

DESIGNING MOTIVATIONAL INTERVIEWING INSTRUCTION EMPLOYING  
THE FIRST PRINCIPLES OF INSTRUCTION

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## DEDICATION

This dissertation is dedicated to my husband, Steven M. Cook, who with patience supported me to complete this research.

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Mary Jane Cook

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Health care reform emphasizes prevention of chronic disease through the reduction of modifiable risk factors as a way to reduce health care costs, morbidity, and mortality. Motivational interviewing (MI) is an effective method of health behavior counseling. It has been used successfully applied in health related behavior change and self- management of chronic disease. The knowledge, skills, and attitude of MI are acquired through learning as other techniques used in the health professions. Nurse practitioner faculty need guidance on how to design instruction in MI that incorporates competencies and utilizes innovative strategies. Prescriptive instructional design theory utilizes knowledge from educational research to establish the steps in the design process.

The purpose of this research was to apply prescriptive instructional theory to the design of effective, efficient, and engaging instruction in MI resulting in beginning proficiency in the NP students. A formative design was used for this study. The First Principles of Instruction served as the prescriptive design theory used in the design of instruction in MI. Data sources included the researcher's design journal, observation during interaction with the instance, demographics of authentic users, authentic user reaction, and knowledge testing. Four cycles of design-redesign were completed.

Results of the study point to improvements in the First Principles of Instruction. The instruction was effective, based on the improved scores from pretest to posttest on the Helpful Response Questionnaire. The improved scores also indicated an increase in knowledge of MI. Efficiency was not improved from pretest to posttest. The definition of efficiency as less time to completion of the task did not apply to MI communication skills. The First Principles of Instruction were useful in the design of the techniques of MI. However, there is little guidance for the affective component of MI such as empathy. The prescriptions of the First Principles of Instruction were useful in designing the instruction in MI. NP students indicated in post instruction interviews that engagement in the instruction was related to the relevance of the subject matter to practice and interactive exercises.

Deanna Reising, PhD, RN, ACNS-BC, FNAP, ANEF, Chair

## TABLE OF CONTENTS

LIST OF TABLES .....	xi
LIST OF FIGURES .....	xii
LIST OF PICTURES .....	xiii
LIST OF ABBREVIATIONS.....	xiv
LIST OF DEFINITIONS .....	xv
CHAPTER I BACKGROUND AND SIGNIFICANCE .....	1
Background of the Study .....	1
Statement of the Problem and Research Questions .....	3
Significance of the Problem.....	6
Theoretical Framework.....	7
Problem-Centered Instruction.....	8
Activation.....	8
Demonstration.....	9
Application.....	10
Integration .....	11
Pebble-in-the-Pond Model .....	11
Organization .....	13
CHAPTER II REVIEW OF LITERATURE .....	15
Nurse Practitioner Education .....	15
Technology in Nurse Practitioner Education Research .....	18
Online and Blended Education .....	18
Design Frameworks .....	19
Outcomes .....	22
Motivational Interviewing Training.....	24
The Eight Stages of Learning Motivational Interviewing .....	24
Motivational Interviewing Training Research.....	27
Training interventions .....	28
Intervention effectiveness.....	28
Computer based training in MI .....	32
Application of the First Principles of Instruction .....	34
Conclusion .....	36
CHAPTER III METHODS .....	38
Design .....	38
Formative Design Research .....	39
Analysis of Instructional Need.....	41
Instrumentation for the Pilot Study.....	41
Results of the Analysis of Instructional Need Pilot Study.....	44
Outcomes in Formative Research .....	46
Effectiveness .....	46
Efficiency.....	46
Engagement.....	47
Subjects .....	47
Instrumentation .....	49
Demographics .....	49



Measures of Effectiveness .....	49
The Helpful Responses Questionnaire.....	49
Measures of Efficiency .....	50
Measures of Engagement.....	50
Data Collection .....	51
Data Analysis Steps .....	53
Iterative Process .....	54
Data Quality .....	55
Construct Validity.....	56
Sound Data Collection and Analysis Procedures.....	57
Credibility of the Data .....	58
Summary .....	59
CHAPTER IV DESIGN INSTANCE.....	60
Case Baseline MI Instructional Method .....	60
Design Decision Priorities .....	61
Design a Problem Prototype .....	62
Progression of Problems .....	68
Component Analysis.....	69
Functional Prototype.....	75
Enhancing Strategies.....	80
Finalize the Functional Prototype .....	82
Summary .....	83
CHAPTER V FINDINGS.....	85
Participants .....	85
Round One .....	86
Pretest and Posttest Results.....	86
Pretest and Posttest Completion Times.....	87
Observations .....	87
Data from Interviews .....	88
Effectiveness .....	88
Efficiency .....	89
Engagement .....	90
Changes in the Instance and Interaction .....	91
Round Two.....	92
Pretest and Posttest Results.....	92
Pretest and Posttest Completion Times.....	92
Observations .....	93
Data from Interviews .....	94
Effectiveness .....	94
Efficiency .....	94
Engagement .....	95
Changes in the Instance and Interaction .....	95
Round Three.....	97
Pretest and Posttest Results.....	97
Pretest and Posttest Completion Times.....	98
Observations .....	99

Data from Interviews .....	99
Effectiveness .....	99
Efficiency .....	100
Engagement .....	101
Changes in the Instance and Interaction .....	101
Round Four .....	103
Pretest and Posttest Results.....	103
Pretest and Posttest Completion Times.....	104
Observations .....	104
Data from Interviews .....	105
Effectiveness .....	105
Efficiency .....	106
Engagement .....	106
Changes Made During Round Four .....	107
Answer to Research Question One .....	107
Effectiveness .....	107
Efficiency .....	109
Answer to Research Question Two.....	110
Answer to Research Question Three.....	110
Summary .....	111
CHAPTER VI DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS .....	112
Discussion .....	112
Recommendations for the First Principles of Instruction .....	115
What Worked.....	115
What Did Not Work.....	116
Improvements to the Pebble-in-the-Pond Model.....	119
Implications for Nurse Practitioner Education .....	123
Limitations .....	124
Future Research .....	125
Conclusion .....	127
APPENDICES .....	128
Appendix A Outcome Measures .....	128
Appendix B Helpful Responses Questionnaire.....	134
Appendix C Demographic Survey .....	136
Appendix D Post Instruction Interview Questions .....	137
Appendix E Researcher Observation Form .....	138
Appendix F Design Journal .....	139
REFERENCES .....	167
CURRICULUM VITAE	

## LIST OF TABLES

Table 1. The Eight Stages of Motivational Interviewing with Learner Tasks.....	26
Table 2. Interviewer Proficiency and Competency Thresholds for MITI 3.1.1 .....	43
Table 3. Comparison of Beginning Proficiency Criteria and NP Student Mean Scores ..	45
Table 4. Motivational Interviewing Prototype Demonstration (Storyboard).....	63
Table 5. Processes of Motivational Interviewing Aligned with Tasks .....	68
Table 6. Component Skills and their Properties .....	69
Table 7. Problem Solving Event Table .....	71
Table 8. Summary of Pebble-in-the-Pond Model for Instructional Design.....	83
Table 9. Descriptive Statistics for Demographics of Participants All Rounds .....	86
Table 10. Participant Demographics by Rounds.....	86
Table 11. Descriptive Statistics Helpful Responses Questionnaire Scores Round One ..	87
Table 12. Completion Times for Helpful Responses Questionnaire Round One .....	87
Table 13. Round One Changes in Instructional Instance.....	91
Table 14. Descriptive Statistics Helpful Responses Questionnaire Scores Round Two ...	92
Table 15. Descriptive Statistics Pretest and Posttest Completion Times Round Two.....	93
Table 16. Round Two Changes in Instructional Instance .....	96
Table 17. Descriptive Statistics Helpful Responses Questionnaire Scores Round Three ..	98
Table 18. Descriptive Statistics Pretest and Posttest Completion Times Round Three.....	98
Table 19. Round Three Changes in Instructional Instance .....	103
Table 20. Descriptive Statistics Helpful Responses Questionnaire Scores Round Four ..	104
Table 21. Descriptive Statistics Pretest and Posttest Completion Times Round Four ..	104
Table 22. Motivational Interviewing Whole Problem Content Elements.....	149

## LIST OF FIGURES

Figure 1. Prototype Demonstration for Problem Progression (Storyboard) .....	141
Figure 2. Typical Content Elements for How-to Component Skill .....	148
Figure 3. Steps Bring About Conditions That Lead to the Consequence .....	148
Figure 4. Content Elements for a Whole Problem.....	149

## LIST OF PICTURES

Picture 1: Quitting Smoking .....	63
Picture 2: Physical Activity .....	63
Picture 3: Healthy Diet.....	63
Picture 4: Medication Self-Management .....	64
Picture 5: Provider on Left Talking to Patient .....	64
Picture 6: Provider Talking to Patient with Hand on Chin .....	64
Picture 7: Provider on Right Talking to Patient.....	65
Picture 8: Demonstration Master Slide .....	76
Picture 9: Demonstration Slide with Content .....	76
Picture 10: Knowledge Master Slide .....	77
Picture 11: Knowledge Interactive Slide .....	78
Picture 12: Application Slide Displaying Correct Response .....	79
Picture 13: Application Slide Displaying Feedback for Incorrect Response.....	79

## LIST OF ABBREVIATIONS

Abbreviations	Terms
HRSA	Health Resources and Services Administration
HRQ	Helpful Response Questionnaire
MI	Motivational interviewing
MISC	Motivational Interviewing Skills Code
MITI 3.1.1	Motivational Interviewing Treatment Integrity code, version 3.1.1
NONPF	National Organization of Nurse Practitioner Faculties
NP	Nurse practitioner
OARS	Open-ended questions, affirmations, reflections, summaries
TALQ	Teaching and Learning Quality scales

## LIST OF DEFINITIONS

Terms	Definitions
Blended education	Instruction combining face-to-face encounters with computer based instruction
Component skills	Individual skills needed to complete a task or solve a problem
Design research	A systematic methodology to improve educational practices through iterative analysis, design, development and implementation of instruction
Effectiveness	Extent to which the instructional goals are achieved
Efficiency	Speed which the learner can complete a task or solve; or time the learner takes to complete the instruction
Engagement	Learner persistence in completing instruction, solving a problem or seeking out additional instruction on the subject matter
How to	Follow steps to solve a problem
Instance	A single instructional case; one application of an instructional theory
Kinds of	Categorization of items
Parts of	Definition of parts
Principle	A relationship that is always true under appropriate conditions regardless of the methods or models used to implement this principle
What happens	Outcome of following a process

## CHAPTER I BACKGROUND AND SIGNIFICANCE

Nurse practitioner (NP) faculties strive to educate students in achieving requisite competencies required for quality health care. A variety of pedagogical approaches are used to engage students while effectively and efficiently instilling the knowledge, skills, and attitude needed to practice. Often, descriptive theories, focusing on behavior, cognition, experience, or brain science (Ard, 2009) are used in nursing education research to explain the learning process. Consequently, instructional design rests on general concepts and traditional pedagogies. With the increasing use of web-based instruction in NP education, instructional design needs to evolve beyond the lecture and discussion format traditionally used in the face-to-face classroom. Active learning strategies facilitate student learning how to solve complex real-world problems and meet required NP competencies. Prescriptive instructional design theory can serve as a guide in creating instruction that is more active and enhances complex learning. Training NPs who can optimize patient health outcomes requires complex learning that integrates knowledge, skills, and attitude.

