins, 2007). While no similar studies have been conducted for healthcare education, it is reasonable to assume that the return on investment is no better than that reported in HRD research.

For transfer of training (or learning) to occur, new knowledge and skills must be generalized to the job context and maintained over a period of time on the job. From the variety of models for transfer of learning and related factors, the Baldwin and Ford (1988) framework and the conceptual model of Holton (1996) are the most commonly cited and used in transfer studies. The Baldwin and Ford framework divides the factors affecting learning into three groups: (a) training inputs, specifically learner characteristics, the instructional design and the work environment; (b) training outputs, or the learning and retention of knowledge from the training; and (c) conditions of transfer as the generalization and maintenance of training (see Figure 2-1). All three training inputs contribute directly to learning and retention which in turn, directly influences

generalization and maintenance (practice). The characteristics of the individual and the work environment directly impact implementation of learning while the intervention design has only an indirect impact. It should be noted that Baldwin's model does not address the self-directed learner or learning resources, but focuses on formal instructor-developed learning activities.

Holton (1996) based his conceptual model on the premise that learning is an internal behavior and a means to improved performance. The model proposes three primary outcomes of training: learning, individual performance, and organizational results. In contrast to the Baldwin and Ford

model, Holton theorizes that learning is affected only by ability and that it is the individual *performance* that is influenced by learner characteristics, environmental elements, and content (see Figure 2-2). Both models suggest that the individual performance is influenced by similar factors and differ slightly only in factors that promote application of learning.

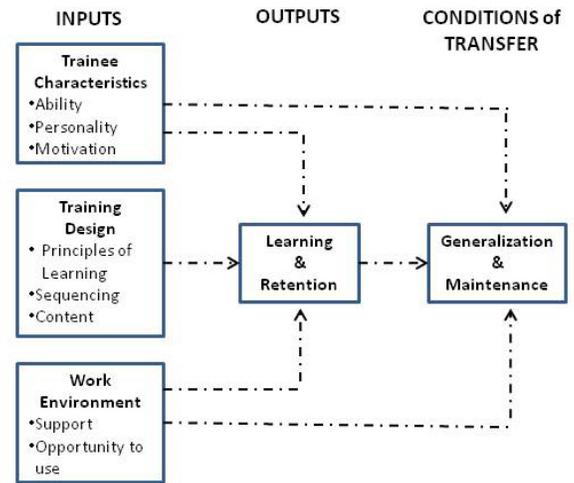


Figure 2-1. A Model of Transfer Process (Baldwin & Ford, 1988)

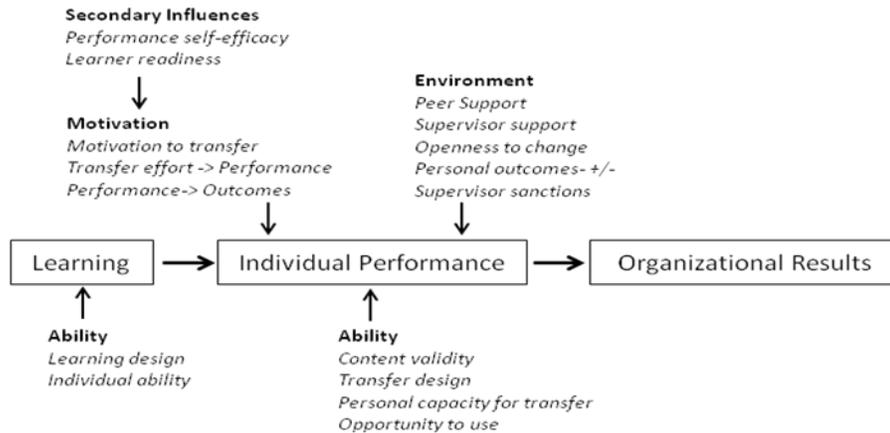


Figure 2-2. Learning Transfer System (Holton, 1996)

The literature offers diverse empirical studies on the application of learning and the factors that contribute to its application. Some studies explore a single factor such as the relevance of content to learning (Liebermann & Hoffmann, 2008) or student perception of factors that impact learning (Lim & Johnson, 2002). Other studies look at the effect of multiple factors impacting learning and application (Kirwan & Birchall, 2006; Velada, Caetano, Michel, Lyons, & Kavanagh, 2007). In addition to empirical studies, meta-analyses and literature reviews are available (Arthur, Bennett, Edens, & Bell, 2003; Merriam & Leahy, 2005; Subedi, 2004; Yamnill & McLean, 2001). The overwhelming research-derived consensus is that learning and its application are impacted by three categories of training input: individual characteristics, training activity design, and work environment.

A recent integrative literature review (Burke & Hutchins, 2007) provides a comprehensive summary of 170 empirical learning research studies. The authors summarize specific factors for which a strong or moderate relationship with learning or training has been reported in the literature (see Table 2-1).

Table 2-1 Summary of Transfer Influences

Learner Characteristics	Intervention Design	Work Environment
Cognitive ability	Learning goals	Climate
Self-efficacy	Content relevance	Supervisory support
Pretraining motivation	Practice & feedback	Peer support
Anxiety/negative affectivity	Behavioral modeling	Opportunity to perform
Openness to experience	Error-based examples	
Perceived utility		
Career planning		
Organizational commitment		

The study reports little research to support motivation to learn, or motivation to transfer, as important learner characteristics. A paucity of empirical data exists to support the influence of active learning methods or technology support as important design components. An additional criticism is that much research uses a single assessment administered shortly after completion of the learning activity. Few studies assess aspects of learning and retention at more significant time frames of 6 months to a year after the learning activity (Burke & Hutchins, 2007).

Almost all learning-specific studies used only formal, instructor-developed activities as the source of learning. Healthcare professionals learn in many ways that shape their practice including formal continuing education programs, interactions with professional peers, and self-directed learning episodes in different combinations and ranges of activities. The self-directed selection of learning activities requires a modification to the learning transfer models discussed above. The learner is more independent, making learning decisions motivated by professional needs which may or may not be met by formal instructional activities.

Campagna and Newlin (1997) studied key factors influencing pharmacist performance when making drug therapy decisions. They identified eight factors:



Figure 2-3. Practice Change Model (Holland & Nimmo, 1999a)

attitudes, economic structure, expertise, laws and regulations, motivation, personality, practice settings and public expectations; as the most important and influential in practice behavior.

Holland and Nimmo (1999a) synthesized these factors into their practice change model. They theorize that practice change cannot occur unless three sets of conditions are simultaneously satisfied (see Figure 2-3). The practice

environment condition is essentially equivalent to the work environment of training models. Motivational strategies contain factors similar to those within learner characteristics. The major difference in this model is that aspects of training design have been replaced with learning resources. This contribution, when integrated with the HRD training models, provides a workable theory of learning for the self-directed healthcare professional (see Figure 1-1 Theoretical Model of Practice Change).

Professional learning can be summarized as a theoretical model containing many factors that interact in complex patterns unique to specific situations. Analysis of learning can be facilitated by grouping the factors into three general categories: the intervention, the workplace environment, and the individual.

Effectiveness of Intervention

Healthcare professionals must continue learning at every stage of their professional career to stay current with advances in research and treatment in their fields as well as maintain current knowledge and skills in patient care. The mandated continuing education (or continuous professional development) programs are intended to provide professionals with the knowledge needed to maintain practice skills. However, this formal intervention has been found to be ineffective in meeting public expectations for quality and safety in healthcare (Fletcher, Hager, & Russell, 2007; Institute of Medicine, 2001, 2010; Swankin, LeBuhn, & Morrison, 2006).

Continuing education activities are based on a belief that exposure to knowledge will lead healthcare providers to improve their practice and, consequently, improve patient care. Formal continuing education activities range from passive, didactic, large-group presentations to very interactive learning methods such as workshops, small groups and individualized training sessions. In an effort to address the educational shortcomings within the continuing education system, much research has been done on the effectiveness of formal continuing education. The bulk of the research has been driven and supported by the medical community with little investigation of pharmacy, nursing or other healthcare professional practice areas. For purposes of this study, it will be assumed that effective learning strategies, or interventions, are universal to all healthcare professionals.

Interventions in Continuing Medical Education

Extensive research has attempted to determine the overall effectiveness of continuing medical education (CME). The literature provides literally thousands of

articles about implementing practice change in healthcare. It is difficult to identify primary literature studies because these studies are poorly indexed and are scattered throughout a variety of journals. Periodic systematic reviews of the literature provide a representative overview of the extent of research in this area. Table 2-2 contains a summary of the more relevant systematic reviews addressing the effectiveness of interventions from formal continuing medical education activities.

Table 2-2. Summary of Systematic Reviews of Continuing Medical Education Effectiveness

Citation	Results and Conclusions
Davis, Thomas, Oxman, & Haynes, 1992	<ul style="list-style-type: none"> • Search period 1977-1991 • 50 randomized controlled trials • CME is more effective when it incorporates practice-based enabling and reinforcing strategies • Adequate assessment of physician needs leads to increased possibility for change
Oxman, Thompson, Davis, & Haynes, 1995	<ul style="list-style-type: none"> • Search period 1990-1993 • 102 trials • Dissemination-only activities had little to no effect • More complex interventions were most often moderately effective in changing performance
Davis, Thompson, Oxman, & Haynes, 1995	<ul style="list-style-type: none"> • Search period 1975–1994 • 99 trials • Conferences have little impact on improving professional practice. • More effective methods such as systematic practice-based interventions are seldom used by CME providers
Bero et al., 1998	<ul style="list-style-type: none"> • Search period 1966–1995 • 18 systematic reviews • Little to no effect seen with written materials or didactic educational meetings • Multifaceted interventions & interactive workshops found to be consistently effective
Davis et al., 1999	<ul style="list-style-type: none"> • Search period 1993–1999 • 14 randomized control trials • Didactic interventions not successful • Case discussion, role-play, hands-on practice are more effective • Sequential sessions are more effective

The scope and extent of research about the effectiveness in disseminating and retaining medical knowledge is evident in a study commissioned by the U. S. Department of Health & Human Services, Agency for Healthcare Research and Quality. The Johns Hopkins Evidence-Based Practice Center was tasked to comprehensively and systematically synthesize evidence regarding the effectiveness of continuing medical education (CME) and the comparative effectiveness of differing instructional designs for CME in terms of impact on knowledge, attitudes, skills, practice behavior, and clinical outcomes (Marinopoulos et al., 2007). The study goal was to answer specific questions about evidence supporting methods of CME delivery; persistence of change over time; audience characteristics and/or external factors reinforcing behavior change; and reliability and validity of the methods used to measure effectiveness. Multiple databases were searched using open-dates. A total of 68,000 citations were found. Specific inclusion criteria winnowed the citations to 136 articles and nine systematic reviews. Each study was then categorized by study characteristics, CME characteristics, and outcomes. In addition, each was graded as to quantity, quality, and consistency of available evidence addressing each key question.

Despite the low quality of study designs and the lack of valid and reliable evaluation tools, the 560-page study concludes that most studies suggest that CME is effective, at least to some degree, in achieving and maintaining the objectives studied.

Three common themes emerged:

- Live media was more effective than print.
- Multimedia was more effective than single media interventions.
- Multiple exposures were more effective than a single exposure.

The study recommends that more research is needed to determine, with any degree of certainty, which types of media, techniques and audience characteristics are associated with improvements in outcomes.

In summary, while well-designed interventions can result in change of practice with varying effect, no intervention is superior to others. No single intervention method produces change in all settings. Specific types of change in practice seem to require distinct types of intervention (Grol & Grimshaw, 2003).

Interventions in Continuing Pharmacy Education

In contrast to the studies done on the effectiveness of interventions in continuing medical education, very little research on continuing pharmacy education is available. A systematic search of literature found no comprehensive reviews on the effectiveness of continuing pharmacy education. A search of several electronic databases found few citations: PubMed (20 citations), PsycINFO (12 citations), International Pharmaceutical Abstracts (IPA) (153 citations), Educational Resources Information Center (ERIC) (50 citations), and the Research and Development Resource Base (RDRB) (174 citations). Titles, abstracts, and then full articles were reviewed for content assessing the effectiveness of interventions in continuing pharmacy education.

The small number of research articles specific to pharmacy interventions and impact on practice behavior are summarized in Table 2-3. As with studies on continuing medical education, the impact of interventions in continuing education for pharmacists has mixed results on changes in behavior. A critique of continuing education studies (Robertson, Umble, & Cervero, 2003) chides researchers for attempts to find a causal

relationship between continuing education formats and changes in behavior without considering other factors that might moderate effects.

Table 2-3.
Summary of Research on Continuing Pharmacy Education Effectiveness

Citation	Results and Conclusion
Koda-Kimble & Batz, 1994	<ul style="list-style-type: none"> • Single active learning event • 1 year follow-up showed changes in practice
Patterson, 1999	<ul style="list-style-type: none"> • Quasi-experimental, multiple interventions • Significant changes seen only in documentation & follow-up of practice changes
Watson et al., 2002	<ul style="list-style-type: none"> • 2 x 2 factorial, cluster RCT comparing printed material to multiple intervention strategies • No significant difference found in practice changes as result of interventional strategies
Kansanaho, Pietla, & Airaksinen, 2003	<ul style="list-style-type: none"> • Single multi-modal program delivered over 1 year • Appeared to result in practice change
Fjortoft, 2006	<ul style="list-style-type: none"> • Single interactive program • Significant difference found between pre/post tests with decline in follow-up survey • Effective in initial increase in knowledge but no change in behavior
Saini, Smith, Armour, & Krass, 2006	<ul style="list-style-type: none"> • Parallel group repeated measures design • Education intervention was carefully designed using program planning model (ADDIE) • Effective in behavioral changes in practice
Rouleau, et al., 2007	<ul style="list-style-type: none"> • Quasi-experimental • Pre/post test & log of interventions • No difference as result of intervention
Martin, et al., 2010	<ul style="list-style-type: none"> • Quasi-experimental • Pre/post tests & survey of self efficacy • Intervention increased self-efficacy. Found correlation between self-efficacy & practice change

Robertson et al. (2003) concludes that while continuing education that is ongoing, contextually relevant, interactive, and based on needs analysis is more likely to effect a change in practice and in patient outcomes, continuing education cannot target only

practitioner behavior, but must consider the larger system. Maio et al. (2003) supports this conclusion, citing the Holland and Nimmo (1999a) practice change model.

Education in and of itself does not necessarily result in a change in behavior unless other components including practice environment and individual characteristics are also considered.

Resources for Learning

The Holland and Nimmo (1999a) practice change model expands formal training interventions beyond aspects of design and delivery, adding considerations of awareness, accessibility, affordability, and time. The most well designed learning intervention will not achieve the learning goals if the learners are not aware of its existence. In addition, the program must be in a geographical location accessible to the learner at an opportune time to meet the learning needs. For example, if a learner needs immediate information about disease state management to address patient issues, a formal intervention scheduled in six months and several hundred miles away will not meet the learning needs. The cost, both time and dollars, is an additional consideration for participation in formal learning activities.

These barriers to traditional continuing education activities have been well discussed in the literature (Austin, Marini, Glover, & Croteau, 2005; Bower, Girard, Wessel, Becker, & Choi, 2008; Garganta, 1989; Marriott, Duncan, & McNamara, 2007; Parboosingh, 2002). Time constraints, work or program schedules, and requirements for travel are the most frequently reported barriers to participation in formal, instructor led educational activities. Convenient programs are often not relevant to professional practice and are often attended to meet only the mandatory continuing education

requirements. Learning applicable to professional practice is more likely to be self-directed and focused on a particular topic.

The literature describes physicians' learning as either formal or informal (Campbell, Parboosingh, & Slotnick, 1999; Jennett, et al., 1994; Slotnick, 1999, 2000). Formal learning includes long-term, planned learning projects and continuing medical education activities used to address general problems or to acquire new information. Informal learning is in response to specific problems as they arise in daily practice. These are characterized by uncertainty, ambiguity, and conflicting values that require prompt resolution from self-directed learning. Problem solutions are more likely to be self-directed readings, consultations, or Internet searches rather than formal learning activities (Horsley, O'Neill, & Campbell, 2009).

Haug (1997) used a meta-analytic procedure to categorize and rank physicians' preferred information sources from 12 studies. Books and journals were ranked highest, followed by consultation with colleagues, then workshops or meetings. A similar study of family physicians ranked colleague consultation first, followed by books and journals as information sources for patient care (Verhoeven, Boerma, & Jong, 1995). Within the last ten years, more research has been conducted on information-seeking behaviors and the resources used in informal learning. Table 2-4 provides a summary of some recent research findings on physician information-seeking behaviors.

Table 2-4 Summary of Research on Information Seeking Behaviors and Resources Used

Citation	Results and Conclusions
Bennett, Casebeer, Kristofco, & Strasser, 2004	Reasons for using the Internet to seek information: <ul style="list-style-type: none"> • Latest research on specific topics • New information in a disease area • Specific patient problem • Drug dose information • New therapy or product information Journals ranked as most important for clinical information
Shershneva, Carnes, & Bakken, 2006	Qualitative exploration of learning and teaching. Generalist & specialist consultations are effective as an informal learning activity.
Bennett, Casebeer, Zheng, & Kristofco, 2006	Large survey of learning resources reports: <ul style="list-style-type: none"> • Consult with colleague (64%) • Online journals (36%) • Professional association web sites (27%) • Medical point-of-care databases (25%) • CME programs (9%)
Horsley et al., 2009	Review of 31 resources used in personal learning projects: <ul style="list-style-type: none"> • Literature- primary studies (22%) • Literature-narrative studies (15%) • Internet search (8%) • Textbook (7%)
Gagliardi, et al., 2009	Survey of self-directed learning resources used by surgeons: <ul style="list-style-type: none"> • Written (print or online) (59%) • Consult with colleagues (24%) • Both (17%)

A search of pharmacy-indexing databases found little research specific to resources used by pharmacists during informal learning. The existence of informal learning is recognized by professional organizations because it is included in materials and references to continuous professional development, a combination of formal and informal learning activities (Rouse, 2004; Stasyk, Schnindel, & Wiens, 2005). Continuous professional development programs offer many examples of informal learning including research on a topic to solve a patient/practice-related issue, a literature

review, preparation of a professional presentation, writing an article, teaching students, and consultation with colleagues or experts. Austen et al. (2005) found the most frequently used Canadian learning resource to be regional drug information centers. One of the most significant learning activities reported by practicing pharmacists was teaching pharmacy students. In an unpublished survey, New Mexico pharmacists reported that reading journals and newsletters was the primary resource used for learning followed by discussion with peers and physicians; Internet searches; preceptoring pharmacy students; and discussion with drug representatives (Wittstrom, 2009).

The most frequently reported barriers to informal learning are time and resource management. The job demands may not allow the time needed for informal learning at the workplace. When time is available, the resources are not necessarily accessible. Large chain pharmacies often restrict computer use to distribution purposes forcing pharmacists to conduct informal learning outside of the practice workplace.

Searching for information online has its own challenges. A study of Internet use by pharmacists in North Ireland (McCaw, McGlade, & McElnay, 2007) reported that about 60% of pharmacists accessed health-related websites up to five times per week with online journals being the most popular site. A small survey study of hospital pharmacists (Balen & Jewesson, 2004) found that most respondents were moderately comfortable with online information searches, but were in need of more training in the use of search engines for effective use of medical databases and online information. Bennett et al. (2004) reported that while most physicians found the Internet useful, issues of credibility and relevance of information were concerns.

Resources for informal learning, particularly Internet use, require that healthcare professionals acquire competency in information literacy and knowledge management. Parboosingh (2002) defines information literacy as the ability to collect, store, collate, retrieve, and use information to solve problems. Knowledge management is the ability to integrate both experiential and empirical knowledge and to operationalize these to changes in practice. The immense volume of information now available electronically is itself a barrier. Bennett et al. (2006) reports that Internet barriers include: specific information not readily available; too much information to scan; difficulties in navigating or searching online; and difficulty downloading information.

In summary, resources for professional learning can be either formal or informal learning activities. In both instances, the needed resources for learning must be readily available and accessible. While issues of time constraints must be managed on an individual basis, each learner needs the skills necessary for effective search of the information available. Skills in informatics and knowledge management are necessary for all healthcare professionals.

Impact of Practice Environment

The presentation of knowledge alone cannot affect a change in practice. The reasons for this can be attributed to many factors at a variety of levels. Barriers include the number of new guidelines, procedures, and techniques presented each year; patient demands and expectations; social pressures within teams or units; expectations of administrators/management; the culture or management of the organization; and practical or financial considerations. A series of studies related to improvement in patient care

found that educating the professional was not sufficient to change practice and that success required interventions at multiple levels (Grol, 2002).

A systematic analysis of barriers to change in practice found that obstacles to change develop at different levels in the healthcare system (Grol & Grimshaw, 2003). Obstacles occur at the level of the patient, the individual professional, the healthcare team, the organization, or the greater environment. They summarize barriers to implementing change into three categories (see Table 2-5). Change in clinical practice is only partly in the hands of the practitioner with ultimate outcomes influenced by the organization and culture of the practice.