### **Background of the Study**

The education of primary care NPs has gained increased importance over the past decade. Healthcare reform positions primary care as the entry point to health care services across patient populations. Universal health care coverage will inevitably increase the demand for primary care providers. By 2025, demand for primary care physicians will exceed the supply in the United States (Health Resources and Services Administration [HRSA], 2018). In addition, a maldistribution of primary care practitioners exists with more than 84 million people living in areas designated as health



professional shortage areas (HRSA, 2018). NPs are more likely than physicians to work in health professional shortage areas that are less densely populated areas, less urban, and have a lower median income (Kaiser Family Foundation, 2015). The Institute of Medicine report, *The Future of Nursing* (2011), notes, “There simply are not enough primary care physicians to care for an aging population now, and their patient load will dramatically increase as more people gain access to care” (p.112). NPs practicing to the full extent of their education would increase access to primary care. Currently, NPs are the fastest growing segment of primary care practitioners and rival the numbers of primary care physicians and physician assistants (HRSA, 2018).

To educate enough NPs to meet demand, graduate nursing programs are transforming from traditional face-to-face format to a blended educational format. Blended education combines less frequent face-to-face encounters with computer-based instruction (Graham, 2006). Since travel to the university is often a considerable time commitment, NP students can attend classes and complete their clinical practicum in their home communities. NP students living in rural, less populated geographical areas have access to the same education as NP students who live in urban centers where the university resides. Ideally, the number of NPs providing primary health care in health professional shortage areas will increase in response to these educational transformations.

Health promotion and disease prevention are fundamental to the scope of practice for NPs (American Academy of Nurse Practitioners, 2007). NP practice includes counseling on a variety of lifestyle behaviors for the prevention and management of chronic disease. In research characterizing NP practice, NPs provided preventive services at 99% of all patient visits (Deshefy-Longhi, Swartz & Grey, 2008). Standards of NP

practice stipulate patient participation in health care decisions for the promotion, maintenance, and restoration of health. Patient-centered and collaborative care is an integral part of practice for NPs. Proficiency in behavior change counseling is basic to effective health promotion and, therefore, an essential tool for practice.

### **Statement of the Problem and Research Questions**

Amid the social and political demands of health care reform, nursing faculties have been challenged to redesign educational practices. Benner, Sutphen, Leonard, and Day (2010) called for fundamental changes in nursing education with a series of recommended shifts away from the traditional methods used today. Both the Institute of Medicine's *Health Professions Education* (2003) and the American Association of Colleges of Nursing (2006) reports include a call for radical change in graduate health professional education. NP faculties face growing educational expectations using pedagogies that emphasize situated cognition, clinical judgment, and professional formation (Benner, et al., 2010). NP faculties are urged to be innovative and evidence-based in their instruction. Instructional design theory provides evidence-based prescriptions that can meet the challenge of reforming graduate nursing education.

Health behavior counseling is a necessary skill for NPs. The effective counseling of patients is a set of learned skills similar to physical examination techniques (Kurtz, Silverman, & Draper, 2005). Clinical experience alone is not enough to gain counseling proficiency. Training is necessary to gain skill and confidence in behavior change counseling. One of the methods used for behavior change counseling is motivational interviewing (MI). Learning MI exemplifies complex learning that necessitates the integration of knowledge, skills, and attitude.

MI promotes the principles of autonomy, evocation, and collaboration (Miller & Rollnick, 2013). In addition, MI is patient- centered and goal directed (Rollnick, Miller & Butler, 2008). Understanding human nature and expressing empathy in the interview process is fundamental in MI. The practitioner attempts to activate the patient's own motivation and resources to initiate behavior change. Miller and Rose (2009) theorize that practitioner characteristics along with practitioner behaviors influence the process of change. Consequently, MI training attempts to train practitioners regarding the knowledge, attitude, and skills needed for health behavior counseling.

Learning MI is a challenging complex process. Effective transfer of MI skills to primary care practice would greatly improve the practitioner's ability to engage in health behavior counseling. "Despite its widespread dissemination, relatively little is known about optimal strategies for teaching and supervising this complex method. Are there particular learning stages or methods that facilitate competence in motivational interviewing?" (Miller & Moyers, 2007, p. 4). Research has shown an improvement in MI skills with several face-to-face teaching methods (Madson, Loignon & Lane, 2009; Miller, Yahne, Moyers, Martinez& Pirritano, 2004). There is little evidence about teaching MI in blended education.

NP faculty look for guidance on how best to design instruction for blended education. How should instruction be designed to meet the call for innovative nursing education practices while at the same time increasing the number of NPs in primary care? Instructional design theories can provide this guidance. The intent of design theories is to create instruction that is efficient, effective, and engaging (Merrill, 2013). Student knowledge, attitude, and skills can be changed through instruction designed using

prescriptive design theory practices and pedagogies. The First Principles of Instruction (Merrill, 2002a; Merrill, 2009, Merrill, 2013), a prescriptive instructional theory, originated from the analysis of prescribed practices common among multiple instructional design theories. The First Principles are universal, regardless of program or practice. Therefore, blended instruction in MI, designed using the First Principles of Instruction, should result in instruction that enhances the ability of the NP student to provide behavior change counseling to their patients. The theory will be described in detail in the theoretical framework section.

The purpose of this research was to apply prescriptive instructional theory to the design of effective, efficient, and engaging instruction in MI resulting in beginning proficiency in the NP students.

The research questions were:

1. How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?
2. How could the First Principles of Instruction have been more useful in designing the instruction in motivational interviewing to be engaging to the NP students who participated in this study?
3. Does knowledge of motivational interviewing in NP students participating in this study increase from before to after instruction designed using the First Principles of Instruction?

## **Significance of the Problem**

Chronic disease and mental health conditions accounts for 90% of health care spending and are the leading cause of death and disability in the United States (National Center for Chronic Disease Prevention and Health Promotion, 2018). Approximately one quarter of people with chronic conditions have one or more daily activity limitations. The World Health Organization (2018) estimates that chronic disease accounts for 88% of all deaths in the United States, numbering 2.8 million each year. Health care providers are confronted with the challenge of providing prevention and self-management strategies.

Prevention of chronic disease rests on four modifiable health related behaviors, (a) lack of physical activity, (b) poor nutrition, (c) tobacco use, and (d) excessive alcohol consumption. Up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers could be prevented by a healthy diet, regular physical activity, smoking cessation, and sensible alcohol intake (World Health Organization, 2008). The World Health Organization action plan for chronic disease promotes interventions that reduce the modifiable risk factors for chronic disease. In addition, the leading health indicators for Healthy People 2020 (Office of Disease Prevention and Health Promotion, 2018) includes obesity, physical activity, substance abuse, and tobacco use as well as goals for control of chronic diseases such as diabetes and hypertension. Lifestyle counseling is an effective intervention with the potential to affect chronic disease rates. Primary care practitioners bear the majority of the responsibility for providing behavior change counseling, to help patients enact healthy lifestyle behaviors and adopt self-management strategies. One of the barriers to health behavior counseling in primary care is a lack of

practitioner counseling skills (Walsh, Swangard, Davis, and McPhee, 1999). In self-report surveys, the extent of training in health behavior counseling is associated with the rate of counseling by practitioners in practice (Issacson, Holtrop, Cohen, Ferrer & McKee, 2012). In addition, primary care practitioners identify a lack of empathy toward patients who are not motivated to change unhealthy behaviors (Jansink, Braspenning, van der Weijden, Elwyn, & Grol, 2010). Practitioners rely primarily on information giving about healthy behaviors, neglecting the patient's barriers to change.

With the increasing rates of chronic disease, unquestionably, NPs need to be skilled in behavior change techniques to provide quality health care. The success of MI, demonstrated in alcohol addiction treatment, has led to the expansion of the technique to health behavior change counseling (Miller, 1983). A myriad of research has demonstrated the effectiveness of MI for health-related lifestyle changes and chronic disease self-management (Greaves, et. al, 2008; Knight, McGowans, Dickens & Bunday, 2006; Paradis, et al., 2010; Welch, Zagarins, Feinberg & Garb, 2011). Patient centered care, shared decision-making, and health promotion align well with the philosophy and methods of MI and the philosophy of NP practice. Consequently, MI is a counseling technique consistent with NP practice patterns.

### **Theoretical Framework**

Merrill (2002a; 2009; 2013) developed the First Principles of Instruction (First Principles) from an analysis of multiple instructional design theories. Merrill (2002a) analyzed the precepts held in common among the instructional design theories then synthesized the foundation of First Principles. The First Principles prescribe how to design instruction that is effective, efficient and engaging for the student. Merrill defines

a principle as, “a relationship that is always true under appropriate conditions regardless of the methods or models used to implement this principle” (Merrill, 2013, p. 20).

### **Problem-Centered Instruction**

At the center of the First Principles is the problem-centered principle. Problem-centered learning engages and situates the student in a real-world context. The student is first shown the problem or task that will be performed at the end of instruction.

Instruction is situated within the context of the whole problem or task rather than as individual topics. Information, skills, and behaviors required to solve the problem are included in the instruction. In addition, the student learns when in the problem-solving process to use the knowledge, skills, and behaviors. Problem-centered instruction allows the student to see the relevance of the component skills and improves transfer to real world contexts. A progression of problems, from simple to complex, is presented for the student to solve. Using the problem-centered principle “Learning is promoted when learners acquire skill in the context of real-world problems” (Merrill, 2013, p. 21).

Problem-centered learning is distinct from problem-based instruction. Problem-based instruction presents students with a problem but provides varying degrees of student support in the form of resources or coaching. Whereas problem-centered learning presents worked examples, component skills, coaching, and feedback in a more structured approach set in the context of real-world problems.

### **Activation**

Activation, the first step in implementing the First Principles, is drawing on previous knowledge and experience as the beginning of new instruction. Using existing knowledge to solve a related problem helps the student form new associations and builds

on past knowledge and experience. If the student has no previous knowledge or experience, real world or simulated examples are used to provide background knowledge. The activation principle states, “Learning is promoted when learners recall existing knowledge and skill as a foundation for new skills”. (Merrill, 2013, p. 21).

Part of activation is the formation of new mental models. Mental models are how the student internally organizes information on how things work. It is how students make sense of the world (Merrill, 2013). Memory is not sufficient to solve complex problems. Building on mental models from previous learning helps students connect learning into a coherent structure. However, if the student activates an incorrect mental model, the student will make errors. It will take additional effort to acquire a relevant mental model. Instruction should include guidance on how to organize the new knowledge, skills, and attitude to form new relevant mental models. Appropriate organizers for the activation phase include mnemonics, metaphors, analogies, and checklists.

### **Demonstration**

Learners are better able to acquire a skill if it is demonstrated. General information about the skill is provided then, a specific worked example of the skill is shown. The example provides a distinct situation or context in which the skill is used. This type of example is called a portrayal (Merrill, 2013). Multiple portrayals help the learner see the use of the new skill in a variety of contexts and situations. Guidance is provided during the portrayal to focus the learners’ attention on the key features of the skill as well as to outline steps to be followed. Demonstration relates new information to the learner’s activated mental model. Peer discussion further supplements learning and development of a new mental model. The demonstration principle is, “Learning is



promoted when learners observe a demonstration of the knowledge and skill to be learned” (Merrill, 2013, p. 23).

Merrill (2013) places a particular emphasis on demonstration consistency. There are distinct categories of skills defined as the definition of parts (part-of), categorization (kinds-of), following steps (how-to), and the outcome of a process (what-happens). For each category, there is a type of demonstration that best represents it. For example, showing a picture of a robin is more consistent with categorization of the bird than providing an audio description.

### **Application**

Practice provides the learner with an opportunity to put their newly acquired skill to use. As with demonstration, application should be consistent with the category of skill. For example, a how-to skill should provide an opportunity to complete the procedure. Different application opportunities should be offered to the learner to allow skill use in varied contexts. Early in the application process, the learner is provided with ample support. The support is in the form of coaching and feedback. Coaching is a process by which the instructor does some of the cognitive processing for the learner (Merrill, 2013). The coaching is gradually withdrawn as the application process progresses. Feedback is a form of critical evaluation that can originate from the instructor, peers, or the learner through reflection. The application principle is, “Learning is promoted when learners apply their newly acquired knowledge and skill” (Merrill, 2013, p. 25).