Table 2-5. Environmental Barriers to Implementing Practice Change

Category	Barriers
Practice Environment (organizational context)	Financial disincentive (lack of reimbursement) Organizational constraints (lack of time) Perception of liability (risk of complaint) Patient expectations (“need” for a prescription)
Prevailing opinion (social context)	Standards of practice (usual routines) Opinion leaders (key person agreement) Medical training (obsolete knowledge) Advocacy (pharmaceutical companies)
Knowledge and attitudes (professional context)	Clinical uncertainty (unnecessary test) Sense of competence (self confidence in skills) Information overload (inability to evaluate evidence)

From Grol & Grimshaw, 2003

A recent qualitative study analyzing attendee-perceived barriers to implementing learning from continuing medical education activities found similar barriers (Price, Miller, Rahm, Brace, & Larson, 2010). The study involved a single organization preparing and presenting continuing medical education activities for employee physicians. The program evaluations asked participants to identify potential barriers to

integrating the knowledge and skills into their professional practice. From the more than 3,000 statements, 12 categories of barriers were derived.

Five major categories represent the majority of perceived barriers. About 29% of respondents reported no perceived barriers to implementing learning. Time was reported by 26% of the respondents – including insufficient patient appointment time for new process or a lack of time to learn/practice the new concept. Barriers specific to the organizational structure (12%) included lack of access to supplies or equipment; lack of accessible medical records; uncertainty about the cost; physical structure of building or room; poor relationships between departments; conflicting system policies and priorities; workload challenges; and staffing shortages. More than 15% of the barriers were patient related. Patient beliefs, attitudes, priorities, or predetermined goals conflicted or hindered implementation of a change (e.g., antibiotics for bronchitis). Lack of adherence and specific patient factors (multiple diseases, family or social situations) also make change difficult. Provider barriers (10%) included fear of consequences or legal ramifications and lack of opportunity to use learning because it was outside the user practice area.

In contrast, assessing a change in professional practice as a result of continuing pharmacy education is much more difficult. Changes in professional practice are most easily measured by review of patient intervention records. While patient-physician interactions are routinely recorded into the patient chart, most pharmacist interventions are not currently documented. Practitioners in hospital pharmacy (27.5%) and in specialized clinical practice (10.2%) are more likely to document interventions for retrospective analysis than are the more than 50% of pharmacists practicing community pharmacy (Midwest Pharmacy Workforce Research Consortium, 2009). A current

environmental deterrent to changing professional practice is the organizational structure, especially in for-profit practices. The survey showed that 40.3% of pharmacists practiced in chain, mass merchandiser or supermarket environments, many deliberately structured to prevent distractions. Chain pharmacies routinely block access to the Internet restricting electronic data sources, allowing only specific reference subscriptions. In addition, performance assessment is often based on number of prescriptions filled rather than quality of patient care (personal communication).

Pharmacist education research is not evaluating the barriers to implementing learning from continuing education activities, but instead is focused on learner preferences for delivery of the education. Some investigations are simple surveys asking which continuing education delivery method – live, online, professional journals, or print – the respondent used in the last 12 months (Abel & Ruddy, 2008). Others attempt to correlate learning methods with motivational influences (Driesen, et al., 2008) or measure differences in the activity design and presentation (McNamara, Duncan, McDowell, & Marriott, 2009). Unlike research in medical professional learning, pharmacy-related research has not focused on outcomes or behavioral changes resulting from the educational activity.

Only two articles mention practice setting as a consideration in continuing pharmacy education. Maio et al. (2003) found that hospital pharmacists were most likely to participate in continuing education programs. In addition, hospital pharmacists were more likely to use educational tools beyond the printed and lecture formats preferred by community pharmacists. A reevaluation of facilitators and barriers to lifelong learning found that community pharmacists were less likely than institutional pharmacists to

obtain release time from the job for continuing education activities. Issues concerning professional or community recognition, encouragement, or career advancement were neither motivators nor deterrents to educational participation (Hanson, et al., 2007).

In summary, the practice setting – the work environment – plays a significant role in changing professional practice. The improvement of patient care goes beyond changing the knowledge, skills and attitude of healthcare professionals. For change to occur, the roles of people – both provider and receiver – and the system in which healthcare is provided must be understood. The educational approaches must be integrated with corresponding modifications to the environment in which the change is to take place (Grol, 2002; Holland & Nimmo, 1999a; Price et al., 2010).

Individual Factors

Extensive research on adult learners and the individual factors that contribute to learning and the retention of learning has been published. A review of all adult education literature is beyond the scope of this study. Instead, focus will be placed on representative research specific to pharmacists and other healthcare providers. Some healthcare providers have a profession that is actively practiced with passion, to others it is only a job.

Active practitioners include those whose constant effort to learn leads them to an ever more refined conception and execution of their responsibilities as well as those who seem content to grind through their days practicing routine skills and using long-familiar knowledge.

(Houle, 1980)

The series by Nimmo and Holland contends that motivation to change is a combination of motivation, personality and professional socialization (Holland & Nimmo, 1999a, 1999b; Nimmo & Holland, 1999a, 1999b, 2000).

Personality

A review of five studies of personality traits of pharmacists, each using a different measure, was presented by Nimmo and Holland (1999b). They suggest a dominant personality type among pharmacists characterized by a strong sense of responsibility, conscientiousness, practicality, and logic. It was estimated that about 20% of practitioners had a fear of interpersonal communication. Current practitioners chose pharmacy because they prefer well-planned routine work. Pharmacists may not be willing to accept a change in responsibilities or are not successful when an attempt is made.

The culture of pharmacy practice may itself hinder change in practice. Anecdotal observations of Canadian pharmacists identified pharmacist personality traits that slowed adaptation of change in issues of patient care (Rosenthal, Austen, & Tsuyuki, 2010). They report that pharmacists are simply more comfortable performing routine tasks, not that pharmacists are incapable of changing behavior. A lack of confidence in clinical skills and a fear of new responsibilities may slow acceptance of new practice roles. Assumption of risk is also a deterrent to change. A practice spectrum contains early innovators who have already adopted a more patient-centered practice at one end and those who focus strictly on the technical, distribution aspects of pharmacy at the opposite end. The majority of practitioners are in the middle and need assistance to step outside their comfort zone.

Professional socialization is the process by which one acquires the values that shape one's notion of professional self (Nimmo & Holland, 1999b). Professional socialization is influenced by teaching faculty, internship preceptors, student peers, coworkers, and professional associations. The end result is an internalized set of attitudes and values that determine the individual's conceptualization of what is appropriate in their perceived role.

Motivation

Personal motivation also exists as a continuum. At one end are those who strive to stay current with advances in practice, who seek opportunities to provide innovative services, and who actively participate in professional organizations. These proactive innovators need little more than exposure to new ideas to explore and implement them. At the opposite end are those who suspend all learning efforts once the national licensing exams have been passed. These practitioners regard professional education as a requirement for relicensure and believe any changes in practice are the responsibility of the employer (Nimmo & Holland, 2000). Those in the middle will benefit from constructive coaching.

Nimmo and Holland (2000) suggest that the key to motivating pharmacists to initiate practice change lies in cultivating a change in the intrinsically held professional attitudes and values rather than emphasizing extrinsic rewards. A change in practice not only requires the learning of new skills and knowledge, but also a professional resocialization to reformulate practice-related attitudes and values. To facilitate motivation, they offer a model based on Krathwol's affective learning taxonomy (as cited

in Nimmo & Holland, 2000). Professional resocialization may contribute to developing the necessary motivation for practice change.

Professional Experience

Professional experience is considered to be more than the length of time one functions as a professional. Houle (1980) describes professionals as “deeply versed in advanced and subtle bodies of knowledge, which they apply with dedication to solving complex practical problems.” Houle contends that professionals

...learn by study, apprenticeship, and experience, both by expanding their comprehension of formal disciplines and by finding new ways to use them to achieve specific ends, constantly moving forward and backward from theory to practice so that each enriches the other. (p.1)

He goes on to suggest that professionals continue to learn in three ways that frequently overlap: passive instruction of predetermined knowledge and skills; an exploratory inquiry mode that results in synthesis or creation of new techniques; and performance. Performance is more active and involves practice in the actual work setting. For purposes of this study, professional experience is the experience that comes from the performance mode of practice.

Many have theorized on the process of learning from experience. Common to all these theories is the concept that learning from experience involves the connection of current experiences to those from the past. Learning from experience is cyclical in that new events are linked to old (Merriam & Caffarella, 1999; Mott, 2000). Mott proposes that practitioners actually create new knowledge from the experiences and context of the workplace. While novice practitioners depend on the knowledge and skills gained from

formal instructional settings, the more experienced tend to learn from self-initiated, action-oriented and informal events to construct a unique knowledge base in the context of their practice (Daley, 1999; Dreyfus & Dreyfus, 1980; Dreyfus, 2004).

Much of the applicable professional learning is a result of responding to problems within the practice. Schon's reflective practitioner model suggests that the high, hard ground of preprofessional, research-based education and training is not a reality. Rather, professionals routinely find themselves in a "messy swamp of ambiguous, ill-defined and conflicting situations for which no theories or models apply" (Schon, 1983). Schon suggests that practitioners rely on practical experience, tacit and intuitive knowledge and reflection-in-action to solve the problems of professional practice. Reflection is a social process imbedded in practice. This is a developmental process in which a system of rules and procedures are first learned, recognized for appropriate application in certain situations, and then developed into new forms of knowing in actual practice situations. Professional experience is the build up of a *repertoire* of examples, images, understandings and actions that can be applied to unique situations (p.56).

The concept of reflective practice appears to be supported by psychological theories that attempt to explain professional expertise. Development of expertise occurs through a process of cognitive restructuring of the knowledge upon which the professional acts. Studies on expert performance have shown that deliberative practice (effortful activity intended to improve performance) is the primary mechanism by which expertise is acquired (Ericsson & Charness, 1994). The practitioner must be willing to exert an effortful and conscious attempt to solve unfamiliar problems, not just ignore them. A small study (Mamede & Schmidt, 2004) measured differences in physician

reflective practice and expertise proposing a relationship between reflective practices and degree of expertise in professional lives. While a useful five-factor model emerged from the study, results varied from no reflection to almost always and did not correspond to professional expertise. More research is recommended.

Rosenthal et al. (2010) hypothesizes a similar range of reflection in pharmacists with innovative practitioners willing to investigate and explore change in practice while others remain comfortable performing the routine tasks that have been previously mastered. Those who have developed the capacity to reflect on practice as needed to solve messy problems have continued to learn and expand upon their professional experience and expertise. Houle (1980) suggests that reflective practices are necessary for lifelong learning. Without reflection, one cannot prevent the repetitiveness of practice from leading to staleness, boredom, and routinization of thought as a precondition of failure to learn new knowledge and skills.

Self-Directed Learning

This section is not intended to review the extensive literature on self-directed learning, but rather to provide an overview of the more prevalent theories as possible explanations of adult learning. Perhaps the most well-known description offered to explain the characteristics of adult learners is Knowles' concept of andragogy (Knowles, 1975). Adult learners are characterized as independent self-directed personalities using personal experiences as a resource for learning. Adults are more internally motivated and prefer problem-centered approaches to learning with immediate application.

However, it is Tough (Merriam, 2001) who is credited with the first comprehensive description of self-directed learning: learning that is widespread, occurs

as part of everyday life, and is systematic but does not depend on an instructor or classroom. Newer models are based on the concept that the phrase “self-directed learning” raises both social and cognitive issues.

Garrison (1997) asserts that the basis for self-directed learning is the distinction between external control and internal cognitive responsibility. To be useful, self-directed learning must go beyond task control and include the process of accepting responsibility to construct meaning and to cognitively monitor the learning process itself. Garrison’s model has three integrated dimensions. Motivation to begin learning and to stay on task influences both learner responsibility and learner control. Self-management (responsibility) focuses on goal setting, use of resources and external support. Self-monitoring (control) allows learners to plan and modify thinking according to the task or goal (see Figure 2-4).

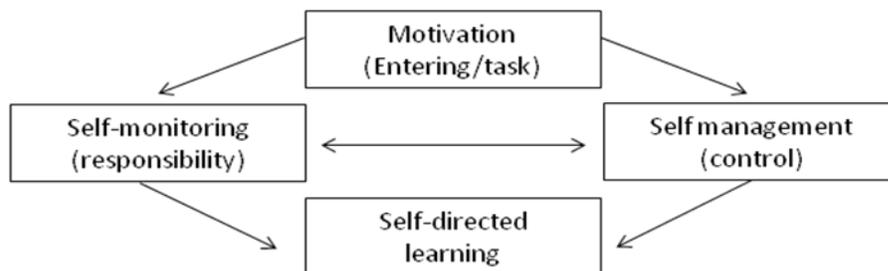


Figure 2-4. Self directed learning (Garrison, 1997, p. 22)

The model of Personal Responsibility Orientation (Brockett & Hiemstra, 1991) is set within a social context because individuals do not learn in isolation. Personal responsibility links the two dimensions of self-direction in learning. Self-directed learning represents the external factors that facilitate the learner in taking responsibility for the planning, implementing, and evaluating the learning process. Learner self-direction centers on internal factors that predispose one to accept responsibility for the

learning. This model suggests that self-directed learning is a combination of internal motivation to learn and control of external events that support such learning (see Figure 2-5).

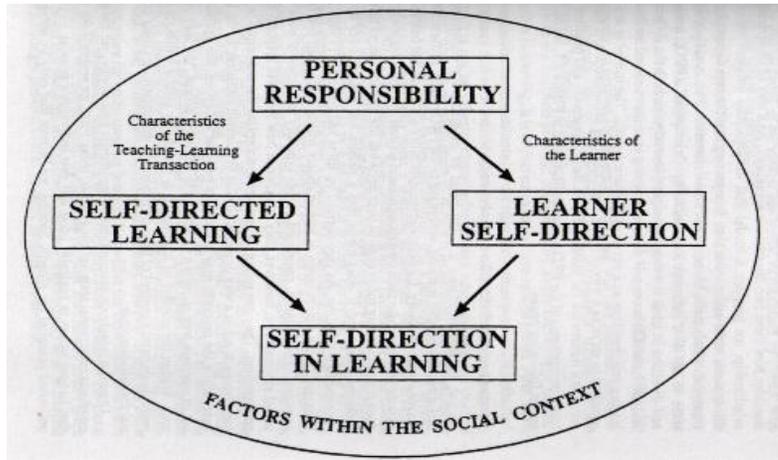


Figure 2-5 Personal Responsibility Orientation (Brockett & Hiemstra, 1991, p. 25)

Candy (1991) proposes that the term self-direction has at least four meanings within two interacting domains of process and product. Aspects of method or process include the mode of organizing instruction in formal settings (learner control) and autodidaxy as individual non-instructional pursuit of learning opportunities. Self-direction as an outcome or goal includes the willingness and capacity to conduct one's own education (self management) and personal attributes or self determination of learning goals (see Table 2-6).

Table 2-6. Four Domains of Self-Direction

Self-direction as: method or process

1. Learner control (over instruction)
2. Autodidaxy (teach yourself)

Self-direction as : outcome or goal

1. Self-management (of learning)
 2. Self-determination (of destiny)
-

From Jennings, 2006

These domains are different, but overlapping, and may vary with time and context. Individuals operate in different environments at different intervals in their lives. They will choose to be more or less self-directed depending upon circumstances and personal confidence in a particular subject at a particular time and place. Self-directed learning is context specific (Candy, 1991, p. 22-23).

Self-directed Learning in Academia

The healthcare professions have recognized that not all students enter professional practice instilled with a commitment of lifelong learning and responded by mandating that the educators assume responsibility for developing this skill in students. The Accreditation Council of Pharmacy Education (2011) Standard 11 states that teaching and learning methods must

“...produce graduates who become competent pharmacists by ensuring the achievement of the stated outcomes, fostering the development and maturation of critical thinking and problem-solving skills, meeting the diverse learning needs of students, and enabling students to transition from dependent to active, self-directed, lifelong learners.” (ACPE, 2011, p. 20)

Successful instructional techniques that optimize effective professional learning in students after graduation have yet to be documented. Student learning is more likely to be short-term: learning for the test, rather than learning for a lifetime. Short-term learning is driven by deadlines, grades and progression rather than a preferred systematic monitoring of learning (Hagemier & Mason, 2011).

Mocker and Spear (1982) differentiate a self-directed adult learner from a student by the decision-making source of goals and means of learning.

- Formal Learning: Learners have no control over the objectives or means of their learning.
- Nonformal Learning: Learners control the objectives but not the means.
- Informal Learning: Learners control the means but not the objectives.
- Self-Directed Learning: Learners control both the objectives and the means

The self-directed learner not only selects, but also may reject, add, or change resources at any time; decides to continue or terminate the learning; and finally determines the adequacy of the outcomes (p. 11).

Educational programs that promote self-directed learning methods have been described in various health professional programs. Murad and Varkey (2008) provide a review of more than 100 research articles on self-directed learning in practicing physicians, medical students, nurses and dental students. They found little evidence documenting the efficacy of self-directed learning over traditional didactics. Most studies were focused on evaluating the learner's acceptance and satisfaction with the learning method rather than the impact of the method on learning outcomes. This finding supports the definitions of Mocker and Spear (1982).

The instructor, the prescribed curriculum, and other authorities determine the learning methods and outcomes in formal education institutions. The content to be learned is derived mainly from the disciplines of knowledge and attempts are made to make everyone minimally competent in the same or similar curriculum of knowledge and skills. The outcomes are evaluated by authorities using the same method on the same subject matter for all students. Recent attempts to promote self-directed learning have increased the amount of time spent in experiential learning situations. However, the

goals and objectives of this learning are also controlled by the academic institute (Gibbons & Phillips, 1982).

The prescribed learning of pharmacy students cannot be considered as self-directed learning. Students are not included in this study because they have minimal control over the learning process. While schools and colleges endeavor to prepare students for a life of self-directed learning, true self-education can occur only when a person can choose to learn or not to learn (Gibbons & Phillips, 1982, p. 69).

Summary of Individual Factors

The three models briefly discussed above include aspects of the process of self-directed learning, individual factors that support or deter self-directed learning, and some level of control over the outcomes of the learning experience. Jennings' (2006) review of the evidence for support of self-directed learning concludes that the self-directed learning process is based on the needs of the individual, tailored to individual preference, using personalized tools to determine individual learning needs. In summary, self-directed learning is an individual, non-academic factor that cannot be readily separated from other individual factors such as motivation, personality, and attitudes.

Professional Learning

At any given time, healthcare professionals are simultaneously engaged in professional practice and professional learning. Different learning activities include readings in professional literature, problem-solving in the workplace, attendance or participation in continuing education events, personal development projects, and consultations with other healthcare providers. Although frequently represented by straight line models flowing from one stage to the next, the complex interactions of

professional learning are more likely causal relationships in which each factor can present as both a dependent and independent variable. For example, professional learning depends on individual motivation which in turn depends on factors such as supportive environment, access to resources, and individual attitude. Theories on the stages of learning have been extensively investigated. Table 2.5 presents a summary of research in learning stages.

Table 2-7. Stages of Learning

As cited in (Moore, 2007)	Recognizing Opportunity for Learning	Searching for Resources for Learning	Engaging in Learning	Trying Out What Was Learned	Incorporating What Was Learned
<i>Studies on Physician Learning</i>					
Geertsma 1982	Priming	Focusing	Focusing	Follow-up	
Schon 1983	Reflecting-in- action Reflecting-on- action	Decision to pursue information	Develop learning project		
Means 1984	Awareness	Actively seeking solution Decision making			Problem resolution
Putman & Campbell 1989		Preparing to make a change	Making the change	Solidifying the change	Solidifying the change
Garcia, Newsom 1996	Priming	Follow-up	Follow-up	Follow-up confirmation	
Putnam et al 1996	Pre-awareness Awareness	Agreement		Adoption	Adherence
Slotnick 1999	Scanning	Evaluation	Learning	Gaining experience	Gaining experience
<i>Studies on How People Learn</i>					
Rogers 1962	Awareness Felt need	Obtain knowledge about an innovation	Obtain knowledge about an innovation	Favorable opinion about innovation Decision to adopt or reject	Implementation Confirmation
Havelock et al 1969	Felt need Articulate problem	Search for solutions		Choice	Application of solution
Havelock et al 1973	Awareness	Information seeking Interest		Evaluation Trial test	Adoption Integration
Prochaska 1983	Pre- contemplation Contemplation	Preparation	Preparation	Action	Maintenance
Kolb 1984	Experiencing Reflecting	Conceptualization Planning	Planning		

Moore (2007, p. 62) presents convincing evidence that nurses generally follow the same learning stages as physicians. While little evidence exists that pharmacists follow similar patterns, Moore hypothesized that a similarity exists for pharmacists as well. The most recent research article (Slotnick, 1999) cited in Table 2-7 will be used to further describe the stages of professional learning.

Professional learning is motivated by either a specific problem (e.g. a patient-specific question) or a general problem (e.g., gaps in technology or knowledge). The learning can be semistructured with informal use of readily available resources to solve specific problems. More formal planned instructional events like courses or continuing education are used to address the more general problems (Slotnick, 2001; Slotnick, Mejicano, Passin, & Bailey, 2002; Slotnick & Shershneva, 2002).

Stage 1 Scanning

This is the initial stage of professional learning in which a problem is identified and is applicable only when something new is to be learned (Slotnick & Shershneva, 2002). Scanning may be passive as a result of an unanticipated surprise or a specific problem focusing on a particular circumstance. Answers are sought informally using available resources with no attempt made to generalize the knowledge beyond the immediate problem. Active reflection or engagement to identify a lack of knowledge is intended to improve overall improvement and is not precipitated by a specific situation. Information seeking efforts are more likely to progress if the results of learning are seen as rational, relatively easy to achieve, and in the best interest of patients or practice. This stage is completed when the professional concludes that the problem, issue, or information is interesting or important enough to pursue further.

Stage 2 Evaluating

During this stage, the problem is evaluated to determine the benefit of pursuing the needed information. Slotnick (1999) suggests that the evaluation asks four questions: Is there really a problem? Is there a likely solution to the problem? Are resources available to learn the solution? And is it practical to do the learning? A no to any single question terminates the learning activity. If all questions are answered yes, then the practitioner moves to the next stage.

Stage 3 Learning

A conscious decision to seek the information necessary to solve the precipitating problem is followed by learning activities. After identifying the needed skills and knowledge, learning becomes focused, intentional and structured. Informal learning might include Internet searches, journal review, ad hoc conversations with colleagues or other professionals, and interactions with industry representatives. Formal learning is usually planned in some detail and might consist of a self-directed study plan, attendance at a professional conference, or participation in a structured continuing education activity. The learning stage ends before the first use of the new knowledge or skills. At some point it is determined that enough information has been learned to effectively resolve the issue.

Stage 4 Gaining Experience

This stage begins with the first use of the newly learned skills and knowledge. The first phase is experimentation with the new skills and evaluation of their usefulness. After some practice, the new skills become second nature and are incorporated into

routine practice. The stage could also end with resolution of the precipitating problem and lack of further interest in the topic.

It should be noted that not all learning episodes progress through all stages. Learning episodes may end after the evaluation stage with a decision to not solve the problem. This type of decision is an early termination, not a learning failure. Alternatively, termination occurs when practitioners feel that they know enough to either move to the next stage or to end the learning episode (Slotnick, 2002).

Professional learning is active, situated, social, and constructed. Professionals learn through practice experience; reflection has a role in learning; and learning is contextually mediated. Numerous factors both support and deter professional learning. Authentic professional learning is not restricted to formal instructional activities but occurs as a result of daily practice situations. Self-identified, *actual* learning must be explored to define authentic professional learning (Webster-Wright, 2009).

Summary, Part I

Specific models for professional learning have not been defined. It is established that professional learning is multi-faceted consisting of broad elements with multiple factors. Resources, environment, and individual characteristics intertwine to contribute to professional learning. Research specific to medical professional learning provides some insight to begin to understand how pharmacists acquire professional learning and the factors that promote or hinder professional learning. This study will use prior research specific to physicians as a foundation for research specific to pharmacists.

Introduction to the Chapter, Part II

The selection of a research design is based on the nature of the research problem, the strategies of inquiry, and proposed methods of data collection. Creswell (2009) presents three basic types of study design: qualitative, quantitative, and mixed methods. Qualitative research is a means for exploring and understanding the meaning individuals or groups attribute to a social or human situation. The process involves probing questions and procedures; inductive data analysis building from particulars to general themes; and interpretation of the data by the researcher. Quantitative research, in contrast, is a means for testing objective theories by examining measurable relationships among variables. The research method is structured and usually results in numeric data that can be analyzed with statistics. Mixed methods research is a combination of both forms of inquiry, using both approaches in tandem. Stake (1995) differentiates quantitative and qualitative research on the focus of the search. Quantitative research seeks explanations and control while qualitative searches for understanding the complex interrelationships that result in a phenomenon. Yin (1993) also distinguishes research design based upon the nature and scope of inquiry.

In this study, the focus is on how practicing pharmacists acquire professional learning. While the contributing components of the theoretical model could be measured by quantitative means, it is the integration of the three elements of the model that are of interest in this study. The integration of environment, resources and individual factors influences the participants' perspectives, their meanings, and subjective views that contribute to, or hinder, the pursuit of professional learning. A qualitative approach will contribute to understanding the operational links applicable to professional learning

(Creswell, 2007, 2009). This part of Chapter 2 will review appropriate literature in consideration of the research design specific to qualitative approaches using case study methods. The use of replication logic in building theory from cases is explored with considerations for reliability, validity, and generalizability.

Qualitative Approaches

A qualitative approach is useful when a problem or an issue needs to be explored (Creswell, 2007); when a complex, detailed understanding of an issue is needed (Yin, 1993, 2009); or to develop theory when only partial or inadequate theories exist for a given population participating in complex interactions (Creswell, 2009). The professional learning patterns used by pharmacists are uniquely individual, are in need of theory development, and cannot be adequately researched at this time using quantitative measurement and statistical analyses. A qualitative approach is a better fit to explore the research problem specific to this study.

Creswell (2007, 2009) lists five major types of qualitative approaches. While the general characteristics of qualitative research are similar, there are differences among the specific types of qualitative research. These are highlighted below.

Narrative or biographical studies explore the life of an individual. Findings are derived mainly from oral story-telling by the subject. The goal is to collect information that emphasizes important life events and reveal the individual (Hancock & Algozzine, 2006).

Phenomenological studies contribute to understanding an experience. Several individuals who share a common experience (for example, surviving breast cancer) are interviewed to describe the essence of the experience (Creswell, 2007).

Ethnographic studies investigate cultural or social groups to describe beliefs, values and attitudes of the group. Data is collected using primarily observations and interviews that lead to a description of how a culture-shares group functions (Hancock & Algozzine, 2006; Creswell, 2007).

Grounded theory research seeks to develop a theory that explains some action, interaction, or process when no particular prior theory appears to be relevant or explicable (Yin, 1993). The process is studied by interviewing 20- 60 individuals; analyzing the data through open, axial or selective coding ; and generating a theory “grounded” in the data (Creswell, 2007, p. 79).

Case studies use a strategy of inquiry to explore in depth a program, activity, or process. Cases are bounded by time and activity and may use multiple sources of information. A single individual or several persons may be studied to obtain a deep understanding of the research question (Creswell, 2009; Yin, 1993, 2009).

Case Study Method

Yin (2009) contends that any research method, quantitative or qualitative, can be used for any of three purposes – exploratory, descriptive or explanatory. He recommends selecting the research method based upon three conditions: the type of research question posed; the control of the investigator over actual behavioral events; and the degree of focus on contemporary events as opposed to historical. A case study method has distinct advantages when “...a ‘how’ or ‘why’ question is being asked about a contemporary set of events, over which the investigator has little or no control.” (p. 13). Case studies are an approach that supports deeper and more detailed investigation that allows the development of answers to how and why questions.

Yin (2009) provides a concise technical definition of the case study.

1. A case study is an empirical inquiry that

- investigates a contemporary phenomenon in depth and within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident.

2. The case study inquiry

- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- benefits from the prior development of theoretical propositions to guide data collection and analysis. (p. 18)

The case study is a research strategy that focuses on understanding the dynamics within a bounded system (Stake, 1995). Case studies may include single or multiple cases and may use numerous methods of analysis. Case studies typically combine data collection methods such as archives, interviews, and observations. The evidence may be quantitative (numbers) or qualitative (words) or both. Finally, case studies can be used to provide a description, test a theory, or generate a theory (Eisenhardt, 1989). Common characteristics of case studies include seeking to understand cultural systems of action or sets of interrelated activities engaged in by actors in a social situation (Tellis, 1997a). The case study must always have boundaries, but is *not* sampling research (Stake, 1995; Yin, 1993,2009).

The literature offers three approaches to case studies: exploratory, explanatory and descriptive. Descriptive case studies are used to describe an intervention or phenomenon and the context in which it occurs. Explanatory case studies attempt to explain the presumed causal links in real-life interventions that are too complex for survey or experimental strategies. The primary purpose is to determine how events occur and which events may influence a particular outcome. Exploratory case studies seek to define research questions for a subsequent study or to explore situations in which the intervention being evaluated has no clear, single set of outcomes (Baxter & Jack, 2008; Hancock & Algozzine, 2006; Tellis, 1997a; Yin, 1999 & 2009).

Before the designing the case study, the unit of analysis must also be determined. Stake (1995) defined a “case” as a phenomenon within a bounded context. The case is essentially the unit of analysis, becoming the analytical level of the study. One may choose to analyze the individual, a phenomenon, a program, a process, or a difference between organizations. At the same time, boundaries of a case are needed to keep it focused. Suggestions include binding by time and place (Creswell, 2009; time and activity (Stake, 1995); and by definition and context (Yin, 1993). The boundaries establish what will and will not be studied during the research project. Although similar to the inclusion/exclusion criteria used in quantitative sample selection, boundaries in a case study indicate the breadth and depth of the study, not just the sample to be included (Baxter & Jack, 2008).

In addition to identifying the specific type of case study to be researched and the unit of analysis, one must choose between single and multiple case studies. A single holistic case study is suitable as a critical case when testing a well-formulated theory; for

describing an extreme or unique case; for capturing the attributes of a representative or typical occurrence; or for longitudinal study over time. A single case with embedded units allows the researcher to explore a similar phenomenon within subunits. This is useful when exploring the influences of factors and allows analyses within, between, and across subunits to better delineate a more global issue (Baxter & Jack, 2008; Bergen & While, 2000; Tellis, 1997a; Yin, 1993 & 2009).

If a study contains more than a single case, then a multiple case study may be appropriate. Multiple case studies examine several cases to analyze the differences and similarities between/among the cases. As with the embedded single case study, the phenomenon can be studied both across and between cases. The advantage of multiple case studies is that the evidence, overall, is considered more robust and reliable (Baxter & Jack, 2008).

Stake (1995) describes case studies as intrinsic, instrumental, or collective. A unique situation in which one has an intrinsic interest is quite similar to a single case study. If the intent is to gain more understanding about a phenomenon, an instrumental case study would be appropriate. Stake uses the term collective case when more than one case is being examined—similar to Yin’s multiple case study (Baxter & Jack, 2008).

Replication Logic

Yin (2009) believes that multiple case studies are analogous to multiple experiments. A significant result from a single experiment would immediately call for a replication of the results by conducting additional experiments to confirm or refute the findings. By repeating the experiment, by replicating the initial work, the original finding would be considered robust. The same logic can be applied to multiple case studies.

Each case is treated as a single set of constructs and then compared to other cases within the study for similarities or differences in constructs. The value of the multiple case studies comes from replication, not sampling logic. Yin (1993, p. 34) provides a concise comparison.

Multiple case studies should follow a replication, not sampling logic. This means that two or more cases should be included within the same study precisely because the investigator predicts that similar results (replications) will be found. If such replications are indeed found for several cases, you can have more confidence in the overall result. The development of consistent findings, over multiple cases and even multiple studies, can then be considered a very robust finding.

Sampling logics are entirely different. They assume that an investigation is mainly interested in “representing” a larger universe. The cases selected are therefore chosen according to pre-identified representation criteria. These logics do not work well with multiple-case studies and distort the benefits of using the case study method in the first place. In fact, if the sampling logic is important in the inquiry, the survey or experimental methods are more likely to satisfy an investigation’s needs than is the case study method.

The use of sampling logic is misplaced in case studies. The intention is not to measure the prevalence of a phenomenon, but rather to predict similar results (replication logic) or to predict contrasting results with predictable reasons (theoretical logic). The first step in multiple case studies is to develop a theory and then show that the case

selection and the definition of measures contribute to the design and data collection process. Each individual case is essentially a whole study in which convergent evidence is sought about the facts and conclusions under consideration. The case conclusions are considered to be information that needs to be replicated in other cases. For each case, the final report should discuss how and why a particular proposition was demonstrated or not demonstrated (Yin, 2009).

Building Theory from Cases

Building theory from case studies is a research strategy that uses one or more cases to develop theoretical constructs or propositions from empirical descriptions of instances of a phenomenon from a variety of data sources. The cases are used to develop theory inductively. The theory emerges from the patterns of relationships among the constructs within and across cases and their underlying arguments. The emphasis on developing constructive measures and testable theoretical propositions from inductive case research produces new theory which can then tested by deductive theory testing (Eisenhardt & Graebner, 2007). In her often- cited work on building theory from case study research, Eisenhardt (1989) discusses an 8-step process.

Research Questions & Propositions

Begin with a research question(s) to focus the study. A priori constructs, or propositions, are recommended in that propositions reflect theoretical issues for study providing focus to the study and enable more accurate measurement of the constructs. Propositions are based on the literature relevant to the research questions and reflect the important theoretical issues. Similar to the hypotheses of quantitative research, propositions contribute to the development of a conceptual framework of the study to

guide the data collection (Baxter & Jack, 2008; Bergen & While, 2000; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Tellis, 1997a Yin, 1993).

Case Selection

The second step is case selection. A specific population must be defined to control for extraneous variables and to assist in defining limits. Unlike hypothesis-driven research, cases should be selected for theoretical, not statistical, reasons. While cases may be strategically chosen in a random way, choosing cases for statistical representativeness is not recommended (Amaratunga & Baldry, 2001; Baxter & Jack, 2008; Bergen & While, 2000; Eisenhardt, 1989; Eisenhardt & Grabener, 2007; Flyvbjerg, 2006; Gerring, 2004; Kohn, 1997; Rowley, 2002; Tellis, 1997a; Yin, 1993, 1999, 2009). The goal of theoretical sampling is to choose cases which are likely to replicate or extend the emerging theory. The purpose of the research is to develop theory, not to test it.

Dividing multiple cases into specific categories allows for broader exploration of research questions and increases theoretical elaboration. Cases within each category allow findings to be replicated within and across the categories as well as within and across the individual cases. Theory building from multiple cases typically produces more robust, generalizable and testable theory. Generalization of the results is made to theory, *not* to the population (Eisenhardt, 1989; Stake, 1995; Tellis, 1997a; Yin, 1993, 2009).

Unlike purely quantitative research, no ideal number of cases has been established. Optimally, cases should be added until theoretical saturation occurs. This is the point at which incremental learning is minimal, where no new phenomenon is being added to the study. Practically, theoretical saturation is often curtailed by issues of time and resources. Eisenhardt (1989) suggests that between four and ten cases is sufficient.

It is often difficult to generate theory with less than four cases while more than ten can increase the complexity and volume of data. Yin (2009) sets minimum of two cases when such are believed to be literal replications. The goal of the study is to investigate the research question and constructs. Tellis (1997a) states that “It is a fact that case studies do not need to have a minimum number of cases or to randomly ‘select’ cases.”

Instrumentation & Protocols

Case study evidence typically comes from multiple sources. Yin (2009) and others frequently cite six possible sources of evidence to be considered while developing the case study methodology. These include archival records when available; documentation including formal studies, evaluations, or mass media material relevant to the research questions; interviews targeted to the case study topics; direct observation of the phenomenon; participant observation; and physical artifacts (Baxter & Jack; 2008; Bergen & While, 2000; Eisenhardt & Graebner, 2007; Hancock & Algozzine, 2006; Stake, 1995; Tellis, 1997a, 1997b; Yin, 1993, 1999, 2009).

Three essential data collection principles are also necessary, regardless of the type of sources used.

Principle 1: Use multiple sources of evidence. Combining methods to study a single phenomenon –triangulation – provides stronger substantiation of constructs. Triangulation tests the consistency of findings by using different instruments of data collection. While data triangulation is most commonly used in multiple case studies, it is not a finite requirement. Patton (as cited in Yin, 2009, p. 116) presented four types of triangulation. Data triangulation is the most frequently discussed method. Data triangulation looks for data to remain the same in different contexts. Investigator

triangulation uses multiple investigators to develop convergent perspectives and build confidence in the findings. Theory triangulation is used to compare and contrast similar theories. Methodological triangulation combines several methods to complete the investigation and increase the confidence in interpretation (Amaratunga & Baldry, 2001). Not all sources of evidence are relevant to all case studies. The researcher must structure the investigative process in a fashion that allows for the best outcomes while recognizing that case studies using multiple sources of evidence are rated more highly than those that use only a single source of information (Yin, 2009, p. 117).

Principle 2: Create a case study database. The data or evidence must be collected and retained in a database separate from the report of the investigator. Use of a separate archive allows for the independent inspection of the raw data by subsequent investigators who may wish to replicate the study. A case study database increases the reliability of the entire study.

Principle 3: Maintain a chain of evidence. It should be possible for any external reviewer to trace the steps of the research process from questions to conclusion. Each fact should be carefully preserved to show that protocol procedures have been followed. This methodological approach increases the overall quality and credibility of the study.

Overlapping Data Analysis & Collection

The fourth step in Eisenhardt's (1989) theory building process is using the potential overlap of data collection and data analysis. Running notes allows one to capture differences between cases as the data are collected. A key feature of theory building is to make adjustments in data collection as emergent differences in cases occur.

These adjustments may result in the addition of cases to explore an emergent theme or the addition of questions to an interview protocol. This flexible approach to data collection allows an increased understanding of each specific case in as much depth as possible. Such additions should be carefully documented to maintain the chain of evidence.

Analyzing the Data

The type of analysis selected will depend on the type of case study. Yin (2009) offers two general strategies. One is to use the theoretical propositions of the study to guide the analysis coordinating the evidence with the propositions. The other technique is to develop a case description as a framework for organizing the case study. He provides detailed descriptions of five techniques for analysis: pattern-making, linking data to propositions, explanation building, time-series analysis, logic models, and cross-case synthesis. Stake (1995) recommends categorical aggregation as a means of analysis. He also presented pattern-matching similar to that of Yin. Coding the data to identify issues more clearly identifies relative frequencies in a multiple case study.

Within-case data. A key feature of case analysis is the within-case analysis. This typically involves a detailed write-up for each case which captures and tabulates the unique features of each case. The goal is to capture and analyze specific case details before attempting to generalize across cases. The increased familiarity with each case will facilitate cross-case comparisons.

Cross-case patterns. The cross-case search for patterns follows the individual within-case analysis. The object is to approach the data from several perspectives before developing a conclusion. One tactic is to use categories to look for within-group

similarities coupled with intergroup differences. A 2 x 2 cell design can be used to compare more than one category at a time. A second tactic is to pair cases and then list similarities and differences between each pair. A third tactic is dividing the data into groups for the initial analyses. These tactics improve the likelihood of accurate and reliable theory (Eisenhardt, 1989).

Shaping Theory

As themes and concepts begin to emerge from the data, the evidence from each case is systematically compared to the emergent theory. Constructs are focused by refining the definition of the construct and building evidence that measures the construct in each case. Tables are often used to summarize and tabulate the evidence supporting the constructs. In replication logic, cases that confirm relationships improve confidence in the validity of the relationships. Cases that do not support the relationships provide opportunity to refine and modify the theory. Overall, the shaping process in theory building involves measuring the constructs and verifying relationships (Eisenhardt, 1989).

Enfolding Literature

An essential feature of theory building is comparing the emerging concepts and theory with comparable reports in the literature. Literature which supports the findings sharpens generalizability, improves construct definition, and raises the theoretical level. Conflicting literature also raises theoretical level and defines constructs while building internal validity. This comparison is particularly important in theory building because findings are often based on a small number of cases (Eisenhardt, 1989).

Closure

The study closes when theoretical data saturation has been reached or when case collection ends. The second issue of closure is determining when to stop iterating between theory and data. Eisenhardt (1989) defines this as another form of saturation, the point at which incremental improvement is minimal.

Summary of Theory Building

Theory building from case study is particularly appropriate when little is known about a phenomenon or when current perspectives have little empirical support. Strengths of theory building include the possibility of generating novel theory; that emergent theory is likely to provide constructs that can be measured and tested; and that the resultant theory is likely to be empirically valid. The characteristics that provide strength may also contribute to weakness. The intensive use of evidence can result in a theory that is too complex or is too narrow and idiosyncratic. Strong studies are those which result in interesting or frame breaking theories which meet the tests of good theory development and are grounded in convincing evidence (Eisenhardt, 1989).

Reliability, Validity and Generalization

Reliability, validity, and generalization are specific terms routinely applied to quantitative research. Reliability and validity are linked in that instrument repeatability and consistency does not necessarily imply validity. The two terms are not viewed separately in qualitative research, nor is the meaning similar to that applied to qualitative research. The approaches used to determine the consistency and reliability differ in both procedures and documentation.