Peer collaboration is an important aspect of application. Working with other learners on a newly acquired skill involves reflection and significant mental processing.

The learner has to offer rationale for actions, think through steps, and justify decisions publicly. This active learning process tests the new mental model. Teamwork mimics most problem-solving work situations in the real world. In addition, peer interaction is motivating to the learner.

### **Integration**

The goal of instruction is the integration of a new skill into behavior. The learner merges past knowledge and experience into a new mental model upon which to act. Peer critique enhances integration through engagement with skill improvement. Merrill (2013), however, cautions that peer critique should be carefully structured in order to provide the best integration. Peer collaboration on a skill is followed by constructive criticism on the work of other groups. The constructive criticism includes advice on how to improve skill performance. The peers then collaborate to revise skill performance based on the suggestions from other peer groups. This type of learning cycle exposes the learners to multiple ways of performing skills. The integration principle is, “Learning is promoted when learners reflect on, discuss, and defend their newly acquired knowledge and skill” (Merrill, 2013, p. 29).

### **Pebble-in-the-Pond Model**

The Pebble-in-the-Pond Model (Merrill, 2002b, 2013) sequences instructional design as prescribed by the First Principles. The First Principles of Instruction prescribe components of the instruction required for it to be effective, efficient and engaging. The Pebble in the Pond Model is the process followed by the designer to create the instructional components. The analogy of a pebble and its ripples in water represents how the pebble prompts a sequence of events affecting the entire pond. The pebble represents

a typical problem to be solved to meet identified instructional goals. The problem replaces abstract learning objectives as the starting point and center of instructional design. The pond symbolizes the environment in which the instruction occurs. The first ripple is a progression of problems that evolve from the simplest to the most complex problem until the instructional goal is met. The second ripple is the component skills required to complete the problems. Component skills are associated for each of the problems in the progression. Component skills are taught before the learners are asked to solve the corresponding problem.

The first three elements of the Pebble-in-the-Pond Model form the foundation of the instructional design. “The result of the first three ripples in the Pebble-in-the-Pond Model is a functional prototype of your course that includes a demonstration or application strategy for each of the problems in the progression and a demonstration or application strategy for each of the component skills required to solve these problems” (Merrill, 2013, p. 262). The remainder of the Pebble-in-the-Pond Model represents instructional enhancements and testing to improve the efficiency, effectiveness and engagement of the instruction.

The fourth ripple denotes instructional enhancements using guidance, coaching and organization to the instruction. Peer interaction can also be included to reinforce the learner’s reflection and mental processing. Finalizing the design and evaluation are the outer two ripples. Details of the instructional navigation, user interface, and supplemental materials (ripple five) are decided before the prototype testing and revision (ripple six).

Although Merrill (2013) differentiates the Pebble-in-the-Pond Model from the traditional instructional systems design model of analyze, design, develop, implement,

and evaluate, he retains many of the process elements. The Pebble-in-the-Pond Model assumes that an analysis of learners and context has occurred, and an instructional goal has been established before instructional design is undertaken. The major difference between the traditional instructional systems model and the First Principles with the Pebble-in-the-Pond Model is the center of attention. The traditional instructional systems design model specifies the content to be covered in the instruction. The Pebble-in-the-Pond Model focuses on a series of problems to be solved. Merrill (2013) has only addressed the design of instruction. Implementation and evaluation of the instruction, although considered important, is not prescribed by the First Principles with the Pebble-in-the-Pond Model.

### **Organization**

This research will be presented in six chapters. Chapter I presented the background, statement of the problem, research questions, significance of the problem, and theoretical framework. Chapter II will review the relevant research literature in three areas, (1) pedagogies used in advanced practice nursing education, (2) MI training, and (3) application of the First Principles of Instruction.

Chapter III will describe the methods, sources of data, and iterative process of this design research. The various data sources used in instructional formative research will be reviewed as well as the reliability and validity of the Motivational Interviewing Treatment Integrity 3.1.1 (MITI) scale (Moyers, Martin, Manuel, Miller & Ernst, 2010). Chapter IV will describe the design process and the instruction in MI using the First Principles of Instruction.

Chapter V will present the analysis of data as related to the research questions. Finally, Chapter VI will consider the implications of the data analysis, strengths and limitations of the research, make recommendations for improvements in the First Principles of Instruction as well as recommendations for further inquiry.

## CHAPTER II REVIEW OF LITERATURE

This literature review begins with setting the context for nurse practitioner (NP) education including current regulatory and policy influences. The review then examines NP education research related to computer-based instruction, specifically, the design frameworks applied in the research and measured outcomes. Motivational interviewing (MI) training research is reviewed with discussion of the eight stages of learning motivational interviewing and the effectiveness of various training interventions including computer-based training. The literature review concludes with discussion of the literature related to the application of the design framework, First Principles of Instruction (Merrill, 2013), to instructional design.

### **Nurse Practitioner Education**

The American Association of Colleges of Nursing sets quality standards for advanced practice nursing education. The quality standards take the form of competencies to be achieved by all advanced practice nurses. The Consensus Model for Advanced Practice Nursing Regulation adopted by the National Council of State Boards of Nursing (2008) stipulates four advanced practice roles, (a) nurse midwife, (b) clinical nurse specialist, (c) nurse anesthetist, and (d) nurse practitioner (NP). The National Organization of Nurse Practitioner Faculties (NONPF) establishes the standards for NP education. NP curriculum is prescribed by competencies, population of focus for practice, and course requisites decided by these organizations. Curriculum prescriptions include specific courses and practices. Additionally, direct patient care in a clinical setting is a requirement of all NP students for a minimum number of hours (NONPF, 2017). Although the standards for the curriculum are prescribed, NP faculty determines the

design of instruction (American Association of Colleges of Nursing, 2011). The diversity of design is demonstrated by the variety of pedagogies, methods, and media employed by NP programs.

In addition to quality standards, NP curriculum and course design is influenced by trends, initiatives, and policy in nursing and health care education. The Institute of Medicine (2001) report, *Crossing the Quality Chasm*, describes changes in the education of health care professionals to improve the quality of health care delivery. *Health Professionals Education: A Bridge to Quality* (Institute of Medicine, 2003) expands on the recommendations setting five core competencies for all health professionals educated in the 21<sup>st</sup> century, (a) utilize patient-centered care, (b) employ evidence-based practice, (c) apply quality improvement, (d) work in interdisciplinary teams, and (e) utilize informatics. The conceptualization of patient-centered care is an area at the center of three overlapping circles representing the health professions competencies of employ evidence-based practice, apply quality improvement, and utilize informatics. The fifth competency, interdisciplinary teams, completely encloses the other overlapping circles of the competencies. Thus, learning how to implement shared health decision-making and individualize care to meet the needs of the patient is central to health professional education. A subsequent Institute of Medicine (2011) report, *The Future of Nursing*, also urges a transformation of nursing education. The report reinforces the call for a set of core competencies for all educational levels in nursing. Assessment of competencies through a performance-based appraisal integrates theoretical knowledge with simulation or clinical practice.

Health promotion and disease prevention are fundamental to the scope of practice of NPs (American Academy of Nurse Practitioners, 2007). The core competencies specify that an NP provides health care services that include health promotion, disease prevention, counseling, and disease management (NONPF, 2017). The NP also “works to establish a relationship with the patient characterized by mutual respect, empathy, and collaboration” (NONPF, 2017, p. 14). Effective counseling skills that are empathetic and collaborative are part of the competencies that are mandatory components of NP curricula.

Competencies, set by the American Association of Colleges of Nursing, National Organization of Nurse Practitioner Faculties, and the Institute of Medicine, are the outcomes for NP education. The design of nursing education is the subject of the Carnegie Foundation report, *Educating Nurses* (Benner, Sutphen, Leonard, & Day, 2010). A fundamental change in nursing educational design is called for in a series of four shifts away from the traditional teaching methods. Nursing education should place an emphasis on, (a) teaching for a sense of salience, (b) integration of clinical and classroom teaching, (c) clinical reasoning and multiple ways of thinking, and (d) professional formation rather than socialization. Paradigm cases in the report present examples of the recommended shifts. However, prescriptive guidance on how to design lessons outside of the contexts of the paradigm cases is lacking. In addition, the recommendations are based on qualitative and descriptive data from baccalaureate nursing programs. Most nursing education research, in fact, focuses on prelicensure programs and neglects masters and doctoral education (Valiga & Ironside, 2012).



## **Technology in Nurse Practitioner Education Research**

Recent initiatives encourage nursing faculty to incorporate innovative technologies in instructional design (Health Information Technology Scholars Program, 2013). NP education research demonstrates the use of multiple pedagogies incorporating innovative technologies. Blended learning, online education, simulation, podcasting, and virtual worlds are all present in the literature. Few studies examine the process of design and development of instruction using a theoretical framework. Most studies examine instruction involving technology in a specific context with a small convenience sample of NP students. Case reports or descriptive studies are the predominant research designs.

### **Online and Blended Education**

In order to reach more students in diverse locations, NP education has shifted from face-to-face classroom teaching to distance education. The definition of distance education is “planned learning that occurs in a place different from teaching, requiring real-time (synchronous) or delayed (asynchronous) interactive technology and needing a course design supportive of students” (Firth, 2013, Chapter 2, Key Concepts Defined, para. 1). Distance education is inclusive of online and blended learning. Online learning occurs solely through the Internet, whereas, blended learning is a combination of face-to-face and online interaction.

One approach to instructional design evaluation is the use of evaluations tools for online nursing courses. Best practices (Chickering and Ehrmann, 1996) and benchmarking (Billings, Connors, & Skiba, 2001) from undergraduate online education served as the basis of evaluation tools (Avery, Cohen, & Walker, 2008; Blood-Siegfried, et al., 2008). There are two problems with this approach. First, the generalization of

undergraduate best practices may not be valid for graduate NP education. Second, evaluation can only be accomplished after the initial course design and delivery. Instead of initial design recommendations, the evaluation tools urge revisions after the course is delivered.

Instructional method versus media is a classic argument in instructional design. Instructional method is “any way to shape information that activates, supplants, or compensates for the cognitive processes necessary for achievement or motivation” (Clark, 1994). Instructional media is the technology through which students access the method of instruction. The medium used to deliver the instructional method has consistently produced no difference in student knowledge, motivation, or instructional efficiency. NP education research revisits the argument regarding method versus media. In comparison studies of online delivery and face-to-face learning, there was no difference in knowledge gains or student satisfaction between the two media (Corbridge, Robinson, Tiffen, & Corbridge, 2010; Lancaster, Wong, & Roberts, 2012; Stiffler, Stoten, & Cullen, 2011; Wells & Dellinger, 2011). “The findings suggest that quality of instruction is more important than the medium by which course content is delivered” (Wells & Dellinger, 2011, p. 408).

### **Design Frameworks**

Less than half of NP education research articles specify a framework for instructional design. With the emphasis on competencies in NP education, few researchers employ a competency framework for their research (Hallas, Biesecker, Brennan, Newlands, & Haber, 2012). The design frameworks are referenced but not consistently applied to structure the research. Instead, instructional frameworks serve as a

theoretical point of view (Distler, 2008) or stated as rationale for an intervention as “grounded in general, adult and experiential learning theory” (Langley & Brown, 2010, p. 13). Design frameworks originating in nursing education and used in NP education research are relevant to simulation and reflection.