Reliability

Quantitative reliability can be defined as (a) the degree to which a measurement, when used repeatedly, remains the same; (b) the stability of a measurement over time; or (c) the similarity of measurements within a given time period. Golafshani (2003) presents several views on reliability as applied to qualitative research. He cites researchers (Lincoln & Guba, 1985; Patton, 2001, p. 601) that argue that because reliability is concerned with measurement, it has no relevance in qualitative research. Terms, such as 'trustworthiness' or 'dependability', have been suggested as alternatives to convey the concept of consistency in qualitative research. Creswell (2009, p. 190) and Yin (2009, p. 40) define qualitative reliability as thorough documentation of procedures in a manner that allows the study to be repeated with similar results. In addition to using a detailed case study protocol and database (Yin, 2009), reliability procedures might include verification of transcript accuracy; careful and consistent use of coding or tabulations, and cross-check procedures when using multiple investigators (Creswell, 2009).

Validity

Quantitative validity determines if the means of measurement are accurate and if these means actually measure what they are intended to measure. Qualitative validity refers to the accuracy of the findings from the standpoint of the researcher, the participant, or the readers (Creswell, 2009). Many researchers have developed their own concepts of qualitative validity and use terms such as quality, rigor or trustworthiness. (Golafshani, 2003)

Creswell (2009) recommends multiple validation strategies to promote accuracy and trustworthiness. These include triangulation of different data sources as discussed above and member checking in which participants verify the descriptions or themes for accuracy. Yin (1993, 2009) proposes similar criteria to facilitate validity.

Construct validity is the identification of correct operational procedures for the concepts studied. Tactics for construct validity include use of multiple data sources, establishment of a chain of evidence, and review of reports by informants (p. 42).

Internal validity seeks to establish causal relationships and is, therefore, useful only in explanatory case studies. Tactics may include pattern matching, explanation building, rival explanations and use of logic models (p.43).

Generalization

External validity, or generalization, is limited because case studies are not intended to generalize to a population but rather to a theory. Stake (1995) terms it as “particularization” rather than generalization. Generalization of a theory requires replication to provide strong support for the theory (Bergen & While, 2000; Creswell, 2009; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009).

Summary

The use of multiple case studies can be used to explore a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. The case study inquiry copes with the technically distinctive situation in which the factors of interest are more numerous than data points. The inquiry relies on multiple sources of evidence with data needing to

converge in a triangulating fashion and benefits from the prior development of theoretical propositions to guide data collection and analysis.”

The review of literature specific to case study method supports its use in this study. Little theory exists about how pharmacists acquire professional learning suggesting that an exploratory study is most appropriate. Multiple cases will provide sufficient data for analysis by replication logic. The use of propositions will provide focus and structure to the research process and contribute to the refinement of the proposed theory. The following chapter provides details on the research methods.

CHAPTER THREE METHODS

Introduction to the Chapter

The primary purpose of this qualitative study was to examine the professional learning activities of practicing pharmacists and to identify common factors that promote or hinder the acquirement of professional learning. The study focuses on detailed self-reports of professional learning experiences obtained from semistructured interviews. A review of the research paradigm and rationale is presented, followed by the propositions used to guide the research. Methods used in to the participant selection process, the interview instrument, data collection and data analysis are detailed. A discussion of the study reliability, validity, and generalization concludes the chapter.

Research Paradigm and Rationale

In theory, professional learning strongly epitomizes constructivist epistemology. Learners construct their own knowledge and self-direct learning on the basis of interactions with their environment. Factors contributing to the development, acquisition, and maintenance of professional learning are many. These include individual characteristics, influences of practice environment, and availability of resources. Professional learning is a complex phenomenon deeply embedded within the context of daily professional practice.

According to Yin (2009), case study is the preferred method of investigation when (a) *how* and *why* questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context. Stake (2005) recommends the preferential use of the case-study method when the issues are complex, situated, problematic relationships embedded in a number of

contexts or backgrounds. Eisenhardt (1989) suggests the case study as a first-line approach to explore a complex phenomenon for which little research exists. A lack of prior research suggests an exploratory case study to investigate process and identify contributing constructs for development of larger, more quantitative studies.

Case-study methodology is useful to explore areas and issues where little theory is available or measurement is unclear. According to Eisenhardt (1989), theory building begins with a tentative theory. As described in the literature review, aspects of professional learning specific to the practice of medicine have been extensively researched while little is known about similar aspects specific to practicing pharmacists. The theoretical model of pharmacists professional learning (see Figure 1-1) was used to explore the constructs of the learning process. Eisenhardt's process for theory building from case studies was used as the methodological framework for this qualitative study.

The process of professional learning has many factors that differ with the individual and with the location and characteristics of the learning event. This study explored the process(s) by which pharmacists acquire professional learning, using multiple cases as multiple units of analysis. The unit of analysis was the individual participant, as a single case (Yin, 2009). The study included many individuals each providing a unit of analysis (case) to facilitate comparisons both across and between the cases. Each case was reviewed for constructs supporting the research propositions and then compared to other cases for the replication of constructs. The use of replication logic to test the theory is explained in Part II of Chapter 2. Evidence obtained by recurring constructs from many individual cases is considered more robust and reliable in

the development of theory (Baxter & Jack, 2008; Bergen & While, 2000; Eisenhardt, 1989; Yin, 2009).

Problem Statement and Research Questions

Problem Statement

No substantial research could be located to explain how practicing pharmacists acquire professional learning or what factors support pharmacists' professional learning activities. Research is needed to explore how pharmacists acquire professional learning.

Research Questions

1. How do practicing pharmacists acquire professional learning?
2. What factors promote or hinder professional learning in practicing pharmacists?

Propositions

The use of constructs or propositions is essential in the case-study method to provide focus and structure to the research process. By examining each case for support or refutation of the propositions, basic characteristics can be explored and used to refine the developing theory (Baxter & Jack, 2008; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009). The seven propositions selected for this study directed the exploration of tentative constructs thought to be relevant to addressing the research questions.

1. Pharmacists must have ready access to appropriate resources to obtain professional learning.
2. Pharmacist practice setting, location, or organizational climate influence professional learning.
3. Pharmacists self-identify professional learning needs.

4. Pharmacists' motivation in pursuing professional learning is complex and a result of multiple factors.
5. Pharmacists professional learning occurs as a result of a specific and short-term event (e.g., a physician request, a patient-specific situation) or as more general and long-term learning (e.g., learning about a new drug or practice guideline).
6. Pharmacist professional learning causes a change in behavior, attitude, or practice.
7. Pharmacists accept the responsibility for being self-directed, lifelong learners, and take personal responsibility for developing their own learning goals.

Participant Selection Process

A challenge to theory building from case studies is the case selection. In quantitative research, units of analysis (cases) are selected to represent a population in order to test a theory. In contrast, theory building research is intended to develop theory, not test it. Accordingly, *theoretical* sampling is appropriate; statistical representation is not (Amaratunga & Baldry, 2001; Baxter & Jack, 2008; Bergen & While, 2000; Eisenhardt, 1989; Eisenhardt & Grabener, 2007; Flyvbjerg, 2006; Gerring, 2004; Kohn, 1997; Rowley, 2002; Tellis, 1997a; Yin, 1993, 1999, 2009). Cases are sampled for theoretical reasons, such as replication of findings from other cases, elimination of alternative explanations, and expansion of the emerging theory. Multiple cases allow comparisons that distinguish between an idiosyncratic result from a single case or consistent replication by several cases. Multiple cases create more robust theory because they allow more precise delineation of the constructs, determine more accurate

definitions, and enable broader exploration of research questions and theoretical elaborations (Eisenhardt & Graebner, 2007; Yin, 2009).

The primary focus in the participant selection was to identify those who strive to stay current with advances in practice, who seek opportunities to provide innovative services, and who actively participate in professional organizations. Nimmo and Holland (2000) found that these factors are more likely to provide positive examples of professional learning and to identify the factors that support professional learning. The criteria for participant selection included:

1. A current, active registered pharmacist in good standing who is practicing within the state of New Mexico. This information is a public record readily available from the New Mexico Board of Pharmacy. This restricted the population to a single geographical area regulated by one set of rules and regulations.
2. A minimum of five years of experience. This was estimated from the initial date of licensure listed in the Board of Pharmacy records. This criterion set a minimum level of time of practice experience necessary to develop self-directed learning habits necessary for acquiring professional learning.
3. A minimum of 75% of practice activities deal directly with patients and patient care. This was determined from individual descriptions of job responsibilities. This restricted the population to practitioners providing direct patient care. For example, a registered pharmacist employed by a mail-order pharmacy or a pharmacy benefits management group was not eligible.

4. A member of a national or state professional pharmacist association such as the American Pharmacists Association, the New Mexico Pharmacists Association, the American Society of Health-Care Pharmacists, or the New Mexico Society of Health-Care Pharmacists. Membership in a professional association has been linked to more proactive professional involvement (Nimmo & Holland, 2000).

The purposeful sample was stratified to reduce extraneous variation and to define the limits of the study. A minimum of four practitioners was selected from three subgroups of practice: community pharmacists practicing in ambulatory outpatient care in independent settings and chain settings; hospital pharmacists practicing institutional inpatient care; and pharmacist clinicians providing specialized practice services. Each subgroup was further divided into rural¹ and urban service areas (see Table 3-1).

Table 3-1. Sample Subgroups

	Community		Hospital	Specialty Practice	Sum
	Independent	Chain*			
Rural	2	0	2	2	6
Urban	2	2	2	2	8
Total	4	2	4	4	14

*Rural chain pharmacists were not interviewed due to difficulty in locating participants.

The purposeful selection and stratification by practice setting and location represents the potential differences as a result of practice setting or practice location. A minimum of two participants (Yin, 2009) per subgroup is sufficient to characterize variances due to practice setting or practice location (for example, rural independent versus urban independent). Variance as a result of practice setting, without consideration of location, is represented by a minimum of four participants, as suggested by Eisenhardt

¹ For purposes of this study, a rural area is defined as one with a population area of less than 100,000.

(1989). It was anticipated that some constructs would be replicated within each practice setting and location. Two or three such replications of a proposition are sufficient to support the proposition (Yin, 2009).

Participant selection was one of stratified purposeful sampling (Patton, 2002). Persons knowledgeable about New Mexico pharmacists (a member of the Board of Pharmacy, the executive director of the New Mexico Pharmacists Association, and the assistant dean of professional experiential education at the University of New Mexico, College of Pharmacy) were asked for names of practitioners in the three practice settings. Pharmacists enrolled in a state pilot program for Continuous Professional Development also were included in the pool of possible participants. Prospective candidates were matched to a setting-location subgroup and were sent an e-mail invitation to participate. The final group of participants represents a purposeful sample stratified across the three practice settings.

Participants were licensed New Mexico pharmacists who met the qualifying criteria. Equal numbers of male and female participants are represented among the six rural and eight urban practitioners. Six participants practice in community settings, while hospital and specialty practices are represented by groups of four each. Specific demographics pertinent to the study are listed in Appendix A.

Interview Instrument

The interview instrument presented in Appendix B was adapted for use, with permission, from investigative research on how physicians learn (Slotnick, 1999). Dr. Slotnick provided guidance on the adaptation of this instrument for use in investigating pharmacist learning and reviewed the final instrument. The design is semistructured to

allow all participants to be asked the same questions within a flexible framework while addressing the factors identified in the theoretical model of professional learning. The open nature of the questions encouraged depth of response and allowed new concepts to emerge with minimal prompting. Demographics were collected at the time of the interview.

The instrument encouraged participants to share a history of learning events that addressed the propositions supporting the theoretical model. The six sections of the instrument guided the collection of information used in the development of literal replications supporting or refuting the propositions underlying the research questions. Section 1 sought information on the motivation or stimulus that initiated learning. Section 2 investigated the resources available and used during the learning activity. Section 3 considered the appropriateness of the learning resources in meeting the learning needs. Section 4 looked for changes in behavior, attitude, or practice. Section 5 investigated aspect of change as a result of the learning activity. Section 6 examined other factors that contribute to typical professional learning experiences. The open-ended outline of questions and prompts allowed the researcher to provide guidance while allowing the participant ample freedom to “tell the story.”

The study protocol and interview instrument were reviewed and approved by the Human Research Review Committee (HRPO# 10-371) at the University of New Mexico Health Sciences Center with a requirement for a signed consent form (Appendix C).

Data Collection

Data were collected using semistructured interviews after written informed consent had been obtained from each participant. Nine interviews were conducted face to

face and five by telephone. Interviews were audio-recorded with one exception due to technical malfunction. Detailed notes and comments were made during each interview. The recordings and one unrecorded interview were transcribed verbatim within 24 hours of the interviews. The transcripts were printed and compared to the original recording to verify accuracy. The recording and the transcription were electronically stored on a secure computer.

Transcripts were reviewed and annotated for information specific to professional learning. The notes from each case interview were entered into a study database to facilitate ongoing review and to identify potential new concepts for inclusion in subsequent interviews (Baxter & Jack, 20008; Eisenhardt, 1989; Stake, 1995; Yin, 2009). For example, early participants brought up *Internet* and *online* as resources. These generic terms needed to be expanded for more detail. Subsequent interviews probed for more detail by asking what was being accessed when either term was used. The study database contains all data, analyses, and researcher notes, as suggested by Yin (2009) to facilitate future replication of the study. The creation of a database and the methodological approach to maintaining the chain of evidence met the requirements for Eisenhardt's (1989) third step in the process of exploring theory from case-study research.

Data Analysis

The accuracy of each verbatim transcript was confirmed by comparison to the recording. Each case was read several times before reviewing the transcript for participant learning activities. These were highlighted, and notations were made. An initial summary of learning stimulus, events, activities, and other contributing factors for

individual participants was entered into an Excel spreadsheet. Concepts that needed expansion or clarification were noted. In two instances, the participants were contacted to provide more detail about statements made. For example, the first chain practitioner interviewed referred to using online resources for answers to patient questions.

Investigation determined that these in fact were electronic reference subscriptions, not research databases, peer-reviewed electronic journal publications, or public information sites.

Data were listed by individual case and paired by both practice type and location for easy reference. This provided a quick overview of each case and each subgroup as well as a presentation of all cases as they developed. This case-ordered matrix recommended by Yin (2003) and Miles and Huberman (1994) facilitated case comparison(s) for similarities and differences. Each case summary was reviewed with each new addition. Cases were compared to others within the relevant subgroup(s) and then to all cases on an ongoing basis. This ongoing review brought forth consistencies in constructs among the cases, allowing for emergence of initial categories of learning methods. For example, an initial category of collaboration was applied to statements such as:

- ...you can bounce ideas off the team. (RS#1)
- I work with the practitioner and combine the physician expertise with my own drug expertise...(RS#2)
- I'm thinking this, what are you thinking?...just bounce ideas back and forth. (UH#2)

- ...so I can actually ask the panel, ‘What do you think about this? I’ve tried doing this, what do you think?’ (RH#2)

As the initial categories emerged, each case summary was again reviewed for matches to the categories. As recurrent categories of professional learning became more apparent, a spread sheet of categories with corresponding subthemes was developed and tested. The reading, summarizing, categorization, testing, and continued review and comparison process was repeated for all 14 cases even though no new concepts or categories emerged after case 10. The study continued beyond the theoretical data saturation point to include equal representation in the stratification of the sample.

Each case was reviewed for the presence of constructs of professional learning. This allowed the unique patterns within each case to emerge before additional analysis began (Eisenhardt, 1989). Analysis for cross-case patterns included (a) identifying similarities and differences between matched pairs of practice and location, (b) comparing all cases within a practice setting, (c) comparing all cases by practice location, and (d) comparing all cases. For example, the process for identifying similarities and differences for resources used in professional learning would follow these steps:

1. Rural community to rural community comparison.
2. All rural practice location comparison.
3. Urban and rural community comparison.
4. Community practice to hospital and specialty practice comparison.

A spreadsheet by construct category and practice-setting location was generated to enhance data analysis (See Appendix D). The spreadsheet allowed for rapid identification and quantification of similar (replicating) constructs among the cases. For

example, 11 of the participants identified learning from interactions with a peer while only two mentioned the role of mentors in their learning interactions. The use of these structured methods improves the likelihood of developing an accurate and reliable data analysis (Baxter & Jack, 2008; Eisenhardt, 1989; Kohn, 1997; Tellis, 1997b; Yin, 2009).

Reliability, Validity and Generalization

The quality of the study depends, in part, upon the validity and reliability of the process and the data. As discussed in Chapter 2, the definitions of reliability and validity in qualitative studies do not have the same meanings as when used in quantitative research. The approaches used to determine consistency and reliability in qualitative research differ in procedure and documentation. References on qualitative research suggest four criteria to ensure quality and accuracy in case-study research (Creswell, 2009; Yin, 2009). These are discussed below.

Reliability

In qualitative research, reliability does not pertain to measurement but rather implies a thorough documentation of procedures in a manner that allows the study to be repeated with similar results. Reliability in this study was obtained by using structured case-study protocol and the development of a case-study database (Yin, 1993, 2009). The careful and compliant use of the study protocol and the development of a detailed case-study database provide sufficient documentation to repeat this study, thus meeting the definition of reliability.

Validity

Validity in qualitative research differs from that of quantitative research in that it is not paired with reliability or generalizability. Qualitative validity is based on the

accuracy of the study findings from the standpoint of the researcher, the participant(s), or the readers (Creswell, 2009). Validity strategies are incorporated into the study methods.

Construct validity is the identification of correct operational procedures for the concepts studied (Yin, 2009, p. 40). The emergence of similar construct patterns across the collected cases served as data triangulation in this study. The triangulation of data sources, or the checks for consistency of patterns in data from various individuals, is an acceptable alternative to investigator, methodological, or theoretical triangulation to support the overall credibility of the study (Patton, 1999).

While the use of recorded interviews provides some rigor to the study analysis, misinterpretation of data could introduce unwanted bias and reduce validity. Peer review is recommended to increased study validity (Creswell, 2009). A colleague with expertise in both adult learning and qualitative research was asked to review a random sample of interview transcripts. He was provided with the research questions and was asked to annotate emerging constructs that addressed the research questions. These notations and identification of relevant constructs were essentially concurrent those of the researcher. The peer review identified an unrecorded construct of *self assessment*, which then was added to the database. The use of an outside interpretation contributed to the construct validity of the study.

Internal validity seeks to establish causal relationships and therefore is useful only in explanatory case studies (Yin, 2009). This study was an exploratory case study and was not structured to investigate causal relationships. Internal validity analysis is not appropriate for this study.

Generalization

External validity, or generalization, is limited in that case studies are not intended to generalize to a population but rather to a theory. Stake (1995) terms it as “particularization” rather than generalization. Generalization of a theory requires replication to provide strong support for the theory (Bergen & While, 2000; Creswell, 2009; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009). This study used replication logic (Yin, 2009) to demonstrate convergence of the propositional constructs across many cases. According to Eisenhardt (1989), this suggests that an analytical generalization would support the theoretical model. These constructs are suitable for development of research that is more quantitative in nature.

Summary

The methods presented in this chapter incorporate multiple aspects of exploratory research in a qualitative multiple case study. The purpose of the study was to identify ways in which practicing pharmacists acquire professional learning so that more quantitative research could be developed for more in-depth investigation of this phenomenon. Semistructured interviews were conducted with a stratified purposeful sample representing rural as well as urban pharmacy practitioners in three types of practice settings—community, hospital, specialty. Replication logic (Yin, 2009) was used to identify common factors that promoted acquiring of professional learning. Chapter 4 (Results) and Chapter 5 (Summary, Discussion and Conclusions) of this report will address the findings, conclusions, and recommendations from the study.

CHAPTER FOUR RESULTS

Introduction to the Chapter

The results of semistructured interviews conducted to explore professional learning activities of practicing pharmacists and to identify common factors that promote or hinder pharmacists in acquiring professional learning are presented . The chapter begins with a review of the problem statement and research questions and then discusses the professional learning themes that emerged from the study. A discussion of the factors that appear to promote or challenge professional learning activities is presented, followed by the chapter summary.

Research Questions & Methods

No substantial research could be located to explain how practicing pharmacists acquire professional learning or what factors support pharmacists' professional learning activities. Research is needed to explore how pharmacists acquire professional learning. This study addressed the following research questions.

1. How do practicing pharmacists acquire professional learning?
2. What factors promote or hinder professional learning in practicing pharmacists?

A stratified, purposeful sample of New Mexico pharmacists participated in semistructured interviews specific to constructs of professional learning. The participants represented three practice settings: community, hospital, and specialty practice in rural and urban locations. Replication logic was used to identify common factors in acquiring professional learning and factors that either promoted or hindered professional learning.

Research Question 1: Acquiring Professional Learning

Each practice site was unique, and the learning activities and experiences reported by the participants were distinct in details. As the interviews were read and re-read, common factors that addressed the research question began to emerge. These factors were distilled into four themes to define how pharmacists acquire professional learning:

1. Interactions with others.
2. Teaching and education.
3. Non-formal learning.
4. Learning resources.

Theme 1: Interactions with others

All pharmacists believed that interactions with others contributed to their individual professional learning. Teamwork, discussion, or collaboration with other healthcare providers was the most frequently mentioned interaction by both rural and urban participants in all practice settings. Unique problems were discussed most often with a fellow pharmacist, regardless of practice setting, while hospital pharmacists were more likely to include nurses in their discussions. Interactions with the prescribing provider also were a common resource reported by most practitioners. Only one urban specialist did not mention interaction with others as a mode of learning. Table 4-1 summarizes the types of learning interactions reported in this study.

The most prevalent interaction with others was reported as discussion, collaboration, or teamwork with other healthcare professionals to address a specific issue. Reports included a brief phone call to a practitioner in another pharmacy for specific information; a team discussion related to a specific patient drug management; and synthesizing the

experience of others in collaborative problem-solving. Pharmacists routinely seek input from other healthcare providers to confirm their understanding of a specific issue and the accuracy of possible solutions.

Table 4-1. Learning from interactions

Pharmacist interactions with others	Frequency (N=14)
A. Specific discussion, collaboration, or teamwork is used to address unique problems or situations. Pharmacists routinely interact on many levels with colleagues, co-workers, nurses, physicians, and technicians to acquire new learning.	13
B. Providers and/or patients request specific information or services that result in acquisition of new learning.	9
C. Networking, the informal, spontaneous interaction with a colleague, often results in new learning.	8
D. Consultants and mentors provide additional information that helps pharmacists learn new solutions.	5

Professional learning often was prompted by a specific request from a patient or provider. Patients asked about drug interactions and specific conditions (e.g., pregnancy) while providers were seeking consultation on prescribing or solutions to unique patient conditions. Requests for information from patients generated specific learning in a brief period of time. Provider requests often generated more prolonged learning events. A hospital pharmacist talked about a request for a protocol for ilbutilide:

It wasn't so much about the drug –pharmacodynamics, kinetics and the like, but it was more real world: How do you administer it, when do you monitor, how do you monitor, what do you do for the adverse effects -- more of the real world, the practical side of using the drug. (UH#1)

The development and implementation of the protocol took many weeks, involved physicians, nurses, other pharmacists, and the drug manufacturer, and provided a significant learning experience in the logistics of protocol development.

Networking, the spontaneous, casual, and social association of others in similar practice situations, was mentioned frequently. Learning from networking is coincidental, with no structured intention of learning. It is commonly described as a social meeting between peers in which ideas and solutions are shared. One provider describes networking as:

Sit down for a drink after the sessions and just talk and chat, share stories with people who can actually understand what you are talking about. I have learned a bunch from that. (RC#1)

Networking also was described as the use of professional association listservs or blogs to gain perspective from other practitioners who had encountered similar problems. All hospital pharmacists referenced networking as a learning tool.

Seven of 14 participants discussed learning from mentors or consultants. Mentors (a trusted, more experienced individual who shares knowledge, skills, information, and insight with another) were cited frequently in learning new skills such as compounding, or developing effective problem-solving techniques. Consultants (an expert temporarily employed to address a specific issue or area) provided learning in areas outside of traditional pharmacy practice. A computer consultant employed by a community pharmacy taught a great deal to the responding participant about security in developing online access to prescription records.

Theme 2: Teaching and Education

Each pharmacist participant reported professional learning was acquired as a result of teaching of others: on the job, in the classroom, or in formal professional presentations. Learning with intent to transfer information to specific others, most often patients or physicians, was frequently described as “keeping up” or “staying current.” The preparation of more formal presentations included anticipating challenges and questions from pharmacy students, peers, and physicians. A summary of learning as a result of teaching is presented in Table 4-2.

Table 4-2. Learning from Teaching

Pharmacist teaching	Frequency (N=14)
A. Patient education or counseling requires learning the most current information and using effective communication skills to deliver the information to the patient.	11
B. Teaching and precepting pharmacy students challenge pharmacists to present the most current information and effectively articulate the synthesis of information to address a situation.	10
C. Protocol development and implementation require careful research, synthesis of information, and education of others to affect a change.	6
D. Preparing professional presentations results in new learning.	5
E. Physician education is needed to substantiate recommendations in treatment. Pharmacists learn while investigating the supporting documentation.	4

Patient education (counseling) is a key responsibility for all pharmacists. To provide clear and accurate information to patients necessitates professional learning about new drugs.

I don't stay up with all new drugs because some of them are out of our scope of practice here. When I encounter a drug that is now introduced into my practice, then I go ahead and read up on it. In some cases, I might consult the Internet [drug manufacturer website] for specific things. (UC#1)

Patients seek information from the pharmacist to answer questions about specific prescription medications, confirmation of consumer information found on the Internet, validation of the effectiveness of herbal remedies, drug interactions, and lifestyle changes. Participants reported numerous instances of learning to answer these questions.

The majority of participants volunteer as preceptors for pharmacy students, and four are periodic guest lecturers in didactic instruction. The role of the preceptor requires professional learning sufficient to withstand challenges that students bring. Students also bring new information and techniques to the preceptor, providing another learning event. Formal instruction involves extensive preparation that often results in acquisition of professional learning.

Learning events triggered by a provider request or by serendipitous information resulted in extended knowledge/skill research and the initiation of change. An example of a serendipitous trigger:

At a CE session, I heard about a protocol for [drug] that was different from ours and got better results. When I got back, I looked it up and talked with my supervisor to change our protocol. I did the in-service for the pharmacists. (RH#1)

The development of new protocols involves acquisition and synthesis of new information but requires the teaching and education of others. The process of initiating change in others is the challenge in implementing procedural protocols. A hospital pharmacist provided insight into the education of others in implementing protocols.

As we rolled it out, we educated, we checked, rechecked, audited and reeducated, cut down kind of transmission errors, cut down omission of doses....So we removed all that inconsistency in charting. So everyone charts the same way now. If you see a certain notation on the medication administration record, every nurse, every pharmacist knows what that means. If we transfer patients, or at shift change and a new nurse is coming on, everybody is now on the same page. (UH#2)

While the actual protocol development requires self-directed learning, the implementation and application of the protocol depends heavily on the effective teaching and education of others. Because successful adaptation of a new protocol requires teaching skills to affect practice change, it is included here in the teaching and education theme.

Five participants reported that preparing a formal presentation to other professionals resulted in professional learning. Presentations were presented to other pharmacists, co-workers, and other healthcare providers. Learning occurred in the preparation of the presentation:

I was asked to do a presentation to a group of [hospital] pharmacists on hypertension. I definitely knew I needed to increase what I knew about it to be able to talk to a group of colleagues. I knew the basics and I could

counsel my patients, but I also knew that I didn't know all the nuances -- so I did have to get it together and organize myself and do some learning outside the normal. (UC#2)

Feedback from formal presentations also serves as a learning experience.

After a few key points, I would stop because I knew in the audience were PharmDs that ran diabetes clinics, CDSs, endocrinologists – I would stop and say, does this make sense so far? Is there anything that doesn't? Is this too simple? Are you getting anything out of this? One of our endocrinologists chimed in on one of my points and expanded. So I gotta build that slide up a little more -- sort of instant feedback. (UH##1)

Physicians often seek detailed information that requires pharmacists to provide responses in more detail than expected from a simple informational request. The physicians look to the pharmacist to provide information, such as managing complex drug regimens or alternative therapies for unique patient situations. These become teaching intervals in which the pharmacist provides appropriate physician education with evidence-based recommendations documented from the research literature.

We get calls from doctors; they want some strength to be made topically.

But it is not feasible because the skin cannot absorb it. We have to convince them, send them some studies, talk about it. They are very receptive, understand where we are coming from. (US#2)

The provision of evidence-based information, key to providing sound recommendations, requires pharmacists not only to carefully research the problem but to synthesize the information while educating the physician.

Theme 3: Non-Formal Learning

Non-formal learning falls between structured formal learning, as offered in academic settings, and unstructured, non-intentional informal learning that results from daily activities. It is defined as a learning activity in which the learner decides what is to be learned, but seeks assistance in how the learning will occur (Mocker & Spear, 1982). Non-formal learning was reported by all participants in this study. Reports included membership in professional organizations, attendance at seminars, and continuing education activities. A summary of non-formal learning is presented in Table 4-3.

Table 4-3. Non-Formal Learning

Non-Formal Learning	Frequency (N=14)
A. Live continuing education activities provide opportunities for professional learning.	11
B. Membership in professional organizations provides regular updates and access to the most current information.	7
C. Attending seminars is a concentrated and specific learning experience.	7

The majority of participants commented on continuing education events. It should be noted that all comments pertained to live educational events, short, one-to-three hour sessions presented outside of the workplace. Most comments were incidental and casual references made during the interview. While no continuing education events were cited as a significant learning event, some participants identified learning “nuggets” or small incidental pieces of useful information.

- I sit in on the classes and actually sometimes you pick up new stuff. (RI#1)

- I did the smoking cessation CE at the pharmacy convention 2 years ago, and that girl pointed out something I didn't know. Those companies put pieces of silica or something into chewing tobacco to cut the inside of cheeks so that they absorb more nicotine. I took the course because it was required, but that was a real learning experience. (UI#1)
- I prefer the live CE because I usually come away with at least one or two things out of each hour I attend. (UI#2)

There were reports in which the “nugget” triggered more in-depth learning activities.

- Dr. A presented a typical CE on clopidogrel and aspirin....I know some physicians will say: OK, instead of Prilosec use Protonix, but because of his presentation and the articles I read on it, I won't recommend that class of drugs, PPIs, at all. (UC#1)
- At a CE session I heard about a protocol for [IV drug] that was different from ours and got better results. When I got back, I looked it up and talked with my supervisor to change our protocol. (RH#1)

A few participants noted the lack of professional learning opportunities associated with live continuing education.

- The pharmacist meetings don't provide much that is new. I try to get to the big medical meetings for cutting-edge information. (US#2)

- I'm starting to find, in the areas I am interested in, it [CE] is just barely scratching the surface. It's becoming frustrating to go to try to learn something new. Typically I don't walk away with much more than I knew before. (UH#1)

Eight of the participants rely on information supplied by professional associations or organizations to acquire professional learning. All specialty-practice participants (four) were members in professional organizations such as National Comprehensive Cancer Network, American Diabetes Association, Society of Endocrinologists, International Association of Compounding Pharmacists, and American Heart Association. These groups provide members with daily or weekly newsletters of current topics, access to specialty journals and listserv access to other members. Two community and two hospital practitioners used similar information sources to acquire non-formal learning.

Seminars focus on a single specific topic or area of interest and are presented over many hours or days. Attendance at seminars was often part of a longer learning activity with a specific outcome.

- We participate in [post-marketing] studies. We have to know the drug inside and out. But there is also the resources, where to go to find things, or who to contact. Sometimes we have to have special skills we get trained for. For instance, I am going for a training this weekend, and I'll be training for 8 eight hours on Saturday. (UI#2)

- One of our major consultants PCCA brings in a lot of physicians, and they hold live seminars for three or four days that you go and procure that kind of information at. (RI#2)

Participants reporting seminars as professional learning activities included three community, three hospital and one specialty practitioners.

Theme 4: Resources

All participants reported the use of favorite resources to “look it up.” Using resources to develop answers to questions or just to stay up to date with new developments generates professional learning. Pharmacists accessed multiple resources beyond those discussed above. Participants reported from three to nine frequently used information sources that contributed to their professional learning. It should be noted that all participants had access to paper and electronic resources within the workplace and at home. The most frequently mentioned types of resources are summarized in Table 4-4.

With the exception of one rural specialist, all participants reported use of practice setting appropriate electronic databases available by subscription. Community pharmacists, both independent and chain, reported using Clinical Pharmacology and Facts and Comparisons[®]. Hospital pharmacists accessed Micromedex[®] on institutional computers or Lexicomp[™] on personal handheld devices. Less-frequently reported databases included The Merck Manual, Epocrates[®], Medscape[®], and Drugs.Com.

Table 4-4. Resources for Learning

Resources	Frequency (N=14)
A. Electronic drug information database subscriptions are routinely accessed to obtain new information.	13
B. Online sites serve as resources for a wide variety of information used in daily practice.	12
C. Searching PubMed provides abstracts and references to primary literature for evidence-based practices.	10
D. No-fee journals are used frequently by community pharmacists for drug information and current practice issues.	6
E. Package insert/drug literature provides FDA-approved information about drugs, doses, and adverse reactions.	4

The use of electronic databases was not restricted to the work place.

I have actually downloaded a lot of stuff onto my iPod, and I use it everywhere I go, constantly. I use it here at work—I can be at Walmart and someone will walk up to me and ask me about a drug interaction. I may not remember what it is, but I can look it up right then and there and we can actually have the discussion. (RI#2)

These electronic resources were cited as the first-line source for information about drugs: indications, administration, dosages, adverse effects, and other drug-specific information. The databases also provide lab values, patient monographs, monitoring parameters, and electronic drug alerts.

The use of online sites was reported by all participants except one rural community and one rural hospital practitioner. Both had access to such sites but simply did not report using them in their professional learning. Targeted professional sites were

accessed rather than using a search engine (for example, Google[®]) to gather information. Sites mentioned included the Center for Disease Control, National Institutes of Health, the University Health Sciences Library, professional association sites, and sites unique to specific practice needs (such as the New Mexico Immunization Program). Online sites are browsed for non-formal learning or are used to address specific problems.

The use of online sites requires an unrestricted Internet connection in the workplace. Community pharmacies use software systems to manage daily practice requirements for dispensing, record keeping, reimbursement, inventory, and other tasks. While software systems may be connected to a local, regional, or national network, none are connected to the open Internet. Independent community pharmacies have computers separate from the dispensing system that are used to openly access the Internet.

- ...so I went in the back and looked it up on the Internet. (UI#1)
- “In fact, the [dispensing system] I work on does not have the capability [Internet access]. It’s working on Internet phase 5.0 or 6.0 – it’s really antiquated. (RI#2)

In contrast, the chain community pharmacist has access only to the dispensing system and company intranet resources in the dispensing workplace. Access to online sites is made outside of work. The lack of unrestricted, workplace Internet access in chain community pharmacies was the only noted difference found among the practice settings.

PubMed is a free database allowing access to the citations and abstracts within the U.S. National Library of Medicine. Links to full-text original biomedical articles are often available as well. The majority of participants reported using PubMed to access primary literature pertinent to a specific problem.

Only community pharmacists, both independent and chain, reported using no-fee journals such as U.S. Pharmacist, Drug Topics, or Pharmacy Online. These journals, specifically targeted to community practitioners, provide summaries of recent primary literature, commentary about current pharmacy management issues, and regulatory updates. The time demands in community practice make these quick-reads an efficient resource for professional learning while providing links to the primary references.

A few participants reported using the package insert or other drug literature to learn about unfamiliar drugs. The insert contains FDA-approved information about dosage, contraindications, and adverse reactions useful in dispensing or counseling.

Interactions with others, teaching, non-formal learning, and the use of resources contribute to the process of acquiring professional learning. While each individual has personal preferences, all study participants reported professional learning from all four of the discussed themes.

Research Question 2: Part I-Factors Promoting Professional Learning

Factors that promote professional learning are individually unique. While individual traits and attributes were not the focus of participant interviews, recurrent constructs emerged in this study. It is recognized that these constructs are not discrete, measurable entities and, in fact, often overlap or merge with one another, blending in each individual professional persona. The constructs are represented as separate factors to better identify underlying traits. Subjective interpretation of participant statements contributing to professional learning is presented as factors in Table 4-5.

Table 4-5. Factors Promoting Professional Learning

Factors	Frequency (N=14)
A. Professional pride and responsibility promote pharmacists to stay current, be knowledgeable, and provide accurate, verifiable information.	14
B. Reflection on past learning and self-assessment of current knowledge helps pharmacists retain knowledge and promotes acquisition of new information.	11
C. Experience promotes professional learning as knowledge is continually constructed.	9
D. Self-directed study and introspection are used to seek solutions to more-complex problems.	7
E. Creativity, exploration, and experimentation are used to develop new techniques and find innovative solutions that result in professional learning.	6

Professional Pride and Responsibility

Each participant talked about professional responsibility as a personal need to stay current or up-to-date on drugs, trends, and procedures. It was important to each individual that patients receive the best possible care, the best treatments possible, and that physicians receive the most accurate and up to date information. Solutions to problems were routinely double-checked for accuracy and effectiveness. The reliability of the information given to providers and patients was a universal concern.

- I wanted to have a finished product that could be transferable to the next person and something that was going to be practical, plus these were *my* patients. (UH#1)

- They [providers] call us for topical before doing that we go to the book to see if it possible to do, is it effective to do? If it is, then we'll do it. (US#2)
- It's really important to help clients sort the myths from facts. (US#2)
- For me, it is more along the lines of being well prepared; I need to have the knowledge. (RH#2)
- It's a continual process; you never know what you read today is going to help you tomorrow. (RI#2)
- Every drug I dispense, I know all the basics and most of the nuances, but that is a responsibility that I have. (UI#1)
- This is a lifelong learning career, and you really do your patients a disservice if you don't stay on top of it. (RS#1)
- I like doing discharge counseling so that the patient doesn't end up back in here. (RH#1)
- We need to stay on top of new trends and things because we are the defense when patients aren't doing well. (UH#2)
- So much stuff is changing right now since they are learning more about vaccines and immunity. It triggers looking more in depth at what is going on. (UC#2)

Acquiring professional learning is a personal priority that is part of the professional responsibility of practicing pharmacists. Professional pride and responsibility appear to be major factors stimulating professional learning.

Reflection and Self-Assessment

The majority of participants reported that reflection on events helped to solidify their learning and allowed them to identify what else they needed to know or learn. Self-assessment was an ongoing process directing individuals to learn more about specific situations or to improve skills.

- Problems come up that require deep thought. I find I keep working it over in my mind until I can get a solution. (RS#2)
- I do a lot of reflection to try to make sure that I retain. You may only see the thing once, but six months from now there may be another guy come in who needs something similar and you will remember where you found it. (RI#2)
- When you're in a busy pharmacy, you kind of know when you should go out and help a patient and take the extra minutes. That's something I don't want to hold back on. I feel I have gotten better at judging those situations, where I need to pull away and help the patient versus just saying it's over there. (UC#1)

Several participants discussed self-identification of developmental needs and the self-directed steps taken to reach a desired goal. As discussed in Rosenthal (2010), those who have developed the capacity to reflect on practice as needed to solve “messy” problems have continued to learn and expand upon their professional experience and expertise.

Experience

Experience was reported as part of professional learning by eight of the participants. Experience in problem-solving, finding resources, establishing networks, and increased acceptance of not knowing all the answers were reported as facilitating new professional learning. The more-experienced pharmacists were more comfortable in not knowing everything and in accepting the need to seek new information.

It is not necessarily how much you know but that you know how to look it up. (RI#2)

The interview transcripts show that participants who have practiced five to 10 years had some difficulty in identifying and describing a significant learning event and were less able to articulate the process of acquiring professional learning. Interviews with these participants required considerable prompting and questioning. In contrast, those with more experience needed little prompting and were readily able to share their learning strategies and events.

Experience represents a developmental continuum in which professionals progress from novice to expert (Daley, 1999; Dreyfus & Dreyfus, 1980; Dreyfus, 2004). Those with more experience (experts) have developed more awareness of their own learning processes and can articulate how they learn and how they teach themselves. They approach problems with a holistic discrimination of the particular situation and use intuitive decision-making based on experience to develop solutions. The less experienced practitioners have not yet fully developed an understanding of their own learning processes. They approach problems from an analytic perspective and rely more

on the knowledge and skills gained from formal instructional settings to guide decision-making.

Self-Directed Study

In discussing significant learning events, participants shared long-term projects that required innovation and self-directed study to come up with solutions. An urban hospital pharmacist identified a need for more patient education in diabetes. While he had the clinical knowledge to share, he did not have experience in group instruction. He attended group classes at other institutions, completed training programs in group facilitation, addressed the logistics of space and time, and now offers group diabetes management classes on a regular basis.

A chain pharmacist received a study from the manufacturer of the shingles vaccine reporting an interaction with pneumonia vaccines. After reading the primary literature and review with experts, she initiated a change in protocol at her site but did not stop there. She initiated instruction in this interaction, adding it to statewide immunization training programs, placing alerts on state association sites, and sending notifications to other stores in the chain.

Patient requests to physicians for alternative forms of bioequivalent hormone therapy were passed to a rural independent pharmacist. This required him to revisit the basics of hormonal regulation and learn more about bioequivalent hormonal therapy, particularly when prepared in alternative dosage forms. The project included self-directed reading, working with consultants, and attending seminars specific to compounding. The learning experience gave him the knowledge and skills to prepare and validate delivery of bioequivalent hormones in creams, lotions, or oils.

Taking the initiative to address unique problems was reported as a self-fulfilling challenge that met unique patient needs. The outcomes were motivated by professional responsibility and achieved through self-directed study.