Reflection is at the core of the reflection-centered curriculum and narrative pedagogy design frameworks. Reflection is the practice of mentally assessing an experience while it is occurring as well as after it occurs. A reflection-centered curriculum (Horton-Deutsch, McNelis, & Day, 2012a; Horton-Deutsch, McNelis, & Day, 2012b) blends content with experiences in a psychiatric mental health NP program as a focused way of thinking about practice. Reflective assignments that link theory and research to practice experiences develop self-awareness and foster continuous improvement in the students’ quality of care by continually questioning assumptions on which care is based and considering interactions within a social context. Reflective questioning, guided by faculty, adds structure to the personal and interpersonal aspects of clinical experiences and encourages active, persistent and careful consideration of beliefs supported by knowledge and the resulting conclusions (Horton-Deutsch, 2012; Sherwood & Horton-Deutsch, 2012). Qualitative data from NP students demonstrates that the reflection-centered curriculum is a valuable tool, useful as a professional framework for clinical practice as well as curriculum design. Langley & Brown (2010) use reflective journaling in a single online course to foster learning and professional development.

Similar in its qualitative focus and use of reflection, narrative pedagogy seeks to combine content with clinical and individual experiences. A research-based, phenomenological pedagogy, narrative pedagogy was discovered during a longitudinal

study of the experiences of nursing students (Diekelmann, 1995, 2001). Narrative pedagogy is a way of thinking about practice and education with students and teachers, and collaboratively exploring new possibilities (Ironsides, 2003; Ironsides & Hayden-Miles, 2012). “Our pedagogies focus on seeking, hearing, responding to, reflecting on and interpreting clinical and personal stories of students, patients, preceptors and teachers” (Swenson & Sims, 2001, p.154). Narratives or stories integrate content with clinical practice. The discussion of the narratives guides the NP student to identify the learning issues with personal salience. The NP students develop a content outline at the end of the semester via the identification of learning issues. The chosen narratives address professional formation, use paradigm clinical cases, include the patient’s experience, and develop self-reflection. Qualitative data identifies NP student themes of learning in a new way, listening in a new way, and listening to learn (Swenson & Sims, 2001).

Simulation in nursing education has gained popularity in the past decade. The Nursing Education Simulation framework (Jeffries, 2012) describes the concepts embedded in the design and implementation of simulation for nursing education. The framework has been applied to simulation research for undergraduate nursing students but has not been applied to simulation for advanced practice nursing students. There are five major concepts, educational practices, facilitator, participant, outcomes, and simulation design characteristics. Simulation design characteristics include objectives, fidelity, problem solving, student support, and debriefing. Tiffen, Corbridge, Shen, and Robinson (2011) use the Nursing Education Simulation framework in a high-fidelity manikin simulation for teaching identification of abnormal heart and lung sounds.

Fidelity is the degree to which the simulation characterizes the real world (Jeffries, 2012).

The students using simulation are compared to students who listen to a computer-based tutorial for knowledge, learner satisfaction, and self-confidence in clinical practice.

Although knowledge was higher in the simulation group, there is no change in learner satisfaction or self-confidence in clinical practice.

### **Outcomes**

Kirkpatrick & Kirkpatrick (2007) identified four levels of evaluation. The first level, reaction, measures how students feel about the instruction. Reaction measurement includes feelings about content, the effectiveness of the instructor, and the technology used to convey the instruction. Reaction measurement is recommended for all training. The second level, knowledge, includes measurement of knowledge, skills, as well as, attitude. A control group is recommended for comparison to the group receiving the instruction. Behavior, the third level, is application of the learning to the work setting. In nursing education, observation of behavior would occur in the clinical practice setting. Kirkpatrick points out that “it is impossible to predict when a change in behavior will occur. Even if the trainees have an opportunity to apply the learning, they may not do it immediately. In fact, behavior change may occur at any time after the first opportunity, or it may never occur” (p. 6). Evaluation of results, the fourth level, is completed after reaction, knowledge, and behavior have been measured. Results for NP education could be measured in terms of patient outcomes.

Reaction and knowledge are the outcomes repeatedly measured in NP education research. Behavior is measured by self-report in one study involving the use of podcasting for course content (Stiffler, Stoten, & Cullen, 2011). However, the behavior

was related to the interaction with the technology and did not assess behavior change based on the content of the podcast. Assessment of provider behavior is key to capture verbal and non-verbal actions in MI. The key factors in health-related behavior change with MI is provider empathy and the increased use of change talk by the client (Miller & Rose, 2009). High satisfaction and self-confidence in providers trained in MI did not correlate with provider use of MI in clinical practice (Miller & Mount, 2001; Rubel, Sobell, & Miller, 2000). With the mandate to achieve competencies, NP education must examine student behavior to assess learning, transfer of learning to clinical practice, and professional formation.

Nursing education research is criticized for the lack of standardized instruments to measure learning outcomes (Tanner, 2011; Valiga & Ironside, 2012). Often researcher constructed instruments to measure student reaction or knowledge lack validity and reliability data. The predominant instruments in NP education research were researcher constructed student reaction and knowledge instruments. Few NP education research studies had reliability or validity data to support instrument use. Stiffler, Stoten, and Cullen (2011) use a standardized tool to measure student learning styles. However, they use a researcher-constructed survey to compare student learning styles with learning behaviors. This approach reduces the reliability and validity of the research by introducing potential researcher bias. “Nursing education research lacks common metrics or standardized approaches for the evaluation of learning outcomes that are relevant for a practice discipline and that assess not only students’ knowledge gains, but also their ability to use it during the provision of patient care” (Tanner, 2011, p. 492). NP education

research demonstrates a lack of standardized instruments to evaluate instructional methods, clinical practice behaviors, or achievement of NP competencies.

## **Motivational Interviewing Training**

### **The Eight Stages of Learning Motivational Interviewing**

Miller and Moyers (2007) propose that students acquire MI skills in eight stages. The first stage involves adopting a relationship of collaboration, empathy, and respect for the patient's autonomy. It assumes that people know themselves and will make positive changes given support. MI spirit is this patient centered approach. The patient-clinician relationship involving MI spirit is more likely to result in positive behavior change (Miller & Rose, 2009). The second stage of learning MI is skill in the techniques delineated by the acronym OARS including open-ended questioning, affirmations of the patient's strengths, reflective listening on of the emotion behind the patient's statements, and summarizing (Rosegren, 2009). Reflections that accurately express empathy for the patient's ambivalence about behavior change are particularly important.

Recognizing and reinforcing change talk, the third stage, directs the patient towards a known goal behavior. Change talk is a statement expressing the patient's desire, ability, reason, or need to change current behavior. The patient argues for change based on his personal values and motivation. The clinician recognizes the change talk and reinforces by developing a discrepancy between the patient's stated values and current behavior. The fourth stage, eliciting and strengthening change talk, is more complex than the recognition of change talk. The clinician uses open-ended questions that require change talk as the answer. Keen attention to the patient's language is particularly important in strengthening change talk. The fifth stage of learning MI is rolling with

resistance. Rolling with resistance is the clinician's ability to respond to the patient's arguments against change without confrontation. Reflections, emphasizing autonomy, and sharing alternative views of the situation are strategies for the clinician to avoid debating behavior change.

Developing a change plan is the sixth stage of learning MI. The clinician summarizes the patient's change talk then directs the patient to identify the next steps. The clinician has to recognize when the patient is ready to commit to a change plan. The patient takes control of the change plan rather than the clinician offering lengthy advice. Action reflections by the clinician summarize options based on what the patient has said. The how, when, or where of the action plan is decided by the patient. (Resnicow, McMaster, & Rollnick, 2012). Consolidating client commitment, the seventh stage, occurs after the change plan. In this stage, the clinician elicits a commitment from the patient to carry out the change plan. The clinician carefully listens for the patient's readiness to implement plans to change. Pushing the patient to commit to a change plan too soon can delay the change process.

The final stage of learning MI is switching between counseling techniques. Switching counseling techniques is relevant to experienced counselors who have acquired skills in more than one counseling method. It is unlikely that NP students will reach this stage during their graduate education. The final stage requires the clinician to be competent in multiple counseling techniques. The learner tasks for each stage are shown in Table 1.



Table 1.

*The Eight Stages of Learning Motivational Interviewing with Learner Tasks*

<b>Stage of Learning Motivational Interviewing</b>	<b>Learner Tasks</b>
1. The spirit of motivational interviewing	<ul style="list-style-type: none"> <li>• Openness to the client’s perspective with acceptance of what the client brings</li> </ul>
2. Client- centered counseling skills	<ul style="list-style-type: none"> <li>• Appropriate application of OARS skills               <ul style="list-style-type: none"> <li>○ Open ended questions</li> <li>○ Affirmations</li> <li>○ Reflections</li> <li>○ Summaries</li> </ul> </li> </ul>
3. Recognizing and reinforcing change talk	Recognition of change talk with client language analysis <ul style="list-style-type: none"> <li>○ Desire to change</li> <li>○ Ability to change</li> <li>○ Reasons to change</li> <li>○ Need to change</li> <li>○ Commitment to change</li> </ul>
4. Eliciting and strengthening change talk	Application of OARS skills to purposefully elicit and reinforce change talk
5. Rolling with resistance	Application of skills to minimize sustain talk <ul style="list-style-type: none"> <li>○ Reflections</li> <li>○ Emphasis of client control</li> <li>○ Reframing</li> <li>○ Avoid opposition</li> </ul>
6. Developing a change plan	Application of OARS skills to change from why to how and when change will occur
7. Consolidating client commitment	<ul style="list-style-type: none"> <li>• Recognize the verbal and non-verbal cues that the patient is ready to commit to change</li> <li>• Elicit public commitment language               <ul style="list-style-type: none"> <li>○ “I will—“</li> </ul> </li> </ul>
8. Switching between MI and other counseling methods	Expert level that matches of patient needs and readiness to change to counseling intervention

Note. Adapted from Miller, W. R., & Moyers, T. B. (2007). Eight stages in learning motivational interviewing. *Journal of Teaching in the Addictions*, 5(1), 3 - 17. doi:10.1300/J188v05n01\_02

The eight stages of learning MI are derived from the experience of Miller and Rose (2009) and lack empirical testing. The relationship between the stages has not been established. It is unknown if the student must master a lower stage before moving onto the next stage. Madson, Lane, and Noble (2012) suggest that the eight stages may be used to organize training in MI. Currently, MI is taught in a learning to learn format (Hetteima, Steele, & Miller, 2005). Students are told not expect proficiency after a single workshop. Instead, learning MI is an ongoing process of listening to the patient and recognizing the language of change talk, resistance, and readiness. Principal factors to consider in training also include trainee variables such as counseling experience, years of experience in a professional role, and the perceived relevance of the training to clinical practice (Madson, Lane, & Noble, 2012; Bartholomew, Joe, Rowan-Szal, & Simpson, 2007). In addition, MI trainers emphasize the importance of experiential exercises during MI training. “There is some evidence to suggest that experiential activities are more efficacious in achieving learning outcomes in clinical practice, though there is currently less evidence as to which kinds of experiential activities specifically are most beneficial” (Madson, Lane, & Noble, 2012, p. 21).

### **Motivational Interviewing Training Research**

Randomized controlled trials of MI training examine the effectiveness of several types of training on clinician performance. The large trial conducted by Miller, Yahne, Moyers, Martinez, and Pirritano (2004) is considered the benchmark trial for training in MI. A pretest of MI performance was completed before randomization to stratify participants into equivalent groups. Five training conditions were tested observations at baseline, immediately after training, and at four, eight, and 12 months post training. Gains in MI skills were seen in all training groups except the self-study group.