Creativity, exploration and experimentation

About half of the participants reported learning by exploring what works, experimenting to find appropriate solutions, and using creative methods to facilitate patient care. A community pharmacist, discussing sulfa drugs and the need for forced fluids, instructs patients to drink at least two Tall Sips (32-ounce soft drink in convenience stores) daily instead of 64 ounces of fluids. The instructions creatively allow the patient to immediately focus on the amounts needed. Teaching a child to swallow a capsule also requires creativity – “Pretend your mom is coming and you’re chewing gum--Gulp!” [RI#1]

Specific problems often require exploration for solutions. When asked about administering ciprofloxacin suspension through a G-tube, the pharmacist had to seek alternatives to provide suitable antibiotic therapy via the tube. Factors included patient antibiotic allergies, composition of the G-tube, alternative antibiotics, and bacterial resistance. Each aspect needed individual exploration before synthesizing a solution.

The compounders often experiment to develop useful alternative drug delivery methods. Issues of drug solubility and stability are key to developing new products that might better meet unique patient needs. The experimentation then needs to be validated for appropriate drug delivery.

Factors that contribute to pharmacist professional learning appear to be personally and professionally motivated without hesitation to “think outside the box.” Initiative and willingness to take on a challenge are key components in acquiring professional learning.

Research Question 2: Part II-Factors that Hinder Professional Learning

Very few obstacles were reported that hindered the acquisition of professional learning. Three community pharmacists and one specialty pharmacist said time was sometimes a restriction for in-depth professional learning while at work.

If I am staffing, I find that learning tidbits can only be really small versus if I am in the clinic, I have a lot more time to learn a much broader range on that topic. Not to say that one is less helpful than the other, it is just two different types of learning. (UC#1)

A demand on personal time, such as family commitments, also was cited as an obstacle to learning more. It should be noted that all participants were able to actively pursue professional learning within their time constraints.

With the exception of two chain practitioners and one rural hospital pharmacist, all participants were supported with release time and at least some costs associated with attending external educational events. No participant suggested any obstacle that *prevented* (ital. not necessary) the acquisition of professional learning.

Summary

Pharmacists acquire professional learning through continuous interactions with others as a normal part of their professional practice. These range from simple, easily answered questions to more prolonged and intensive learning activities. Social networking with other professionals often provides unintentional learning in a casual

setting. Mentors and consultants provide new information. Patient counseling, providing physician education, working with pharmacy students, and making professional presentations are activities that not only educate others but also require new learning in the process. While minor non-formal learning occurs with attendance at continuing education events, membership in professional organizations or attending seminars were reported to provide more effective learning. The most frequently reported resources were electronic drug information databases and online professional sites. While chain practitioners did not have workplace access to unrestricted Internet, no difference in access to, or availability of, resources was found based on practice setting or location.

Factors promoting professional learning include individual characteristics of professional pride and responsibility and reflection on past learning with self-assessment of learning needs. Experience contributes to professional learning as strategies and processes of learning are refined. Most participants reported self-directed study and introspection as factors in acquiring professional learning.

Only four participants commented on time as an obstacle in acquiring professional learning. This obstacle was presented more as an inconvenience than as a deterrent.

Chapter 5 will provide a discussion of these findings and consider the potential implications of the study findings in better defining how pharmacists acquire professional learning. The study limitations and potential significance of the findings for future research are also discussed.

CHAPTER FIVE SUMMARY, DISCUSSION and CONCLUSIONS

Introduction to the Chapter

This chapter presents a summary of the study, followed by a discussion of the findings presented in Chapter 4. The findings are organized to focus on the three elements theorized to promote professional learning in the Theoretical Model of Practice Change (Figure 1-1) presented in Chapter 1. The constructs or propositions used to provide focus to the research are linked to the data to confirm or deny support of the theory. The emergent constructs are compared to those in published literature. Limitations of this study and recommendations for future research are presented. A reflection on the research methods is offered to support the significance of the study. The chapter concludes with a discussion of potential implications for change as a result of the study. The primary products of this study are answers to the research questions and confirmation of the propositions.

Summary of the Study

The ongoing and rapid changes in healthcare require healthcare professionals to adopt a lifelong learning approach to maintain and improve their professional practice knowledge and skills. Current continuing education requirements are not effective in changing healthcare professional behavior. Since professional learning must precede any change in practice behavior, an understanding of professional learning is necessary to develop learning opportunities that will effectively impact professional performance (IOM, 2010). While considerable research has been conducted on physician learning, including the factors and processes that result in professional learning there is little research specific to how pharmacists learn.

The purpose of this study was to explore how pharmacists acquire professional learning and to identify factors that support or impede the pursuit of professional learning. The absence of research specific to pharmacist professional learning requires an exploration of relevant factors before quantitative investigation can begin. The study sought to answer two research questions:

1. How do practicing pharmacists acquire professional learning?
2. What factors promote or hinder professional learning in by practicing pharmacists?

To address these questions, a stratified purposeful sample of New Mexico pharmacists participated in semistructured interviews specific to constructs of professional learning. The participants represented three practice settings: community, hospital, and specialty practice in both rural and urban locations. A theoretical model of professional learning factors was tested using the process outlined by Eisenhardt (1989). Replication logic was used to compare the constructs evidenced in a single case with those found in other cases and to identify common factors used by pharmacists in acquiring professional learning and the factors that either promoted or hindered professional learning.

Summary of Findings for

Research Question 1: Acquiring Professional Learning

Participating pharmacists in all practice settings and locations had a myriad of paths that led to acquiring professional learning. A synthesis of information presented in the interviews identified four general areas that contributed to professional learning: (a) interactions with others, (b) teaching, (c) non-formal learning, and (d) resources. All 14

participants acquired professional learning from each of the four areas. The data show that each pharmacist acquired professional learning in similar ways, with no obvious difference in practice settings and no noted differences between rural and urban practice sites.

The data generated from pharmacist interviews support the theoretical model of practice change presented in Chapter 1 (Figure 1-1). Three elements—resources, environment and individual factors—were theorized to support professional learning. The first two are presented here.

Resources

Resources are readily available to all pharmacists. The use of electronic drug information databases as well as bibliographical sources such as PubMed provides pharmacists with sufficient resources to acquire professional learning. While professional association memberships can be costly, all participants belonged to at least one professional organization and some to as many as seven. Cost was not mentioned as a deterrent to acquiring professional learning. Participation in continuing education activities was reported by all. Three pharmacists did not receive financial support or paid release time to attend continuing education events; however, only one (rural hospital) complained of the cost and use of personal leave. Overall, resources specific to learning needs were found to be readily available, accessible, and in sufficient scope and extent to meet learning needs.

The resources used for learning by pharmacists appear to parallel those reported for physicians. The literature specific to physician learning resources reviewed in Chapter 2 (Table 2-4) closely matches the findings of this study, with the exception of

learning from teaching. Like physicians, pharmacists use electronic databases, primary literature, professional association sites, and interactions with others to acquire professional learning in a manner similar to that of physicians. Because physician training and education must be accredited by the American Council on Graduate Medical Education (ACGME), unlike pharmacists, general-practice physicians have limited teaching opportunities.

Extensive amounts of research are devoted to investigating the effectiveness of formal continuing education activities in an effort to document that formal continuing education is actually professional learning. While continuing education was discussed by participants in this study, there is no evidence that continuing education, in and of itself, was considered professional learning. Participants reported that continuing-education activities provided isolated facts useful in their practice or triggered a learning event; however, no participants discussed an isolated continuing-education activity as professional learning that resulted in a change in behavior, attitude, or practice. This study supports the work of others, maintaining that formal continuing education interventions cannot be considered professional learning (Fletcher, et al., 2007; Institute of Medicine, 2001, 2010; Swankin, et al., 2006).

Environment

The practice setting (community, hospital, or specialty) did not influence efforts to acquire professional learning. All participants reported interactions with others, teaching, non-formal learning, and the use of resources as contributing to professional learning. While most participants reported use of online sites and electronic drug information databases as learning resources, some differences existed in the specific

resources used within practice settings. Specialists were more likely to use online professional association services than were community or hospital practitioners. Electronic drug information database subscriptions varied by practice setting. Community pharmacists were more likely to use Facts and Comparisons or Clinical Pharmacology, while hospital pharmacists reported using Micromedex or Lexicomp. This might be explained by differences in database content or configuration, or by the applicability of a source to a specific practice setting. Community pharmacists reported use of no-fee journals targeted specifically for the community pharmacist (e.g., U.S. Pharmacist). These subscriptions provide not only information on drugs and drug use, but also law, technology, and practice management applicable to community pharmacy practice and not necessarily relevant to other practice settings.

Because each practice setting provides services to a specific patient population, the use of different resources is logical. A hospital pharmacist needs information on lab values and the administration of intravenous medications to critically ill patients. A community pharmacy serves ambulatory patients who use prescribed medications in unsupervised situations. The specialist provides long-term medication management services to patients with complex health conditions. The resources selected support the learning needs of the individual's practice.

The only difference attributable to a practice setting was access to unrestricted Internet in the workplace. All community pharmacies routinely use computerized systems that are restricted to dispensing activities. For security reasons, these dispensing systems are not connected to the open Internet. Independent community pharmacies reported using a second, non-dispensing system to access the open Internet. Chain

pharmacies do not have secondary systems available; consequently, pharmacists in chain settings do not have open Internet access in the workplace.

Community pharmacists reported that time was a challenge to acquiring learning in the workplace. The time restriction did not prevent learning but rather reduced the opportunity to learn. Participants reported time issues to be more of an annoyance than an obstacle that prevented acquiring professional learning.

The location of practice, rural or urban, did not influence how pharmacists acquired professional learning. While the widespread availability of the Internet provides equal access to resources, the rural practitioner may have fewer opportunities to participate in teaching and education activities. This subtle difference might be more evident in a larger study.

While the participants in the study considered environmental factors of time and Internet access as inconveniences, neither was reported as an impediment to their professional learning. However, the participants do not represent the general population of pharmacists. Some pharmacists choose to not pursue professional learning, using environmental factors as convenient excuses to avoid engaging in any learning beyond that required for relicensure (Nimmo & Holland, 2000). Environmental factors, whether real or perceived, most likely impact a large percentage of practicing pharmacists and should be investigated in more detail.

Summary of Findings for

Research Question 2: Factors Promoting or Hindering Professional Learning

The third element in the theoretical model is individual factors. These factors promote learning when in evidence and hinder learning when absent (Burke & Hutchins,

2007). Constructs such as attitude, motivation, internalized values, and personality are difficult to detect and impossible to measure in an interview. Subjective interpretations of interview transcripts were used in the analysis.

The analyses showed that all participants exhibited traits of professional responsibility and pride in what they were doing, personifying "...those whose constant effort to learn leads them to ever more refined conception and execution of their responsibilities..." (Houle, 1980). All showed a strong sense of responsibility, conscientiousness, practicality, and logic in their approaches to professional practice as well as to professional learning. Personal motivation was evident from references to the efforts made to stay current in practice, seeking solutions to unique problems and participation in professional organizations (Nimmo & Holland, 1999b).

The development of professional experience was obvious, especially with pharmacists with more than 10 years of practice. These pharmacists could immediately relate a significant learning event and readily discuss issues involved with professional learning. It was apparent that reflection and self-assessment were ongoing aspects of their professional practice. In contrast, the four practitioners with less than 10 years of experience had more difficulty in presenting a learning event and were more uncomfortable talking about learning. This coincides with research in how professionals learn (Daley, 1999; Dreyfus & Dreyfus, 1980; Dreyfus, 2004). Experts, those with more experience, have a more well-developed awareness of their learning processes, can articulate how they learn and have developed strategies that facilitate their learning. They know how to learn from their daily practice and use their experiences to construct a knowledge base in the context of their practice.

Self-directed learning was evident in all discussions. All practitioners identified and addressed problems as they became apparent, seeking additional information as needed. More experienced pharmacists used past learning to build new learning. At least half of the interviews support Garrison's (1997) model of self-directed learning. He states that self-directed learning must include accepting responsibility to construct meaning and cognitive monitoring of the learning process itself. Participants reported motivation to begin learning and to stay on task, reflecting acceptance of learner responsibility and learner control. Self-management was evidenced with goal setting and use of resources. Self-monitoring allowed learners to plan and modify thinking according to the task.

Only one factor was mentioned as a deterrent to professional learning in the workplace. Three community pharmacists and one specialist mentioned the demands of practice. It is unlikely that time demands prevented learning because all were able to relate many instances of professional learning. It is more likely that time restrictions prevented them from learning to the extent they would prefer.

Sufficient evidence was presented in the interviews to infer that the participants exhibited most, if not all, of the individual factors listed in the theoretical model. The purposeful sample used in this study sought practitioners who were likely to validate the individual traits necessary for successful professional learning. It should be noted that the participants do not represent the general population of pharmacists and are more likely to be the exception in how pharmacists acquire professional learning.

Theory Building from the Study

This exploratory study has provided unique information useful in developing further research on how pharmacists acquire professional learning. The constructs or propositions used to provide focus and structure to the research process can now be linked to theoretical model of practice change presented in Chapter 1. The model is reproduced below for the reader's convenience.

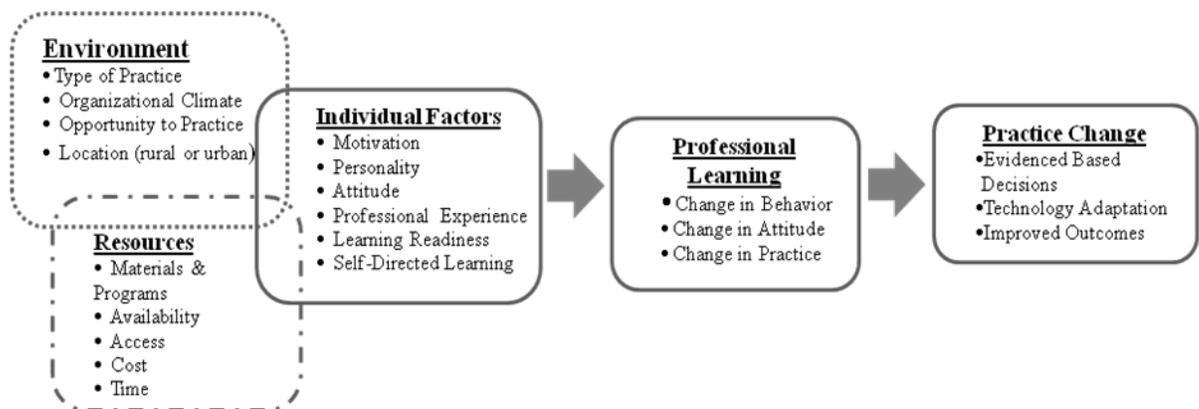


Figure 1-1. Theoretical Model of Practice Change

Data derived from replication logic provides empirical evidence to support or refute the propositions. Just as a distinct laboratory experiment can be repeated to confirm (replicate) the results, multiple case studies provide replication of the constructs found in individual cases and allow basic constructs to become more focused, guiding the development of new research (Baxter & Jack, 2008; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009). The propositions used in this study are linked to the theoretical model to summarize the study results. A brief discussion of how a particular construct might be used in future research is also presented.

Proposition 1: Pharmacists must have ready access to appropriate resources to obtain professional learning.

Proposition 1 is supported by the study. Electronic drug information databases, professional association subscriptions, and PubMed provide ready availability to suitable references and resources. Pharmacists in this study had ready access to abundant resources. Computer technology has eliminated differences in resource availability as a function of practice location. It is likely that all pharmacists have access to appropriate resources.

This data supports the reviewed literature on physician information-seeking behavior. Although the databases used are different, the learning resources used during informal learning are comparable between pharmacists and physicians. The literature can be used to construct more detailed investigation in future research. Suggestions for future research include individual preferences in resources, individual competency in information literacy, and how individuals manage knowledge.

Proposition 2: Pharmacist practice setting, location, or organizational climate influence professional learning.

Proposition 2 is *not* completely supported by the study. No differences in professional learning could be attributed to the practice setting (community, hospital, or specialty practice) or to the practice location (rural or urban). The similarity in available resources and individual traits appeared to negate the influences of environmental factors. Community practitioners reported that time to learn during work hours was limited, suggesting that the community practitioner may learn in smaller units than in other practice settings.

It is anticipated that the more global population of pharmacists would consider environment to be a larger factor in professional learning than did the study participants. Organizational climate may be perceived as influencing professional learning in all practice settings and locations by those who maintain that work-related learning should occur at work during work hours. Additional research is needed to better support or refute this proposition because the results of this study were not able to do so.

Proposition 3: Pharmacists self-identify professional learning needs.

Proposition 3 is supported by the study. All study participants were able to self-identify learning needs and considered this ability to be a professional responsibility of practicing pharmacists. There was no need for prompting or direction from others to identify a situation in which new knowledge or skills are needed. Study participants reported meeting unique problems with innovative solutions motivated by professional responsibility developed through self-directed study. Additional research to better identify the type and extent of professional learning needs is suggested.

Proposition 4: Pharmacists' motivation in pursuing professional learning is complex and a result of multiple factors.

Proposition 4 is supported by the study. Participants presented many factors that motivated their pursuit of professional learning. A desire to prepare an alternative dosage form, to improve patient outcomes, to meet an unaddressed need, to solve a challenging problem, and personal and professional pride were cited as motivators, often occurring simultaneously. While the study group provided evidence of willingness and desire to acquire new knowledge and skills, there was no discussion of instances in which there was no motivation to seek new information. Future research should include investigation

of instances in which solutions to a problem were *not* pursued to gain more insight into learning motivation.

Proposition 5: Pharmacist professional learning occurs as a result of a specific and short-term event or as more general and long-term learning.

Proposition 5 was supported by the study. Professional learning was stimulated by a specific problem (e.g., a patient question) or a more general problem (e.g., development of a diabetes education program). The stimulus for learning events was often as a specific question such as, “Will St. John’s wort interfere with my heart drugs?” The resultant learning events were equally short, such as a review of relevant drug information. Most participants also reported incidents that required more in-depth learning before a solution could be developed. An example of this is the reported protocol development for ilbutilide. As has been reported in physician learning research, learning events vary in time and intensity. A more detailed catalog of events and corresponding learning activities would provide a better understanding of the type of professional learning activity that best meets the needs of practicing pharmacists.

Proposition 6: Pharmacist professional learning causes a change in behavior, attitude, or practice.

Proposition 6 was supported by the study. A change in behavior, attitude, or practice is the outcome of authentic professional learning (Webster-Wright, 2009). While specific changes in attitude or behavior are difficult to document, one can assume that such changes must occur to result in a change in practice. The performance of activities and tasks that comprise professional practice are inseparable from attitudes and behaviors. A change in behavior occurs with experience as the practitioner becomes

more comfortable with seeking new knowledge and more skilled at using resources.

Attitude also changes with experience, as the new practitioner becomes more confident in self-initiated learning. Change in practice was evident from many reports of professional learning. Changing a protocol, developing an alternative drug formulation, and altering recommendations for drug use are examples of practice change initiated by professional learning.

A key finding of this study is that professional learning occurs as a direct result of professional practice and as an indirect result of resources, environment, and individual factors. Future research should focus on the specifics that drive professional learning and clearly identify factors that block pharmacists from acquiring professional learning.

Proposition 7: Pharmacists accept the responsibility for being self-directed, lifelong learners and take personal responsibility for developing their own learning goals.

Proposition 7 is supported by the study. The participants openly discussed the value of ongoing, lifelong learning, and their stories support the personal responsibility taken to acquire successful new learning. The interview guide included the question, “How do you know when you have learned enough?” The question was intended to define the point at which the learner stopped looking for additional knowledge in a *specific* learning situation. The results were surprising in that each participant interpreted the question as applicable to their approach to professional practice.

The unanimous response to this question was a resounding, “Never!” This provides insight into the approach to professional learning: Pharmacists recognize that professional learning is an ongoing process and an inherent part of their daily practice. A community pharmacist stated:

I don't think that you ever learn enough. There is always something new coming out. Just when I think I know all about diabetes, boom!

Something else comes out. Now they're saying probiotics could be helpful. You never learn it all. You just feel a little bit more knowledgeable in the subject. (UI#2)

This question alone could be used in future research to identify pharmacists who actively acquire professional learning, separating them from those who are indifferent to acquiring new knowledge and skills.

Summary of Propositions.

Six of the seven propositions support the three elements of the theoretical model contribute to acquiring professional learning. Proposition 2 theorized that differences attributable to practice setting, practice location and organizational climate would be evident. The interviews did not support this proposition and instead found no differences in setting or location. Each element and its components can be used as a foundation to support additional research in how pharmacists acquire professional learning. An improved understanding of the learning process then can be used to better meet the learning needs of pharmacists as a general population.

Enfolding the Literature

This study explored how practicing pharmacists acquire professional learning and the factors that promote professional learning. A key component in theory building is to compare the emergent constructs with those in the extant literature as a validity strategy

(Eisenhardt, 1989). A comparison of the findings to existent literature is summarized here.

Resources

Interactions with others, specifically consultation with a colleague is well-supported in the physician learning literature (Bennett, et al., 2004; Bennett, et al., 2006; Gagliardi, et al., 2009; Shershneva, et al., 2006). This suggests that an established network of peers is relevant to professional learning.

Teaching and the provision of education was not referenced as a source of professional learning in any of the reviewed literature. The lack of specific inclusion in published literature may be attributed to the inherent professional responsibility of pharmacists to provide patient information on effective medication use. The educational process of pharmacists offers practicing pharmacists a unique opportunity to acquire professional learning while teaching students.

Non-formal learning activities are not well-documented in the reviewed literature. Some evidence that physicians credit professional association membership as contributing to professional learning (Bennett, et al., 2004; Bennett, et al., 2006), but there is no comparable discussion specific to pharmacists professional learning. While participants in this study reported some learning as a result of participation in continuing education activities, such learning was considered to be casual and incidental to their professional learning. This is well-supported in the literature (Fletcher, et al., 2007; Institute of Medicine, 2002, 2010; Swankin, et al., 2006).

The learning resources used by pharmacists appears to parallel those reported by physicians. While research specific to pharmacists has not addressed learning resources,

physician specific research has identified drug information (Bennett, et al., 2004), online sites (Bennett, et al., 2006; Gagliardi, et al., 2009), primary literature (Horsley, et al., 2009), and electronic databases (Bennett, et al., 2006). These resources are similar to those used by pharmacists with the exception of the no-fee journals.

Environment

Participants in this study did not report any environmental barriers to learning other than restriction of time to learn in the workplace. It should be noted that this study focused on the possible influence of practice environment on the *acquisition* of professional learning. It did not address the environmental influences on the application of the professional learning. It is possible that the purposeful sample included practitioners for whom the workplace did not restrict practice change as a result of professional learning.

A review of the literature for both physicians and pharmacists strongly suggests that the environment, particularly the organizational climate, has a marked impact on practice change. A study on drug therapy decision making by pharmacists (Campagna & Newlin, 1997) found the practice setting to be governed by factors outside the control of most pharmacists. They cite employer expectations, time constraints, design and pattern of work, and work outcome measurements as environmental influences. Studies on improvement in patient care found that professional learning by physicians was not sufficient to change practice for similar reasons (Grol, 2002; Grol & Grimshaw, 2003; Price, et al., 2010).

It is more likely that the environment has an indirect influence on acquiring professional learning. If new knowledge and skills cannot be implemented in the

workplace due to constraints beyond the control of the practitioner, motivation to continue to acquire professional learning may be negatively impacted. The practicing professional may develop an attitude of indifference to professional learning because it cannot be implemented (Holland & Nimmo, 1999a; Nimmo & Holland, 2000).

Individual Factors

Individual factors that contribute to learning have been extensively studied. Only a brief summary of study results as they pertain to healthcare professionals will be presented here. Nimmo and Holland (1999b) suggested that the dominant personality type among pharmacists was characterized by a strong sense of responsibility, conscientiousness, practicality and logic. This study found that participants exhibited these traits through their strong professional pride and responsibility. The willingness of pharmacists to make change in their practice covers a spectrum from early innovators to those who are content with maintaining a status quo (Rosenthal, et al., 2010). While the purposeful study sample most likely includes early innovators and those in mid-spectrum, it did not include any practitioners who were complacent in their professional practice.

The more experienced practitioner tends to learn from self-initiated informal events, constructing a personalized knowledge base in the context of their practice (Daly, 1999; Dreyfus & Dreyfus, 1980; Dreyfus, 2004; Houle, 1980; Merriam & Cafarella, 1999). Reflection on the learning event is also an indicator of professional experience suggesting that deliberative practice is the primary mechanism by which expertise is acquired (Ericsson & Charmes, 1994; Mamede & Schmidt, 2004; Schon, 1983). Rosenthal (2010) hypothesizes that pharmacists who have developed the capacity to reflect on practice continue to learn and expand upon their professional expertise. Houle

(1980) suggests that reflection is necessary for lifelong learning. The study participants who cited experience as a factor in acquiring professional learning also reported reflection on learning events. The three participants who did not discuss reflection as part of learning were in the 5-10 years of practice group. These findings are supported by the learning literature (Daly, 1999; Dreyfus & Dreyfus, 1980; Dreyfus, 2004).

The description of self-directed learning reported by seven of the study participants supports Garrison's (1997) model of self-directed learning. Learners reported ability to self-identify a problem and the willingness to accept responsibility to find an answer. All participants were able to self-identify events for which additional learning was needed and appeared to be motivated to seek solutions without external direction.

Deterrent to Learning

The major factor which inhibited participants from acquiring professional learning was reported as time. Constraints of time have been frequently reported as a deterrent to pharmacists professional learning (Austen, et al., 2005; Bower, et al., 2008; Garganta, 1989; Marriott, et al., 2007; Parboosingh, 2002). The findings of this study coincide with previous research.

Overall, the study findings compare well to those in existent literature. The lack of support of environmental influences suggests that this area needs to be explored in more detail; perhaps a study focused only on the workplace and the organizational climate is in order. The issue of time is more likely to be a factor that would be better placed under environmental issues. The contribution that teaching, particularly working with pre-graduate students, may represent a unique contribution to pharmacists professional learning and additional investigation is recommended.

Limitations of the Study

The exploratory study was intentionally limited by using a stratified, purposeful sample to explore self-reported information on pharmacist professional learning. The findings represent a small group of pharmacists within the state of New Mexico and are not sufficient to be generalized to all pharmacists. While the small sample size was suitable to explore the constructs and to test the theoretical model, a larger study using a random selection process is needed to better represent all practicing pharmacists.

This study was an exploratory multi-case study seeking to define how pharmacists acquire professional learning and to identify factors that contribute to professional learning. The study sample was a purposeful selection—participants were selected on the premise that each would provide a suitable example of the learning acquisition process and the factors that promote professional learning. As such, the findings contained in this report cannot be generalized to all practicing pharmacists.

The ideal model of pharmacist professional learning is not defined in this work nor is any attempt made to characterize such a model. Nimmo and Holland (1999b) contend that professional practice covers a gamut ranging from best practices to static dispensing. There are those who endeavor to stay current in practice, seek opportunities to improve their practice and maintain active professional membership. Opposite to best practices are those who regard continuing education as a requirement for relicensure, maintain no professional affiliation, and believe that any change in practice is the sole responsibility of the employer. The purposeful sample sought to select participants who were more likely to demonstrate positive approaches to professional learning to provide examples of how pharmacists acquire professional learning...

The sampling process did not attempt to limit participation to those practitioners who demonstrated only the best of professional practices, but rather to exclude those whose practice was one of static dispensing. While the study findings cannot be assumed to exclusively represent the best of professional practice, it is safe to say that the study findings do not include those indifferent to professional learning and satisfied with static dispensing jobs. The study participants most likely represent practitioners somewhere between the two extremes of professionalism.

Recommendations for Future Research

The largest challenge to future research will be the development of an ideal model of professional learning. Professional learning is an active, situated, social process constructed by unique individuals in context of a specific practice setting. The constructs implicit in the development of individual professional learning are complex and consist of multiple intertwined factors that are difficult to measure. It will be very difficult, if not impossible, to create a standardized approach to an individual process. A logical approach that maintains the individuality of professional learning is to quantify the factors that promote or hinder the acquisition of professional learning. Identification of such factors could then be used to strengthen opportunities for professional learning.

Classic quantitative research methods employ random sampling of a particular population. Future research will be challenged to select a sample that adequately represents all of the individual factors that promote or hinder professional learning. The development of an ideal model must not only define the best approaches to learning, but also identify factors that contribute to indifference. Those with indifferent attitudes towards professional learning are less likely to voluntarily respond to investigative

queries about professional learning. Sampling error from lack of response could be improved with a substantial financial incentive (\$50 to \$100), assuming funding is not restricted.

An alternative approach is to limit the study sample to a specific population and target the total population. I would suggest targeting those pharmacists who are employed by chain, mass merchandiser or supermarkets first. This group represents about 40% of all practitioners (Midwest Pharmacy Workforce Research Consortium, 2009), has been found to have the lowest job satisfaction (Maio, et al., 2004), and has the poorest attitude towards work life (Mott, Doucett, Gaither, Pedersen, Schommer, 2004). It is anticipated that this group will contain a significant percentage of those with the poorest of professional learning skills.

Future research could partner with at least one large chain pharmacy for assistance in data collection. An electronic survey could be delivered by company intranet with management support to encourage participation. This would justify using work time to respond. The survey would include an active opt-out response with a selection of reasons to provide a better understanding of why pharmacists chose to not respond. Participation with anonymity of responses could be easily tracked using existent company training compliance software. A near total population response rate should cover the full range of professional learning abilities and attributes.

A comprehensive survey instrument integrating the three elements identified in the theoretical model and the study propositions would be constructed. It is recommended that validated tools used in the human resource development arena be incorporated where possible. Suggested survey sections are discussed.

1. Demographic considerations are always important. This would include age, years of practice, years at this job, position, primary work days and hours, hours worked per week, membership in professional association(s), and other appropriate factors.
2. Reports on physician use of learning resources estimates that learning varies with individual expertise in informatics and database familiarity. More research is needed to determine information-seeking skills. Identification of the specific resources used and the frequency of use would provide insight into developmental needs. Workplace learning resources should be distinguishable from resources used outside of the workplace.
3. Environmental factors impact opportunities to learn in the workplace and need better definition. Information specific to the practice setting should include the number of prescriptions filled, shift time and length, presence of other pharmacists, technicians or clerks, drive through windows, and patient counseling. More scrutiny of organizational climate including work performance expectations and job performance evaluation is needed. The values of the organization should be examined to determine the importance of professional learning to the organization; the perceived role of the pharmacists (revenue generating or patient care); and the support offered by the organization to acquire professional learning. The established Approaches to Learning at Work Questionnaire and Workplace Climate Questionnaire (Kirby, Knapper, Evans, Carty, & Gadula, 2003) are available tools for this area of research.

4. Individual factors can be best assessed using existing diagnostic instruments.

The Learning Transfer System Inventory (Holton, 2003, 2005) is a valid and reliable instrument that measures individual learning constructs such as learner readiness, motivation to change, perceived value of learning, ability to apply learning, opportunity to practice, and supervisor sanctions and support. Self-regulation of professional behavior can be assessed using available diagnostic tools such as the Self-Direction in Learning Scale (Stockdale & Brockett, 2011).

5. Individual professional learning efforts should be measured over the last few years. Suggestions for items include the types and source of continuing education programs completed, solicitation of non-continuing education learning experiences, probes to recent problems solved through professional learning, and discussions or collaborations with other healthcare professionals to address an event. The question ‘When do you know when you have learned enough?’ should be asked for possible relevance to a lifelong learning philosophy.

Analysis of data collected from a comprehensive survey would require a careful analysis to determine if the range of professional learning skills could be more clearly delineated. These results would then be useful in constructing a shorter, more concise survey to be used in multiple practice settings.

An alternative approach, also widely seen in physician learning research, is to investigate each element of the theoretical model separately sampling a broad population. Studies could be linked with a few common questions pertaining to professional

development while seeking more in-depth understanding of particular constructs. The element of resources lends itself well to this targeted approach. A broad survey of resources routinely used in the workplace or elsewhere and their frequency of use would be a unique addition to pharmacist learning literature. The influence of organizational climate would be better understood with a survey focused only on the work environment. In addition to the details outlined in the environmental section above, queries about the participant's relationship with the employer could be examined for possible deterrents to professional learning.

Quantitative studies of a single construct across a representative population would contribute to a deeper understanding of how a specific factor(s) contributes to professional learning. Each construct must be considered a predictive factor, one that increases the likelihood of professional learning, but does not guarantee it. For example, while professional association membership may be a predictor of innovative professional learning, this does not mean that membership confers has sound professional learning skills, nor that a non-member lacks professional learning skills. Each factor must be considered as part of holistic professional learning.

The theoretical model and the propositions provide a foundation for a variety of research possibilities. The literature on physician learning can be used to develop study designs of scope and complexity suitable to the individual investigator. Opportunities range from small, efficient studies to those complex with multiple variables with each building the pool of information specific to how pharmacists acquire professional learning.

Reflections on the Research Experience

The study addresses the broad question—how do pharmacists acquire professional learning? While published research from the Human Resource Development area provided theories on the development of learning, there was limited research on professional learning and the many factors that contribute to it. Case study method was selected to explore this contemporary phenomenon in depth and in its real-life content (Yin, 2009). A theoretical model with specific constructs was developed from the literature and then tested using multiple case analyses as described by Eisenhardt (1989). Multiple cases provide a stronger base for theory testing by enabling case comparison to determine if an emergent finding is idiosyncratic to a single case or is replicated by several cases. Propositions are more easily tested using replication logic with multiple cases. The results are more accurate than individual instances allowing broader exploration of the research question and support of the theory (Eisenhardt & Graebner, 2007).

The study design was based on replication logic. This design considers each case a single unit of analysis with the findings compared to findings from all other cases. Cases are selected by purposeful sampling of theoretically useful cases predicted to give similar results. Replication logic can be compared to confirmation of experimental results. For example, a scientific experiment with significant results is repeated several times to confirm, replicate, the results. Findings from a similar case are compared to the finding of other cases for replication of constructs that extend to the theory (Eisenhardt, 1989; Yin, 1993, 2009).

The analyses of cases were done in two steps. First, each case was carefully reviewed for unique constructs that were tabulated and reviewed for emergent patterns. A cross-case search for patterns was then conducted. Cases were paired and then grouped for review of similarities and differences. An example from this study (see Appendix A) is that only one participant listed Epocrates as a resource (no replication) while seven mentioned Facts and Comparisons (replication). The patterns were then grouped into categories for additional analysis. In the example of resources, both Epocrates and Facts and Comparison were grouped into the category of electronic drug information databases. Replication logic is applied to cases to confirm emergent constructs which enhances confidence in the accuracy of the results.

The iterative process of case comparisons provided well-defined constructs useful in supporting the propositions underlying the theoretical model. The theoretical model can now be tested to provide stronger empirical information on how practicing pharmacists acquire professional learning.

Significance of the Study

This study proposed and tested a theoretical model on the professional learning of practicing pharmacists. The use of replication logic provides empirical evidence to support propositions underlying the model and provides a foundation to support future research. The significance of the three elements—resources, environment, and individual factors—found to contribute to professional learning are discussed below.

The types of resources used by pharmacists in self-directed learning are similar to those used by physicians. Extensive electronic resources have made learning opportunities readily accessible and available. Portable devices provide unrestricted

access to the Internet, removing issues of time and place. The many available studies on physician learning resources can be used to minimize additional research in the types of resources that pharmacists use to acquire professional learning.

While no distinct differences in how pharmacists acquire professional learning were found as a result of environment, practice setting, or location, this area needs additional attention in future research. The impact of organizational climate was not addressed in this study and may be a significant factor to a different population of pharmacists.

Study participants consider professional learning to be a valued part of professional responsibility. The value that the participants placed on professional learning is evident from two observations. The first is the willingness to participate in an interview about how pharmacists acquire professional learning. Only a small percentage of invited pharmacists were willing to participate in the study suggesting that not all pharmacists are comfortable with discussing their learning processes, or do not perceive value in research on the topic. The second indication is the collective response that a practicing pharmacist is a lifelong learner. The similarities in participant reports are expected from a purposeful sample, but without additional research cannot be generalized to the pharmacist population.

The participants in this study offer evidence of professional learning. The interviews provide examples of stages of learning similar to those used by physicians and support the hypothesis of Moore (2007). Pharmacists approach professional learning first by identifying a problem that requires learning something new. The skill or knowledge is learned and then is used in practice. After some practice, the new skills become second

nature and are incorporated into routine practice. Additional research in the stages of professional learning, specific to pharmacists, would contribute to the understanding of this process.

The study provides insight into how pharmacists acquire professional learning and identifies factors that support or hinder professional learning. The use of a purposeful sample identified constructs common to practicing pharmacists who value professional learning. The empirical assessment of professional learning constructs supports propositions underlying the theoretical model. The research contributes to the understanding of pharmacist professional learning by providing a theoretical model useful as a foundation for developing future research.

Implication for Change

The AACP/APhA Task Force on Continuing Competency in Pharmacy (1975) published their final report recommending that standards of competency for professional practice and that a system of measure be developed. What was intended to guide pharmacists in ongoing professional development and maintenance of competence has evolved into a mandatory requirement to collect a specified number of hours for relicensure. Requirements focused on credit hours do not promote the professional learning needed to maintain the competencies that optimize patient outcomes through quality care (IOM, 2010).

The failure of the continuing education system does not mean that all pharmacists lack competence. If this were true, the situation would be much worse. There are many pharmacists who maintain competence, in spite of the continuing education system. They seek cutting-edge information specific to their practice setting, undertake self-directed

learning to develop innovative practice sites, and are highly motivated to provide the best quality healthcare possible. They must also comply with the mandatory collection of continuing education hours.

The concept of continuous professional development offers an alternative to the current continuing education system. Rouse (2004) initiated discussions of an alternative to continuing education, one in which individual learning is recognized as a method to maintain competency. The continuous professional development model is well-established in Canada and works well to document maintenance of competency. U.S. boards of pharmacy are skeptical about change, nervous about ways to adequately document individual professional development program, and lack the resources needed to implement a radical change from easily documented continuing education events. A review of the literature found only a single research study (Dopp, Moulton, Rouse, & Trewett, 2010) specific to continuous professional development for practicing pharmacists in the United States. Without documentation of self-directed, effective professional learning, it will be difficult to promote change. This study was conducted to begin documentation of professional learning and facilitate changing the current system.

The first step was to attempt to define professional learning for practicing pharmacists. The purposeful sample solicited successful approaches to professional learning and begins to define a model of professional learning. Standards of good practice are the intended outcome. Clear standards are necessary to measure acceptable professional learning and differentiate between strong and poor performers.

The second step is to look at factors that contribute to professional learning. Documentation is needed to quantify the aspects of competency in order to compare them

to actual practice. Public media suggests that consumers want low prices, expedited and efficient service AND a high level of professional competency. These may be mutually exclusive expectations, but such has yet to be thoroughly documented. Quality care requires a competent professional who is motivated to acquire professional learning and has the opportunities to acquire necessary learning over the life of professional practice. This study sought to identify factors found to promote professional learning for use in more extensive studies.

The study findings are not sufficient to promote change, but can serve as guides in developing a deeper understanding of professional learning and its contribution to professional competency. If a significant percentage of practicing pharmacists can be documented as acceptable professional learners who effectively maintain competence in their practice setting, boards of pharmacy might be more receptive to entertaining change to a continuous professional development model.

Continuing education has a limited role in professional learning. Topics such as law updates or refresher courses in basic concepts of therapeutics may be appropriate for *en masse* delivery. Because the stimulus of professional learning is spontaneous, unpredictable, and uniquely individual, structured continuing education events do not make effective contributions to professional learning. Additional investigation in factors that promote professional learning may shift continuing education topics to more just-in-time training that strengthen skills in acquiring professional learning—topics like information management, self-assessment and reflection, or other lifelong learning skills.

Pharmacists, as health professionals, are expected to provide quality care—care that is safe, effective, patient-centered, efficient, timely and equitable (IOM, 2001).

Professional core competencies include the ability to provide patient-centered care, work in interprofessional teams, employ evidence-based practice, apply quality improvement, and utilize informatics. These must be developed and maintained to provide quality patient care for optimal health outcomes (IOM, 2010). Competent practitioners must adopt new technologies, use evidence-based approaches, and actively pursue quality improvement in individual practice settings to initiate improvement in patient outcomes. Successful, meaningful change in practice is preceded by dynamic, self-directed changes in behavior, attitudes or practice—professional learning

Professional learning is individual, contextual and embedded in practice. The change generated by professional learning occurs with practice experience and reflective action within practice context. There is a need to understand the constructs of professional learning within the complexity and diversity of learning experiences in order to develop better ways to support professionals. Identifying factors that develop professional learning skills would facilitate the prerequisite changes in behavior, attitude and practice. These are required to facilitate meaningful change in practice which in turn promotes quality care and optimal patient outcomes.

This study provides an impetus to increased investigation specific to pharmacist professional learning. The findings are a foundational beginning in documenting the process by which pharmacists acquire the professional learning needed to maintain competency in practice and provide the best inpatient care.