**Training interventions.** All randomized controlled trials use a face-to-face instructional workshop as the initial intervention. The duration of training workshops range from one to fifteen hours. Workshops consist of didactic content delivered by lecture combined with demonstrations and practice of MI skills (Baer, Rosengen, Dunn, Wells, Ogle, & Hartzler, 2004). Workshop participants engage in experiential activities through role-playing with other participants or using standardized patients. Miller, et al. (2004) comment:

There is little empirical reason to believe that a one-shot training workshop (albeit the usual method for continuing professional education) would be sufficient to change durable practice behavior. The question, then, is how to enhance training so that broader changes are produced, particularly reductions in MI-inconsistent therapist responses that tend to drive client resistance and thereby alter outcomes (p. 1052).

Thus, the purpose of much of the research in MI training is to determine which training enhancements are most effective. Miller, et al. ask:

What factors, then, might enhance change in clinical practice toward the Adoption of effective innovations, beyond the usual didactic strategies? One of the most consistent findings in motivational psychology is that systematic feedback enhances performance (Locke & Latham, 1990). Indeed, it is a truism that learning does not take place without feedback (p. 1052).

Training enhancements include personal feedback on performance, coaching, and coaching plus feedback. Feedback is derived from the analysis of actual tape-recorded counseling sessions from clinical practice. Coaching consists of eliciting the clinician's experience of using MI and problem solving any difficulties with the technique. Either an expert MI trainer or a clinical practice supervisor trained in MI provides feedback.

**Intervention effectiveness.** Patient behavior change is the ultimate measure of training effectiveness in MI. However, it is not feasible to measure patient outcomes for

every clinician who participates in training. Patient behavior change occurs over time and measurement would vary with the target behavior. In addition, some behaviors may be more difficult to change. Thus, MI training effectiveness is commonly measured using standardized tools that measure clinician adherence to MI attitude and techniques.

The benchmark study by Miller, Yahne, Moyer, Martinez, and Pirritano (2004) examined five training variations with substance abuse counselors. The participants were randomized based on pre-participation questionnaires to ensure balanced groups. There were five group assignments; (1) waitlist or control group who received the training manual and videotapes, (2) workshop only, (3) workshop plus feedback on practice tapes, (4) workshop plus coaching sessions, (5) workshop plus feedback and coaching sessions. Proficiency in MI was assessed using the Motivational Interviewing Skills Code (Moyers, Martin, Cately, Harris, & Ahluwalia, 2003 [MISC]). The MISC contains six subscales of proficiency; (1) global rating of MI spirit, (2) percentage of MI-consistent responses, (3) ratio of reflections to questions, (4) percentage of questions that are open-ended, (5) percentage of reflections that are complex reflections, and (6) therapist's percentage of in-session talk time. Trained professional coders listened to blinded audio tapes of participant work samples in two passes. The first pass is a nonstop 20-minute segment at the beginning of the interview for rating of global factors. The second pass includes coding of specific verbal behaviors. Twenty percent of the audio tapes were randomly double coded to establish interrater reliability. All Proficiency was measured before training, immediately after training, and then again at four, eight and twelve months after training.

The waitlist control group showed no change in MI skills immediately after self-study and at four months. There were only marginal gains at four months for the workshop only group. All enhancement groups, feedback, coaching, and feedback with coaching, demonstrated large training effects immediately after training. Reversal of gains was seen over time for the workshop group suggesting, “a need for ‘relapse prevention’ measures after initial training” (p. 1060). The feedback with coaching group had the largest percentage of clinicians meeting proficiency standards, reporting 82% at 4 months. The feedback with coaching group also had significantly better patient responses compared to baseline. Additionally, the study compared self-report of proficiency with baseline skills. The statement, “I feel proficient” correlated with MI spirit, MI consistent responses and the reflection to question ratio. The statement, “I am a good listener.” was unrelated to the reflection to question ratio and was inversely related to the complex reflection ratio.

Mitcheson, Bhavsar and McCambridge (2009) found no difference in Motivational Interviewing Treatment Integrity (Moyers, Martin, Manuel, Miller, & Ernst, 2010 [MITI) scale scores at 6 months between trained and untrained controls in adolescent substance abuse counselors. Audio recording of sessions with trained actors were rated by a coder. Twenty percent of the audiotapes were double coded to establish interrater reliability. Although researchers offered follow-up coaching sessions, only 44% of the possible sessions were delivered due to participant refusal to make time for consultation. Conversely, another study observed a significant difference between baseline and post-training MITI scores when compared to wait list controls with Air Force substance abuse counselors (Moyers, et, al., 2008). Four trained coders rated work

sample audio tapes at baseline, immediately after training, then at four, eight, and twelve months post training. Interrater reliability was determined by double coding 10% of the tapes and coders attended weekly session in which tapes were reviewed by all coders to prevent deviation from the coding manual. Mean post training ratings for participants met or exceeded thresholds for proficiency in empathy, percent MI adherence and reflection to question ratio. The only variable that did not exhibit sustained improvement in the training groups was the frequency of MI adherent speech. A comparison of workshop only group with the enhanced training group (feedback with coaching) with baseline skills as a covariate demonstrated no difference between groups. MI proficiency decreased over time without coaching or feedback, reinforcing results from previous research (Miller, Yahne, Moyers, Martinez and Pirritano, 2004).

Clearly, MI training and training with enhancement increases clinician use of MI skills. However, much of the research has been done with counseling professionals who have already received training in behavior change. Medical students trained in MI have higher global attitude scores on the MISC than the control group without training (Opheim, Andreasson, Eklund, & Prescott, 2009). The training group also asked more open-ended questions and used more summaries and affirmations than the control group.

Consequently, MI training has an effect on medical students' attitudes regardless of whether their use of MI techniques meets proficiency levels. Multiple studies have demonstrated that empathy and a positive interpersonal relationship correlate with desired patient outcomes and engagement (Gaume, Gmel, Faouzi, & Daeppen, 2009; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Moyers, Miller, & Hendrickson, 2005).

Therefore, increasing empathy and interpersonal skills in clinicians through MI training will promote patient behavior change.

**Computer based training in MI.** Computer based training in MI has been reported in the literature. Both online course content and virtual reality has been used as instructional strategies. Martino, Canning-Ball, Carroll, and Rounsaville (2011) used a criterion-based approach with initial web-based training in MI. Clinicians who did not meet set proficiency for MI performance moved to the next step in training. In total, there were three steps, (1) web-based training, (2) workshop training, and (3) individual supervision. Forty-two percent of the clinicians participating in the web-based course achieved proficiency. In serial assessments of MI proficiency overtime, those clinicians who met proficiency at the end of the web-based training, continued to increase their skills. This finding reinforces the learning to learn philosophy advocated by Hettema, Steele, & Miller (2005).

MI training is described in prototype testing of a virtual reality simulation for pediatricians (Radecki, Goldman, Baker, Kindros, & Boucher, 2013). The pediatricians viewed online didactic content of MI then practiced MI using an avatar-based simulation for prevention and treatment of childhood obesity. Researchers assessed the prototype simulation using focus group discussions and individual interviews. The pediatricians in the prototype testing noted the realism, convenience, and innovation of the technology. In addition, the pediatricians valued the experiential nature of the virtual simulation as well as the feedback on MI skills included in the programming. “A subset of respondents also noted and appreciated the nonthreatening learning environment that simulation

technology offered” (p. 177). The researchers, however, did not measure MI proficiency after interaction with the MI content and simulation.

Two pilot study used the virtual reality platform, Second Life, to teach MI to physicians and medical students. Shershneva, et al. (2014) measured participant knowledge and skills and faculty rating of a recorded standardized patient simulation using a validated tool, the Motivational Interviewing Skills for Health Care Encounters. The educational intervention included three 90-minute sessions with lecture, demonstration, and practice with feedback within the virtual environment. Three months post intervention, the same self-rated questionnaires and recorded standardized patient simulation were rated. Participants rated themselves higher post educational intervention on knowledge and skills. The participants did not reach competency level on the Motivational Interviewing Skills for Health Care Encounters tool (Petrova, et al., 2015). However, there was improvement on demonstrating empathy and responding to the patient’s cores concerns about behavior change scales. The small convenience sample of 22 physicians makes it difficult to generalize the results.

Czart (2014) used a case study design for a pilot study to assess the use of the virtual reality platform, Second Life, in teaching MI to medical students. The intervention was a one-hour workshop. Measures included student self-rating of performance, a recorded pre- and post-intervention assessment using simulation with a standardized patient in virtual reality, a recorded focus group discussion and a usability assessment. A researcher constructed tool was used by the standardized patient and the faculty to assess the student performance on the recorded simulation. Participants rated themselves lower on the post intervention skills. The participants were rated significantly higher only in



ability to determine the patient's readiness to change by the standardized patient post intervention. Faculty rated participants higher on ability to determine readiness, ability to acknowledge the discrepancy between the patient's goals and behavior, reflective listening, and confidence in the patient's ability to change. The lack of a validated tool for assessment of MI skills weakens the results.

### **Application of the First Principles of Instruction**

The First Principles of Instruction (Merrill, 2002a) are derived from multiple instructional theories. Rather than describing the learning process, the First Principles explain how to create instruction based on evidence from educational research. Merrill (2013) believes that instructional design research should involve both technology and science. "Science activities involve theory development and experimental research to substantiate the theory. Technology activities involve the development of design procedures, instructional development, and evaluation [field research]" (Merrill, 2013, p. 440). Both experimental and design activities are represented in research related to the First Principles.

Research applying the First Principles evaluates both student reaction and learning (Appendix C). Employees of Shell EP evaluated courses as more relevant to business when the courses were revised according to the First Principles (Collis & Margaryan, 2005). Instruction also was perceived as increasing application of the skills in the workplace. College students, in a biology course redesigned applying the First Principles, felt that they were able to apply knowledge from the course in meaningful ways (Francom, Bybee, Wolfersberger, Mendenhall, & Merrill, 2009). Both the instructor and students thought the course improved the students' critical thinking skills.

The Teaching and Learning Quality scales (TALQ) was developed to assess the learners' perception of the First Principles (Frick, Chadha, Wang, Watson, & Green, 2007). The subscales of the TALQ assess authentic problems, activation, demonstration, application, integration, academic learning time, learning progress, and student satisfaction. Academic learning time is the amount of time students spent on assignments in order to meet the course objectives (Rangel & Berliner, 2007). The TALQ instrument included a subscale of student-rated statements such as, "I did a minimum amount of work and made little effort in this course" to qualify academic learning time. In descriptive studies of college students in a variety of courses, the First Principles correlated positively with academic learning time, perceived learning, student satisfaction, and an outstanding rating of the instructor and course. (Frick, Chadha, Watson, & Wang, 2010; Frick, Chadha, Watson, & Zlatkovska, 2010). In addition, students rated as having mastered course objectives by the instructor were five times more likely to agree that the First Principles and high academic learning time were present during the course. Students who disagreed that the First Principles and academic learning time were present during the course were 25.6 times more likely to be rated as low masters of course objectives by the instructor.

The First Principles' central concept is problem-centered tasks. Rosenberg-Kima (2012) compared topic centered and problem-centered instruction to learn computer software. Attitude and learning were measured. Problem-centered students performed better on post-test skills and problem-solving. In addition, problem-centered students rated themselves as more confident than topic-centered students. There was no difference between groups in ratings for attention and satisfaction.

Problem-centered learning improves performance on a knowledge test as well as real world tasks (Thomson, 2002). Computer software instruction, in the corporate setting, was presented to two groups of learners. Group 1 interacted with computer-based instruction designed using the First Principles. The instruction was problem-centered, presenting tasks that were progressively more difficult. Problems were based on scenarios that the learner would encounter in the workplace. Demonstrations of solutions were presented step-by-step. Coaching was gradually withdrawn over the course of five problems. Group 2 interacted with computer-based topic centered instruction. A mentor and a frequently asked questions reference were available for the learners. Group 3 was a control and received no instruction. Group 1 was 30% more accurate than Group 2 and 159% more accurate than Group 3 on post-test tasks. In addition, Group 1 performed real world tasks in 41% less time than Group 2. Most of Group 3 failed to complete the posttest tasks.

### **Conclusion**

The review of the literature highlighted current gaps in NP educational research. Professional regulatory bodies set program outcomes. However, NP education has a limited body of evidence to support educational practices to meet program outcomes. Instructional design is not based on prescriptive theory that is supported by educational research. Rather, the few studies that do reference educational theory use descriptive educational theories that describe how students learn rather than how faculty should design instruction. A classic argument in instructional design developed in the 1990 between Clark (1994) and Kozma (1994) as to whether the type of media or technology used to deliver instruction influences learning. Clark states, “All methods required for

learning can be delivered by a variety of media and media attributes. It is methods which is the ‘active ingredient’ or active independent variable that may or may not be delivered by the medium to influence learning” (Clark, 1994, p. 26). For studies involving the use of technology in NP education, researchers are still comparing methods with media. Evaluation of instruction is largely based on student reaction and knowledge, rather than transfer of learning to the clinical environment. Ultimately, NP education should provide the knowledge, skills, and attitude to support novice NPs in developing behaviors that result in safe care and improved patient outcomes.

Research related to training practitioners in MI has focused principally on one method, the face-to-face workshop. The population most studied is substance abuse counselors. Health care practitioners, in contrast to substance abuse counselors, have less time and less frequent visits in which to counsel patients for behavior change. In addition, the theoretical model for acquisition of MI skills has not been empirically verified.

The First Principles of Instruction is a prescriptive instructional design theory that provides guidance to faculty. “Instructors can do something about First Principles of Instruction in their courses. If instructors use more of the First Principles in their teaching, instructional theory predicts that students should learn more” (Frick, Chadha, Watson, & Wang, 2010, p. 60). Research applying the First Principles has shown improvement in student reaction, knowledge, and workplace application over topic centered learning. A systematic approach to the design of MI training for NP students should result in improved satisfaction, increased knowledge, increased use of MI in clinical practice, and ultimately, improved patient outcomes.

## CHAPTER III METHODS

This chapter describes the methods, instruments and analyses used to evaluate the utility of a prescriptive instructional design theory, the First Principles of Instruction (Merrill, 2013), for the design of motivational interviewing (MI) instruction for NP students. The design process and outcomes are evaluated. The evaluation was guided by the research questions:

1. How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?
2. How could the First Principles of Instruction have been more useful in designing the instruction in motivational interviewing to be engaging to the NP students who participated in this study?
3. Does knowledge of motivational interviewing in NP students participating in this study increase from before to after instruction designed using the First Principles of Instruction?

### **Design**

A design research approach was implemented for this study, in which, the First Principles of Instruction were applied to the design of instruction in MI for NP students. Wang and Hannafin (2005) define design research as “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories” (p. 6).

## **Formative Design Research**

Design research has several variations including design experiments, developmental research, and formative research. The design chosen for this proposal is formative research. Formative research is recommended to examine the theory-based processes of design within a particular context (Reigeluth & Frick, 1999; Richey & Klein, 2005). Formative research is useful in the improvement of prescriptive instructional design theoretical models and evaluation of the product of the design process. Richey, Klein and Nelson (2003) make a distinction between performing the process of design and studying the process during instructional design and evaluation. Instructional design and development research differs from traditional research designs traditionally used in the science.

Design experiments were developed as a way to carry out formative research to test and refine educational designs based on theoretical principles derived from prior research. This approach of *progressive refinement* in design involves putting a first version of a design into the world to see how it works. Then, the design is constantly revised based on experience, until all the bugs are worked out (Collins, Joseph & Bielaczyc, 2004, p. 18).

Formative design research consists of a holistic single case in which a theory is applied to the design of instruction. Instructional design theory does not describe the phenomenon of learning nor establish a cause and effect relationship based on probabilities. Instead, instructional design theories define the practices instructional designers should employ to optimize learning. “Design theories are intended to provide direct guidance to practitioners about what methods to use to attain different goals, whereas descriptive theories attempt to provide a deeper understanding of effects that result from phenomena” (Reigeluth, 1999, p. 8). Instructional design theories are focused

on the means to reach learning objectives rather than emphasizing the results of given events.

Reigeluth and Frick (1999) prescribe the process of formative research of an existing theory as; (a) select a design theory, (b) design an instance of the theory, (c) collect and analyze formative data on the instance, (d) revise the instance, (e) repeat the data collection and revision cycle, and (f) offer tentative revisions for the theory. Dick, Carey, and Carey (2009) classify the three stages of formative evaluation as one-to-one evaluation, small group evaluation, and a larger group field trial in the real world. This formative research will rely on one-to-one evaluation as the first stage.

The theory selected for this research is the First Principles of Instruction including the Pebble-in-the-Pond model of the design phase of instruction. The instance for design is web-based instruction in MI for NP students. During the design, the theory should be followed exactly to avoid adding elements to or omitting elements from the theory (Reigeluth & Frick, 1999). Formative data on the instance includes prototype testing. “The basic premise of prototype testing is that you can discover important information about your design by observing the real people who might use your instructional product trying to accomplish tasks they would really do under the conditions they would actually encounter when using it” (Frick & Boling, 2002, p. 40). It is recommended that prototype testing include four to five authentic users. For this instance, authentic users are NP students. Revision of the instance was based on information obtained during prototype testing in cycles. The data collection and instance revision were repeated with additional NP students. Suggested modifications to the First Principles of Instruction are offered after the cycles of revisions.

## **Analysis of Instructional Need**

Data from a pilot study of NP student performance of MI skills will inform the initial instructional design. A need for instruction is a prerequisite for an instructional design project. Dick, Carey, and Carey (2009) cite three components of a needs assessment. The first component is the desired status. The desired status serves as a standard or goal to be achieved by the students. The standard for beginning proficiency in MI is set by the Motivational Interviewing Treatment Integrity code, version 3.1.1 (Moyers, Martin, Manuel, Miller, & Ernst, 2010). The second component is determining the actual status.

### **Instrumentation for the Pilot Study**

The Motivational Interviewing Treatment Integrity 3.1.1 (MITI 3.1.1) code is used as a measure of interviewer proficiency using MI to assess training effectiveness and to evaluate treatment fidelity for research. The MITI 3.1.1 code was used for the analysis of instructional need to evaluate of student performance in a standardized patient simulation for smoking cessation counseling (Pierson, et al., 2007; Moyers, Martin, Manuel, Miller & Ernst, 2010). MITI 3.1.1 has two components, global scores and behavior counts. The global scores address five characteristics of MI; (1) evocation, (2) collaboration, (3) autonomy/support, (4) direction, and (5) empathy. Each component is scored on a five-point scale to depict the character of the entire interview. Each of the five points has verbal anchors and examples of the rating. The verbal anchor at the one-point level for collaboration is “Clinician actively assumes the expert role for the majority of the interaction with the client. Collaboration is absent.” The examples for the



verbal anchor include, “Denies or minimizes client ideas, dominates conversation, and is passive, disconnected or dismissive”.

The behavior counts direct the coder to count the number of times the interviewer uses particular verbal techniques. The behaviors are both positive and negative in relation to recommended MI practice. For example, information giving is counted as either with permission as MI adherent or without permission as information giving. Other MI adherent verbal behaviors are affirmation, emphasizing control, and supporting. MI non-adherent behaviors are advising, confronting, and directing. Questions are counted as either closed or open questions. Reflections are counted as simple or complex.

Global scores and behavior counts are assessed with a single review of a random 20-minute segment of the taped interview. However, coders can choose to consistently use two reviews of the same 20-minute segment, one for global scores and one for behavior counts. The tape can be stopped and restarted at the coder’s discretion. Coders should know the target behavior for the interview. This allows the coder to decide if the interviewer is aiming interventions, such as facilitating change talk, toward the target behavior.

A summary of scores for global and behavior counts serve as a rating of proficiency in the use of MI. The global spirit rating is the sum of the evocation, collaboration and autonomy/support rating divided by three. Behavior counts are reported as a percentage of the total. The percentage of complex reflections equals the number of complex reflections divided by the total number of reflections. The percentage of open questions equals the number of open questions divided by the total number of questions. Reflection-to-question ratio is the number of total reflections divided by the total number

of questions. The percent MI adherent is the MI adherent verbal behaviors divided by the total MI adherent and MI non-adherent verbal behaviors. Proficiency levels are rated as beginning proficiency or competency and are displayed in Table 2.

Table 2.

*Interviewer Proficiency and Competency Thresholds for MITI 3.1.1*

<b>Scores</b>	<b>Beginning Proficiency</b>	<b>Competency</b>
Global spirit rating	3.5	4
Reflection to question ratio	1	2
Percent open questions	50%	70%
Percent complex reflections	40%	50%
Percent MI-adherent	90%	100%

*Note.* Adapted from Moyers, T. B., Martin, T., Manuel, J. K., Miller, W. R., & Ernst, D. B. (2010). Revised global scales: Motivational interviewing treatment integrity 3.1.1 (MITI 3.1.1). *Motivational Interviewing Library*. Retrieved from [http://casaa.unm.edu/download/MITI3\\_1.pdf](http://casaa.unm.edu/download/MITI3_1.pdf)

The MITI code was originally developed by exploratory factor analysis based on the dimensions of the Motivational Interviewing Skills Code (Moyers, Martin, Manuel, Hendrickson, & Miller, 2005). Moyers, et al. (2005) provide psychometric data for the MITI scale that demonstrates good reliability, sensitivity to change, and convergence with other MI rating tools. Reliability estimates used intra-class correlation coefficients. Intra-class correlations ranged from .5184 (fair) to .9681 (excellent), with 70% of rating in the excellent range. Sensitivity of MITI in detecting changes in interviewer behavior was assessed by paired coding of pre- and post-test tapes. Trained therapists scored significantly higher using a paired t-test from baseline to post-test. Therefore, the MITI code demonstrated both reliability and sensitivity to interviewer behaviors. In a subsequent examination of the reliability of the MITI code, Pierson, et al. (2007) reported

intra-class correlations of .71 (good) for global scores and .75 to .98 (excellent) for behavior counts. The Cronbach's alpha for global ratings of empathy, MI spirit and behavior counts ranged from 0.76 to 0.98. The MITI was able to detect a change in provider behavior in pre- and post-testing after MI training using a paired t test with p values of less than .0005 for both empathy and MI spirit. Global ratings of MI spirit and empathy were highly correlated ( $r = 0.75, \alpha < .001$ ) and negatively correlated with MI non-adherent behavior counts (empathy,  $r = 0.68, \alpha = .001$ , MI spirit,  $r = 0.71, \alpha < .001$ ) (Pierson, et. al, 2007). The MITI is a reliable and valid tool for detecting provider behaviors that are consistent with MI principles.

### **Results of the Analysis of Instructional Need Pilot Study**

The pilot study determined the MI performance level of the NP students based on the usual instructional methods of lecture, demonstration, and role playing. NP students participated in a smoking cessation simulation with standardized patients as part of their usual course requirement. Using a process approved by the Institutional Review Board at Indiana University and Michigan State University, NP students were informed of the research study and voluntarily consented to allow their videotaped performance to be coded by the researcher. Coding commenced after grades were submitted, so as not to affect student performance in the course. Coding was completed with the audio recordings from the simulation. A single coder reviewed all audio recordings. Mean MITI scores from 70 NP students were calculated using IBM SPSS Statistics® 21. Finally, the gap between the desired status and the actual status determines the need. Table 3 compares beginning proficiency level with the NP students' performance.

Table 3.