REFERENCES

- Abel, C., & Ruddy, D. (2008). Learning about how pharmacists learn. *Pharmacy Today*, 13(12), 33.
- AACP/APhA Task Force on Continuing Competence in Pharmacy. (1975). The continuing competence of pharmacists. *Journal of American Pharmaceutical Association*, 15(8), 432-437, 457.
- Accreditation Council for Pharmacy Education. (2011). *Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree, Adopted January 15, 2006. Guidelines 2.0: January 23, 2011. Effective February 14, 2011.* p. 20. Retrieved March 20, 2011 from: <http://www.acpe-accredit.org/pdf/FinalS2007Guidelines2.0.pdf>
- Amaratunga, D. & Baldry, D. (2001). Case study methodology as a means of theory building: performance measurement in facilities management organizations. *Work Study*, 50(3), 95-104.
- Arthur, W. A., Bennett, W., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology*, 88(2), 234-245.
- Austin, Z., Marini, A., Glover, N. M., & Croteau, D. (2005). Continuous professional development: a qualitative study of pharmacists' attitudes, behaviors and preferences in Ontario, Canada. *American Journal of Pharmaceutical Education*, 69(1), Article 4.
- Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology*, 41, 63-105.

- Balen, R. M., & Jewesson, P. J. (2004). Pharmacist computer skills and needs assessment survey. *Journal of Medical Internet Research*, 6(1), 311.
- Baxter, P. & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544-559. [On-line serial]. Available at <http://www.nova.edu/sss/QR/QR13-4/baxter.pdf>.
- Bennett, N. L., Casebeer, L. L., Kristofco, R. E., & Strasser, S. M. (2004). Physicians' Internet information-seeking behaviors. *The Journal of Continuing Education in the Health Professions*, 24(1), 31-38.
- Bennett, N. L., Casebeer, L. L., Zheng, S., & Kristofco, R. (2006). Information seeking behaviors and reflective practice. *The Journal of Continuing Education in the Health Professions*, 26(2), 120-127.
- Bergen, A. & While, A. (2000). A case for case studies: exploring the use of case study design in community nursing research. *Journal of Advanced Nursing*, 31(4), 926-934.
- Bero, L. A., Grilli, R., Grimshaw, J. M., Harvey, E., Oxman, A. D., Thomas, M. A., et al. (1998). Closing the gap between research and practice: An overview of systematic reviews of interventions to promote implementation of research findings by health care professionals. *British Medical Journal*, 317, 465-468.
- Bower, E. A., Girard, D. E., Wessel, K., Becker, T. M., & Choi, D. (2008). Barriers to innovation in continuing medical education. *Journal of Continuing Education in the Health Professions*, 28(3), 148-156.
- Brockett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: perspectives on theory, research and practice*. New York, NY: Routledge.

- Burke, L. A., & Hutchins, H. M. (2007). Training transfer: an integrative literature review. *Human Resource Development Review*, 6(3), 263-296.
- Burnard, P. (1991). A method of analyzing interview transcripts in qualitative research. *Nurse Education Today*, 11(6), 461-466.
- Caffarella, R. S. (1988). *Qualitative research on self-directed learning*. Paper presented at the American Association for Adult and Continuing Education, Tulsa, OK.
- Campbell, C. M., Parboosingh, J., & Slotnick, H. B. (1999). Outcomes related to physicians' practice-based learning. *The Journal of Continuing Education in the Health Professions*, 19(4), 234-241.
- Campagna, K. D., & Newlin, M. H. (1997). Key factors influencing pharmacists' drug therapy decisions. *American Journal of Health-System Pharmacists*, 54(11), 1307-1313.
- Candy, P. (1991). *Self-Direction for Lifelong Learning. A Comprehensive Guide to Theory and Practice*. San Francisco, CA: Jossey-Bass.
- Cervero, R. M. (2000). Trends and issues in continuing professional education. *New Directions for Adult and Continuing Education*, 2000(86), 3-12.
- Creswell, J. W. (2007). *Qualitative inquiry & research design, 2nd Edition*. Thousand Oaks, CA: Sage Publications.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- Daley, B. J. (1999). Novice to expert: An exploration of how professionals learn. *Adult Education Quarterly*, 49(4), 133-147.

- Davis, D. A., O'Brien, M. T., Freemantle, N., Wolf, F. M., Mazmanian, P., & Taylor-Vaisey, A. (1999). Impact of formal continuing medical education: Do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *Journal of American Medical Association, 282*(9), 867-874.
- Davis, D. A., Thomas, M. A., Oxman, A. S., & Haynes, B. (1992). Evidence for the effectiveness of CME: A review of 50 randomized controlled trials. *Journal of American Medical Association, 268*(9), 1111-1117.
- Davis, D. A., Thompson, M. A., Oxman, A. D., & Haynes, B. (1995). Changing physician performance: A systematic review of the effect of continuing medical education strategies. *Journal of American Medical Association, 274*(9), 700-705.
- Dopp, A. L., Moulton, J. R., Rouse, M. J., & Trewet, C. B. (2010). A five-state continuing professional development pilot program for practicing pharmacists. *American Journal of Pharmaceutical Education, 74*(2), Article 28.
- Dreyfus, S. E. & Dreyfus, J. L. (1980). A five-stage model of the mental activities involved in directed skill acquisition. (Unpublished report supported by the Air Force Office of Scientific Research No. Contract F49620-79-C-0063). Berkeley, CA: University of California at Berkeley. Retrieved August 5, 2011 from: <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA084551>
- Dreyfus, S. E. (2004). The five-stage model of adult skill acquisition. *Bulletin of Science, Technology & Society, 24*(3), 177-181.
- Driesen, A., Simoens, S., & Laekeman, G. (2008). Continuing education programs for pharmacists: No one size fits all. *Pharmacy Education, 8*(1), 37-43.

- Eisenhardt, K. M. (1989). Building theory from case study research. *The Academy of Management Review*, 14(4), 532-550.
- Eisenhardt, K. M. & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25-32.
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*, 70(1), 113-136.
- Ericsson, K. A., & Charness, N. (1994). Expert performance, its structure and acquisition. *American Psychologist*, 49(8), 725-747.
- Fjortoft, N. F. (2006). Learning outcomes and behavioral changes with a pharmacy continuing professional education program. *American Journal of Pharmaceutical Education*, 70(2), Article 24.
- Fletcher, S. W., Hager, M., & Russell, S. (2007). *Continuing education in the health professions: Improving healthcare through lifelong learning*. New York, NY: Josiah Macy, Jr. Foundation.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), 219-245.
- Gagliardi, A. R., Wright, F. C., Victor, C., Brouwers, M. C., & Silver, I. L. (2009). Self-directed learning needs, patterns, and outcomes among general surgeons. *The Journal of Continuing Education in the Health Professions*, 29(4), 269-275.
- Garganta, K. J. (1989). *The question of mandatory continuing education for professionals*. Boston, MA: Harvard University.
- Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48(1), 18-33.

- Gerring, J. (2004). What is a case study and what is it good for? *The American Political Science Review*, 98(2), 341-364.
- Gibbons, M., & Phillips, G. (1982). Self-education: The process of life-long learning. *Canadian Journal of Education*, 7(4), 67-86.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report* 8(4), 597-607. [On-line serial] Available at <http://www.nova.edu/ssw/QR/QR8-4/golafshani.pdf>.
- Grol, R. (2002). Changing physicians' competence and performance: finding the balance between the individual and the organization. *The Journal of Continuing Education in the Health Professions*, 22(4), 244-251.
- Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *The Lancet*, 362, 1225-1230.
- Hagemier, N. E. & Mason, H.I. (2011). Student pharmacists' perception of testing and study strategies. *American Journal of Pharmaceutical Education*, 75(2), Article 35.
- Hancock, D. R. & Algozzine, B. (2006). *Doing case study research: A practical guide for beginning researchers*. New York, NY: Teachers College Press.
- Hanson, A. L., Bruskiwitz, R. H., & DeMuth, J. E. (2007). Pharmacists' perceptions of facilitators and barriers to lifelong learning. *American Journal of Pharmaceutical Education*, 71(4), Article 67.
- Haug, J. D. (1997). Physicians' preferences for information sources: a meta-analytic study. *Bulletin of the Medical Library Association*, 85(3), 223-232.

- Holland, R. W., & Nimmo, C. M. (1999a). Transitions in pharmacy practice, part 3: Effecting change-the three-ring circus. *American Journal of Health-System Pharmacists*, 56(21), 2235-2241.
- Holland, R. W., & Nimmo, C. M. (1999b). Transitions, part 1: Beyond pharmaceutical care. *American Journal of Health-System Pharmacists*, 56(17), 1758-1764.
- Holton, E. F. (1996). The flawed four-level evaluation model. *Human Resources Development Quarterly*, 7(1), 5-21.
- Holton, E. F. (2003). What's really wrong: diagnosis for learning transfer system change. In E. F. Holton & T. T. Baldwin (Eds.), *Improving learning transfer in organizations* (pp. 59-79). San Francisco, CA: Jossey-Bass.
- Holton, E. F. (2005). Holton's evaluation model: New evidence and construct elaborations. *Advances in Developing Human Resources*, 7(1), 37-54.
- Horsley, T., O'Neill, J., & Campbell, C. (2009). The quality of questions and use of resources in self-directed learning: personal learning projects in the maintenance of certification. *The Journal of Continuing Education in the Health Professions*, 29(2), 91-97.
- Houle, C. O. (1980). *Continuing learning in the professions*. San Francisco, CA: Jossey-Bass.
- Institute of Medicine. (2001). *Crossing the quality chasm*. Washington, DC: The National Academies Press.
- Institute of Medicine. (2010). *Redesigning continuing education in the health professions*. Washington, DC: The National Academies Press.

- Jennett, P., Jones, D., & Mast, T. (1994). Characteristics of self-directed learners. In D. Davis & R. Fox (Eds.), *Physicians as Learners* (pp. 47-65). Chicago, IL: American Medical Association.
- Jennings, S. F. (2006). Personal development plans and self-directed learning for healthcare professionals: are they evidence based? *Postgraduate Medical Journal*, 83, 518-524.
- Kansanaho, H., Pietla, K., & Airaksinen, M. (2003). Can a long-term continuing education course in patient counseling promote a change in the practice of Finnish community pharmacists? *International Journal of Pharmacy Practice*, 11(3), 153-160.
- Kirby, J. R., Knapper, C. K., Evans, C. J., Carty, A. E., & Gadula, C. (2003). Approaches to learning at work and workplace climate. *International Journal of Training and Development*, 7(1), 31-52.
- Kirwan, C., & Birchall, D. (2006). Transfer of learning from management development programmes: testing the Holton model. *International Journal of Training and Development*, 10(4), 252-268.
- Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. New York, NY: Associated Press.
- Koda-Kimble, M. A., & Batz, F. R. (1994). Diabetes care as an active learning model of postgraduate education and training for pharmaceutical care. *American Journal of Pharmaceutical Education*, 58(4), 382-385.
- Kohn, L. T. (1997). *Methods in case study analysis*. Technical Publication No 2. Washington, D.C.: Center for Studying Health System Change.

- Liebermann, S., & Hoffmann, S. (2008). The impact of practical relevance on training transfer: evidence from a service quality training program for German bank clerks. *International Journal of Training and Development*, 12(2), 74-86.
- Lim, D. H., & Johnson, S. D. (2002). Trainee perceptions of factors that influence learning transfer. *International Journal of Training and Development*, 6(1), 36-48.
- Maio, V., Belazi, D., Goldfarb, N. I., Phillips, A. L., & Crawford, A. G. (2003). Use and effectiveness of pharmacy continuing-education materials. *American Journal of Health-System Pharmacists*, 60(16), 1644-1649.
- Mamede, S., & Schmidt, H. G. (2004). The structure of reflective practice in medicine. *Medical Education*, 38(12), 1302-1308.
- Marinopoulos, S. S., Dorman, T., Ratanawongsa, N., Wilson, L. M., Ashar, B. H., Magaziner, J. L., et al. (2007). *Effectiveness of continuing medical education: Evidence report/technology assessment number 149*. Rockville, MD: Agency for Healthcare Research and Quality. AHRQ publication No 07-E006.
- Marriott, J. L., Duncan, G. J., & McNamara, K. P. (2007). Barriers to pharmacist participation in continuing education in Australia. *Pharmacy Education*, 7(1), 11-17.
- Martin, B. A., Bruskiwitz, R. H., & Chewing, B. A. (2010). Effect of a tobacco cessation continuing professional education program on pharmacists' confidence, skills, and practice-change behavior. *Journal of American Pharmacists Association*, 50(1), 9-16.

- McCaw, B., McGlade, K., & McElnay, J. (2007). The impact of the internet on the practice of general practitioners and community pharmacists in Northern Ireland. *Informatics in Primary Care, 15*(4), 231-237.
- McNamara, K. P., Duncan, G. J., McDowell, J., & Marriott, J. L. (2009). Community pharmacists' preference for continuing education delivery in Australia. *The Journal of Continuing Education in the Health Professions, 29*(1), 52-57.
- Merriam, S. B. (2001). Andragogy and self-directed learning: pillars of adult learning theory. *New Directions for Adult and Continuing Education, 2001*(89), 3-13.
- Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive guide, 2nd Edition*. San Francisco, CA: Jossey-Bass.
- Merriam, S. B., & Leahy, B. (2005). Learning transfer: A review of the research in adult education and training. *PAACE Journal of Lifelong Learning, 14*, 1-24.
- Midwest Pharmacy Workforce Research Consortium. (2009). *Final report of the 2009 national sample survey of the pharmacist workforce to determine contemporary demographic and practice characteristics*. Alexandria, VA: Pharmacy Manpower Project, Inc.
- Miles, M. B. & Huberman, A. M. (1992). *Qualitative Data Analysis* (2nd ed.), Thousand Oaks, CA: Sage Publications.
- Mocker, D. W. & Spear, G. E. (1982). Lifelong learning: Formal, nonformal, informal and self-directed. Information Series No. 241. Columbus, OH: National Center for Research in Vocational Education. Retrieved from ERIC database. (ED220723)

- Moore, D. E. (2007). *How physicians learn and how to design learning experiences for them: An approach based on an interpretive review of evidence*. New York, NY: Josiah Macy, Jr. Foundation.
- Mott, V. W. (2000). The development of professional expertise in the workplace. *New Directions for Continuing Education*, 2000(86), 23-31.
- Mott, D. A., Doucette, W. R., Gaither, C. A., Pedersen, C. A., & Schommer, J. C. (2004). Pharmacists' attitudes toward worklife: results from a national survey of pharmacists. *Journal of American Pharmacists Association*. 44(3), 326-336.
- Murad, J. H. & Viarkey, P. (2008). Self-directed learning in health professions education. *Annals, Academy of Medicine, Singapore*. 37(7), 580-590.
- Nimmo, C. M., & Holland, R. W. (1999a). Transitions in pharmacy practice, Part 2: Who does what and why. *American Journal of Health-System Pharmacists*, 56(19), 1981-1987.
- Nimmo, C. M., & Holland, R. W. (1999b). Transitions in pharmacy practice, part 4: Can a leopard change its spots? *American Journal of Health System Pharmacists*, 56(23), 2458-2462.
- Nimmo, C. M., & Holland, R. W. (2000). Transitions in pharmacy practice, part 5: walking the tightrope of change. *American Journal of Health System Pharmacists*, 57(1), 64-72.
- Oxman, A. D., Thompson, M. A., Davis, D. A., & Haynes, B. (1995). No magic bullets: A systematic review of 102 trials of interventions to improve professional practice. *Canadian Medical Association Journal*, 153(10), 1423-1431.

- Parboosingh, J. T. (2002). Physician communities of practice: Where learning and practice are inseparable. *The Journal of Continuing Education in the Health Professions*, 22(4), 2320-2236.
- Patterson, B. D. (1999). Distance education in a rural state: Assessing change in pharmacy practice as a result of a pharmaceutical care certificate program. *American Journal of Pharmaceutical Education*, 63(1), 56-63.
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Sciences Research*, 34(5), Part II, 1189-1208.
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods*, (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Price, D. W., Miller, E. K., Rahm, A. K., Brace, N. E., & Larson, R. S. (2010). Assessment of barriers to changing practice as CME outcomes. *The Journal of Continuing Education in the Health Professions*, 30(4), 237-245.
- Riedl, R. (2007). On the replication of positivist case study research. *ECIS 2007 Proceedings*. Paper 70. Retrieved January 2011 from <http://aisel.aisnet.org/ecis2007/70>.
- Robertson, M. K., Umble, K. E., & Cervero, R. M. (2003). Impact studies in continuing education for health professions: Update. *Journal of Continuing Education in the Health Professions*, 23(3), 146-156.
- Rosenthal, M., Austen, Z., & Tsuyuki, R. T. (2010). Are pharmacists the ultimate barrier to pharmacy practice change? *Canadian Pharmacists Journal*, 143(1), 37-42.

- Rouleau, R., Beauchesne, M.F., & Laurier, C. (2007). Impact of continuing education program on community pharmacists' interventions and asthma medication use: a pilot study. *The Annals of Pharmacotherapy*, 41(4), 574-580.
- Rouse, M. J. (2004). Continuing professional development in pharmacy. *American Journal of Health-System Pharmacists*, 61(19), 2069-2076.
- Rowley, J. (2002). Using case studies in research. *Management Research News*, 25(1), 16-26.
- Saini, B., Smith, L., Armour, C., & Krass, I. (2006). An educational intervention to train community pharmacists in providing specialized asthma care. *American Journal of Pharmaceutical Education*, 70(5), Article 118.
- Schon, D. A. (1983). *The reflective practitioner*. New York, NY: Basic Books, Inc.
- Shershneva, M. B., Carnes, M., & Bakken, L. L. (2006). A model of teaching-learning transactions in generalist-specialist consultations. *The Journal of Continuing Education in the Health Professions*, 26(3), 222-229.
- Slotnick, H. B. (1999). How doctors learn: physicians' self-directed learning episodes. *Academic Medicine*, 74(10), 1106-1117.
- Slotnick, H. B. (2000). Physicians' learning strategies. *Chest*, 118(2 suppl), 18S-23S.
- Slotnick, H. B. (2001). How doctors learn: Education and learning across the medical-school-to-practice trajectory. *Academic Medicine*, 76(10), 1013-1026.
- Slotnick, H. B., Mejicano, G., Passin, S., & Bailey, A. (2002). The epidemiology of physician learning. *Medical Teacher*, 24(3), 304-312.

- Slotnick, H. B., & Shershneva, M. B. (2002). Use of theory to interpret elements of change. *The Journal of Continuing Education in the Health Professions*, 22(4), 197-204.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications.
- Stake, R. E. (2005). Qualitative Case Studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Handbook of Qualitative Research Third Edition* (pp. 443-466). Thousand Oaks, CA: Sage Publications.
- Stasyk, R., Schnindel, T., & Wiens, A. (2005). *Expanding opportunities for professional development*. Edmonton, AB: Alberta College of Pharmacists.
- Stockdale, S. L., & Brockett, R. G. (2011). Development of the PRO-SDLS: A measure of self-direction in learning based on the personal responsibility orientation model. *Adult Education Quarterly*, 61(2), 161-180.
- Subedi, B. S. (2004). Emerging trends of research on transfer of learning. *International Education Journal* 5(4), 591-599.
- Swankin, D., LeBuhn, R. A., & Morrison, R. (2006). *Implementing continuing competency requirements for health care practitioners*. Washington, DC: AARP.
- Tellis, W. (1997a). Introduction to case study. *The Qualitative Report* 3(2). [On-line serial], Available at <http://www.nova.edu/ssw/QR/QR3-2/tellis1.html>.
- Tellis, W. (1997b). Application of a case study methodology. *The Qualitative Report* 3(3). [On-line serial], Available at <http://www.nova.edu/ssw/QR/QR3-3/tellis2.html>.

- Velada, R., Caetano, A., Michel, J. W., Lyons, B. W., & Kavanagh, M. J. (2007). The effects of training design, individual characteristics and work environment on transfer of training. *International Journal of Training and Development* 11(4), 282-294.
- Verhoeven, A. A. H., Boerma, E. J., & Jong, B. M.-d. (1995). Use of information sources by family physicians: a literature survey. *Bulletin of the Medical Library Association*, 83(1), 85-90.
- Vlasses, P. H. (2006). Pharmacy continuing education: 40 years ago to now. *The Annals of Pharmacotherapy*, 40(10), 1854-1856.
- Watson, M., Bond, C., Grimshaw, J., Mollison, J., Ludbrook, A., & Walker, A. (2002). Educational strategies to promote evidence-based community pharmacy practice: a cluster randomized controlled trial (RCT). *Family Practice*, 19(5), 529-643.
- Webster-Wright, A. (2009). Reframing professional development through understanding authentic professional learning. *Review of Educational Research*, 79(2), 702-739.
- Wittstrom, K. (2009). New Mexico Pharmacist Continuing Professional Development Survey. Unpublished Survey.
- Yamhill, S., & McLean, G. N. (2001). Theories supporting transfer of training. *Human Resource Development Quarterly*, 12(2), 195-208.
- Yin, R. K. (1993). *Applications of case study research*. Newbury Park, CA: Sage Publications.
- Yin, R. K. (1999). Enhancing the quality of case studies in health services research. *Health Sciences Research*, 34(5) Part II, 1209-1224.

Yin, R. K. (2009). *Case Study Research: Design and Methods, Fourth Edition*. Los Angeles, CA: Sage Publications, Inc.