*Comparison of Beginning Proficiency Criteria and NP Student Mean Scores*

Clinician Summary Score Thresholds	Beginning Proficiency	NP Student Mean (N=70)	Standard Deviation
Global Clinical Ratings: MI Spirit	Average of 3.5	3.2	0.62
Reflection to Question Ratio (R:Q)	1	0.23	0.17
Percent Open Questions (% OC)	50%	23%	0.13
Percent Complex Reflections (% CR)	40%	44%	0.23
Percent MI-Adherent (% MIA)	90%	76%	0.20

Overall, the NP students did not meet beginning proficiency levels in MI. The gap analysis is consistent with the stage theory of learning MI proposed by Miller and Moyers (2007). NP students nearly reached beginning proficiency in the attitudinal components of MI or MI spirit. However, they were less successful in acquiring the skills. The NP student performance gap was significant in the areas of open-ended questions and complex reflections. NP students relied heavily on closed questions. The beginning proficiency achievement for percent of complex reflections in the pilot study is misleading. Overall counts of simple and complex reflections were low, demonstrating an NP student priority for information gathering over acknowledging ambivalence. Reflections, when used, were simple and echoed the words of the patient. Behavior counts also showed a heavy reliance on information giving. The most frequent MI non-adherent verbal behavior was advice giving. The results support Miller and Moyer's (2007) hypothesis that students learn the evocation, collaboration, and autonomy of MI

spirit first, and then acquire techniques such as open-ended questions, reflections, and recognition of change talk.

### **Outcomes in Formative Research**

Reigeluth and Frick (1999) state, “for design theory, the major concern is preferability: the extent to which a method is better than other known methods for attaining the desired outcome” (p. 634). The three dimensions of preferability are effectiveness, efficiency, and appeal. Merrill (2013) expresses the outcomes of instructional design as e<sup>3</sup> instruction: effectiveness, efficiency, and engagement. Wood, Bonakdarian, and Whittaker (2012) described e<sup>3</sup> instruction as instruction that helps the learner to learn, holds the learner’s interest, and uses the learner’s time well.

#### **Effectiveness**

All definitions of effectiveness reference the learners’ level of achievement. Effectiveness is defined as the extent to which the instructional goals are achieved (Reigeluth & Frick, 1999), the attainment of instructional objectives (Lohr, 2000), and the level of achievement within a particular situation (Reigeluth, 1983). Effectiveness is typically measured numerically based on norms or achievement criteria. Merrill (2013) views effectiveness in terms of the learners’ problem-solving ability. Effectiveness is the ability of learners to solve a class of problems that they could not solve before the instruction.

#### **Efficiency**

Definitions of efficiency include varying dimensions of cost and time. Reigeluth & Frick (1999) refer to efficiency as “bang for the buck” (p. 635). It is the effectiveness versus the cost of instructional design. Cost includes money, time, equipment, or any

resources used in the design of instruction. Lohr (2000) defines efficiency as how quickly and cost-effectively learning objectives are achieved. Merrill (2013) defines efficiency only in terms of learner time. “Instruction is efficient if learners can solve an instance of the problem in less time following instruction than they could prior to the instruction and/or if learning from one instructional strategy requires less time than learning from an alternative instructional strategy, providing that the resulting problem-solving skill is the same” (p. 370).

### **Engagement**

For the purposes of this research and consistent with the First Principles of Instruction, the third outcome of instructional design measured is engagement. Engagement is the extent to which the instruction motivates learners to solve a problem. In addition, the learner should want to learn more about the subject matter. Engagement is demonstrated by learner completion of instruction, persistence in problem solving, and seeking out additional instruction in the subject matter (Merrill, 2013).

### **Subjects**

NP students are the authentic users or subjects of the instance. As such, they will contribute the majority of the data for this design research. A convenience sample of NP student subjects was used based on the face-to-face interaction needed for the initial stage of prototype testing. NP students were recruited via the Michigan Council of Nurse Practitioners and Michigan State University College of Nursing. Subjects were informed of the research study and consented, using a process approved by the Institutional Review Board at Indiana University. Protection of the human subject participants in this study followed the Indiana University–Purdue University Indianapolis Institutional Review

Board policies and procedures for expedited research. Approval for the initial proposal was secured prior to the initiation of the study.

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Subjects were solicited via email and asked to participate. The invitation email specified participation in the research as extracurricular and did not affect the subject's grades. Subjects volunteered by contacting the researcher. A mutually agreed upon date, time, and place were set to meet with each subject face-to-face. The location of the meeting was usually either a coffee shop or public library in the subject's home community. The subject designated the site for the meeting. One subject due to her rural location chose to meet in her home. Subjects were assigned a participant number as a unique identifier that included the round in which the subject participated. A small incentive of a \$25 Amazon gift card was offered to compensate the subjects for participation. Inclusion criteria were students enrolled in an NP or Doctor of Nursing Practice program, ability to understand verbal and written English language, and ability

to come to a mutually agreed upon site in the subject's local community. No NP students indicated extensive experience with MI and none were excluded on that basis.

## **Instrumentation**

### **Demographics**

Subjects completed a short demographic questionnaire. The questions included age, gender and years of experience as a registered nurse. To assess previous counseling experience, the subjects were asked if they had previous motivational interviewing training. Counseling and cognitive behavioral therapy was also assessed.

### **Measure of Effectiveness**

Effectiveness is traditionally measured by accessing learner knowledge before and after instruction. Often the instructional designer constructs the knowledge test. For this study, the knowledge test was a standardized measure of MI knowledge, the Helpful Responses Questionnaire (HRQ).

**The Helpful Responses Questionnaire.** The Helpful Response Questionnaire (HRQ) (Miller, Hedrick & Orlofsky, 1991) consists of six items that require the learner to respond to a situation in a helpful manner. The question response is a narrative written by the learner. The scoring is based on a 5- point ordinal scale for the presence of reflections and conversation roadblocks. A rating of one is given when the response contains no reflection but includes at least one roadblock. Roadblocks are based on Gordon's 12 roadblocks to communications (Gordon, 2008). A rating of two is scored when the response contains both a reflection and a roadblock or contains neither a reflection nor a roadblock. A simple reflection in a response is scored a three. A complex reflection that contains inferred meaning is scored at the four level. A level five is scored when the



response is a reflection of feeling or is a metaphor or simile. The highest level of reflection is used if more than one reflection is in the response unless a roadblock also is present. The average time for completion of the questionnaire is 15 to 20 minutes. The HRQ has an inter-item correlation of .67 pre-training and .57 post training with Cronbach's alpha of .92 at pre-training and .89 post training. Inter-rater reliability is .71 to .91. Higher scores on the HRQ are more consistent with accurate empathy than lower scores. Appendix B is a copy of the HRQ.

### **Measures of Efficiency**

Consistent with the definition of Merrill (2013), efficiency was measured by the time it takes the learner to complete the HRQ both pre- and posttest. If the instruction is efficient, learners should take less time to complete the posttest than the pretest. The time to complete the instruction was also recorded. Qualitative questions after interaction with the instruction include open-ended questions related to efficiency. Appendix D contains the qualitative questions used in this study.

### **Measures of Engagement**

Engagement was measured qualitatively through questioning of the learner after interaction with the instruction. Open-ended questions related to attention, persistence, and desire to learn more about the subject matter were included in the interview questions. Frick and Boling (2002) base the qualitative questions on prototype testing guidelines. The interviews were audiotaped and transcribed for analysis. Learners verified the transcripts as a member check.

Merrill (2013) notes that aspects of engagement can also be assessed during observation of the learner in functional prototype evaluation. Observation of attention and

persistence during interaction with the instruction is an evaluation of engagement. The observation checklist is based on the recommendations of Merrill for the First Principles of Instruction. Appendix E contains the observation checklist for this study.

### **Data Collection**

Formative data is collected to improve the design instance before full implementation of the instance of instruction, as well as make recommendations to improve the instructional design model. The data is in qualitative and quantitative formats. Reigeluth and Frick (1999) name three categories of data in formative research, (a) observations, (b) documents, and (c) interviews. For this study, observations were made by the researcher to confirm the presence of the First Principles of Instruction in the instance. Additional observations of the NP students' reaction during their interaction with the instance were made. Documents consisted of methods of instructional design in the form of the design journal (Appendix F), a detailed description of the instance (Chapter IV), and an MI knowledge test. The design journal, kept by the researcher, included a progression of problems, elements of the instance, and rationale for design decisions. Interviews were conducted with the authentic users, the NP students, during and after interaction with the instance. The most useful data is derived from the authentic users.

Subjects were solicited via email and asked to participate. The invitation email specified participation in the research as extracurricular and did not affect the subject's grades. Subjects volunteered by contacting the researcher. A mutually agreed upon date, time and place were set to meet with each subject face-to-face. The location of the meeting was usually a either a coffee shop or public library in the subject's home

community. The subject designated the site for the meeting. One subject due to her rural location chose to meet in her home. Subjects were assigned a participant number as a unique identifier that included the round in which the subject participated. A small incentive of a \$25 Amazon gift card was offered to compensate the subjects for participation. Inclusion criteria were students enrolled in an NP or doctor of nursing practice program, ability to understand verbal and written English language, and ability to come to a mutually agreed upon site in the subject's local community. No NP students indicated extensive experience with MI and none were excluded on that basis.

Demographic data was collected related to gender, years of experience as a registered nurse, NP program level, previous experience with MI, and previous experience with counseling (Appendix C). Prototype testing will generate observations of NP students on a one-to-one basis as they interact with the instance. During use of the instance, the researcher assisted with technical problems and answered questions posed by the subject. The researcher also observed the NP students during interaction with the instance. Observations included confusion of difficulty of the content, difficulty following directions, navigation through the instance, adequacy of demonstrations, guidance needed, application of the content, and coaching to complete the instance (Appendix E). After interaction with the instance, the interview featured a set of open-ended questions related to the effectiveness, efficiency, and appeal of the instance (Appendix D). NP students were encouraged to point out the limitations of the instance. Reigeluth & Frick state that consistency across authentic users should be evaluated until saturation is achieved. Audio recording of the post instruction interviews were obtained and transcribed for participant confirmation. Each transcript was sent to the participant

via email and confirmed as accurate. The confirmation of transcript accuracy is a form of member check to enhance the credibility of the research (Lincoln & Guba, 1985).

The subjects took a pretest for knowledge, the Helpful Response Questionnaire before the instance and a posttest for knowledge after interaction with the instance. Gaining knowledge is basic to any instructional instance. It is necessary to know the principles and skills of MI before using the technique in the clinical setting. A problem-solving approach was taken for the knowledge test. Problem-solving questions best evaluate the cognitive outcomes of application, analysis, and synthesis (Morrison, Ross, Kalman, & Kemp, 2013).

The researcher maintained a design journal to document design decisions during the development of the instance (Appendix F). The design journal systematically documents the design procedure and includes relevant forms of expertise (Edelson, 2002). In addition, a detailed description of the instance was documented in the design journal. The detail description is necessary to establish the dependability and confirmability of the formative research (Lincoln & Guba, 1985).

### **Data Analysis Steps**

Design decisions consider multiple factors. Expert designers rely on their experience to see a problem within the context in a holistic manner (Ertmer, et al., 2008; Benner, 1984). In contrast, novice designers use decision rules and guidelines to complete the tasks of design. Merrill (2013) provides ample worksheets and guidelines for the novice instructional designer to use during the design process. Although not an expert instructional designer, the researcher in the current study is an experienced

educator of nurse practitioners. As such, expertise related to student characteristics and professional competencies is available to the researcher.

Design decisions, in this formative research, are based on more than designer expertise. Subject matter, theoretical framework, the learner, and designer factors are also considerations in decision-making. Motivational interviewing, as the subject matter, has an affective component that is the basis of the counseling technique. It would be counter to the subject matter to design instruction that is not consistent with the attitude that embodies the technique. The First Principles of Instructions, as the theoretical framework, are prescriptive in features of instruction and the process of instructional design. Consistency with the foundations of the theory is also a primary consideration in the design of instruction. Additional factors such as the technical ability of the designer, costs in time and money, and feedback from authentic users are considerations in the design and revision of the instruction. The design journal will document decisions, the influence of multiple factors, and compromises included in the design decisions.

Compromises in design are anticipated to balance the demands of instruction that is effective, efficient, and engaging. For example, a design decision may be made in favor of effectiveness that decreases the efficiency of the instruction. Rationale, factors of influence, and final decision decisions are documented in the design journal.

### **Iterative Process**

Formative design research is an iterative process. The process consists of cycles of design, analysis, and revision. Embedded within each cycle was a whole task, as well as the concepts of activation, demonstration, application and integration consistent with the First Principles of Instruction. Four cycles of evaluation were completed for this

research. The four cycles were based on the processes of MI outlined by Miller and Rollnick (2013). The complexity of the instance increased with each cycle of instruction. The first cycle provided instruction related to MI spirit, which embodies person-centered care. The second cycle included revised instruction from the first cycle and added instruction related to engaging with the patient in a conversation about behavior change. The third cycle included revisions from the previous cycle and added instruction concerning focusing the conversation and evoking the patient's own reasons for change. The fourth cycle evaluated revisions from the previous three cycles with additional instruction pertaining to developing and committing to a change plan. Each cycle was completed with five to six NP students who met individually with the researcher to complete the instructional instance. The researcher made observations during the student interaction with the instruction. Each NP student completed the pretest and posttest and provided reaction to the instance during a recorded interview with the researcher.

### **Data Quality**

The number of participants recruited for each round of data collection is based on recommendations by Frick and Boling (2002) for prototype testing. "You should normally aim for 4-5 subjects at minimum for a round of developmental/usability testing. This is usually enough to detect major problems with the prototype design" (p. 46). Reigeluth and Frick (1999) do not specify the number of participants per round for the formative research design but recommend continuing until saturation is achieved or "where new rounds of data collection merely confirm prior findings and yield no new findings"(p. 20). Demographic information was collected from each participant to assure similar characteristics in each round of evaluation to enhance reliability of the data.

The formative research design is based on the methodology of case study research. It is described as such because; it consists of a holistic real-world case in which a theory is applied to the design of instruction. Methodological concerns arise due to the complexity of real-world situations and the struggle to impose experimental controls (Collins, Joseph, and Bielaczyc, 2004). Yin (2014) states that in case study research, construct validity, internal validity, external validity, and reliability should be addressed through consistent strategies to provide rigor to the methodology. Reigeluth and Frick (1999) describe three methodological issues in formative research; construct validity, sound data collection and analysis procedures, and attention to the generalizability to the theory.

### **Construct Validity**

Construct validity is the measurement applied to the theoretical concepts of interest. Reigeluth and Frick (1999) maintain that construct validity can be weakened in formative research by “omission (not faithfully including an element of the theory) and commission (including an element that is not called for by the theory). Indicators of strengths and weaknesses should include the effectiveness, efficiency, and appeal of the methods”. The omission of theoretical elements for the First Principles of Instruction were minimized in this study by using Merrill’s (2013) systematic process and tools of instructional design. The design process was documented in design journal (Appendix F) for analysis. Additionally, measures, as defined by Merrill, of effectiveness, efficiency, and engagement are included in the data.

## **Sound Data Collection and Analysis Procedures**

The thoroughness and accuracy of the data shares some of the same features of trustworthiness in qualitative research (Lincoln and Guba, 1985). Trustworthiness is rigor in qualitative research, encompassing credibility, transferability, dependability, and confirmability. Reigeluth and Frick (1999) outline five strategies to strengthen the thoroughness and accuracy of data collection in formative research; (1) advanced preparation of subjects, (2) emergent data collection, (3) start with obtrusive questions, (4) use of obtrusive questions until saturation is achieved, and (5) data should be collected on strengths as well as weaknesses.

Advanced preparation of subjects means preparing the subject to be critical of the instructional instance. Often, subjects are reluctant to be critical to the researcher who designed the instruction. Encouraging critique is essential in formative research by being open and establishing a rapport with the subject.

Data collection should be emergent or evolving with the data (Reigeluth & Frick, 1999). Questions and ongoing observations should adapt to the data as it reveals itself. Questions and observations begin as general and open, then gradually become more focused in reaction to the subject's answers and behaviors. The open to focused questions approach helps to reveal the unknown weaknesses of the theory under investigation.

Generalizability of the findings to the theory under investigation is a form of external validity in formative research. To enhance external validity, questions should be obtrusive or interrupt the implementation of the designed instruction in the initial rounds to establish a pattern in the data (Reigeluth & Frick, 1999). Gradually, in subsequent rounds, questions are less obtrusive to the instruction and confirm earlier findings.



Obtrusive questions were asked about the format, visual look, content, and interactivity in the initial two rounds. By the third round, questions were less obtrusive and based on the revisions made in from the previous rounds.

Rounds of data collection continue until saturation is achieved. Saturation is achieved when additional rounds of data collection will yield no new findings but merely repeat already discovered information (Speziale & Carpenter, 2011). There were four rounds of data collection in this formative research. By the fourth round of data collection, few new answers and comments were made by the participants. The interviews were audio recorded and transcribed for analysis.

To be credible, data is collected on the strengths and weaknesses of the instructional instance (Appendix D). The questions used during interviews with the participants included questions about improvement of effectiveness, which aspects of the instruction were most and least valuable, efficient navigation, what held the participants attention, and motivation to complete the instruction as well as learn more about MI (Frick & Boling, 2002; Merrill, 2013).

### **Credibility of the Data**

Credibility of the data in formative research relies on similar techniques to case study and qualitative research. Triangulation, chain of evidence, member checks, and clarification of the researcher's assumptions, biases, and theoretical orientation are all used in formative research to establish credibility (Yin, 2014; Lincoln & Guba 1985).

Triangulation relies on multiple sources of data. In this study, there were multiple participants, four rounds of data collection, a pretest and posttest, and multiple measures

for each of the research questions. The measures for each research question are found in the table of measures (Appendix A).

Maintaining a chain of evidence in formative research increases the reliability of the study. Chain of evidence, as described by Yin (2014), is the capability to trace the process backward from conclusions to the evidence. Sources of the data should be documented as well as the context in which the evidence was gathered. For this study, the NP students volunteering for participation were the source of the data. The context was use of the instructional instance about MI. The measures and data gathering tools for this study are presented in Appendices B through F.

Member checks are a formal means of confirming the data gathered from the participants. Member checks enhance the credibility of the data. In this study, a transcript of the interview conducted after the encounter with the instructional instance was sent to the participant via email for confirmation of the content. All participants responded to the emailed transcript.

### **Summary**

A design case study was conducted using the First Principles of Instruction. The purpose of this research is to provide an instance of instructional design within the context of NP education. Improvement of the First Principles theoretical prescriptions is the goal. In addition, NP students are expected to increase their MI knowledge working toward achievement of beginning proficiency in performance during standardized patient simulation.

## CHAPTER IV DESIGN INSTANCE

Formative research specifies a detailed description of the design instance.

Reigeluth and Frick (1999) specify a design instance as “a holistic single case: one application of the theory” (p. 637). The design instance in this research was created based on the theory, the First Principles of Instruction, using the design prescriptions defined by Merrill (2013). The subject matter for the design instance is motivational interviewing (MI). Barab and Squire (2004) note that context of the design instance is significant in understanding design processes. In this design instance, the context is computer-based instruction for nurse practitioner (NP) students.

This chapter describes the computer-assisted instruction in MI for nurse practitioners used in this formative research. First, a brief description of previous instructional methods for MI is provided. Second, the priority considerations for design decisions are discussed. Third, the designed problem prototype is described. Finally, the prototype interface for the instance is illustrated.

### **Case Baseline MI Instructional Method**

Instruction in MI for NP students previously occurred in the third clinical semester of the program. The course focused on health promotion and disease prevention. MI instruction included reading about the topic, an interactive lecture, and roleplaying with peers. The lecture included video demonstrations of MI and interactive questions. Roleplaying was organized in groups of three students. Each student, in turn, took on the role of patient, provider, and observer. After each role play, feedback was offered from the perspective of each role. Later in the course, a simulation in smoking cessation counseling with standardized patients was required and evaluated for each student. The

NP students participated in a standardized patient simulation for smoking cessation. The simulation was video recorded and rated using MITI 3.1.1 Code (Moyers, Martin, Manuel, Miller & Ernst, 2010). The students were rated on global scales for evocation, collaboration, autonomy, direction, and empathy. Verbal behavior counts were also evaluated for giving information, MI adherent, MI non-adherent, open and closed questions, and simple and complex reflections. A description of NP student proficiency in MI during the simulation is provided in Chapter 3.

### **Design Decision Priorities**

At the beginning of the design process, the researcher determined a set of priorities for design decisions. The First Principles of Instruction design mandates were given the first priority. Secondly, the subject matter specifications of MI were given the next priority. The underlying attitude called MI spirit, prescribes partnership, acceptance, compassion, and evocation as core affective principles. Design decisions should support the core principles of the subject matter. The priorities were determined based on the prescriptions of formative design research as well as a means of clarifying the assumptions, biases and theoretical orientation of the researcher. A complete list of the hierarchy for design decisions is:

1. First Principles of Instruction mandates
2. Subject matter specifications (MI spirit and techniques)
3. Professional expertise of the designer (advanced practice nurse, experienced faculty)
4. Design resources (money, time, technical skills)
5. Findings from usability testing
6. Effectiveness
7. Efficiency defined as student time for task completion.
8. Engagement defined as the student wants to learn more about the subject and plans to use in clinical practice (Merrill, 2013).

## **Design a Problem Prototype**




The first step in the design process is to design a problem prototype. The designer identifies the content area, primary goal, and learner population for instruction. The content area is MI in the context of health-related behavior change. The learner population is nurse practitioner students. The primary goal of the instruction is to enable novice nurse practitioners to counsel patients effectively in primary care to make changes in their health-related behaviors such as diet, physical activity and smoking cessation using MI.


The first step in the Pebble-in-the Pond model of the First Principles of Instruction is to specify a whole problem that the learner will be able to solve at the end of instruction. For this formative research, the solution is that the student demonstrates beginning proficiency in MI. As such, the student should be able to adopt an attitude of acceptance of the patient (MI spirit), engage, focus and evoke, and plan for health-related behavior change (Miller & Rollnick, 2013). Merrill (2013) recommends starting by specifying an instance as a demonstration of the whole problem. A demonstration was written by the researcher to include the components and steps of MI. The demonstration narrative was produced as video using Windows Movie Maker and audio recording using Audacity software. A montage of public domain photos was used with an audio recording produced by the researcher to create the prototype demonstration. Pictures 1, 2, 3, and 4 demonstrate healthy behaviors. Pictures 5, 6, and 7 are still pictures of a patient and provider in conversation.

Table 4.

*Motivational Interviewing Prototype Demonstration (Storyboard)*

<b>Narrative</b>	<b>Images</b>
<p><b>Narrator:</b> This program will help you develop the skills necessary to counsel patients to adopt healthy behaviors and manage their chronic diseases. You will have trusting and mutually respectful relationships with your patients and your patient's will have improved health outcomes.</p>	<p>Picture 1.</p> <p><i>Quitting Smoking</i></p>  <p>Picture 2.</p> <p><i>Physical Activity</i></p>  <p>Picture 3.</p> <p><i>Healthy Diet</i></p> 

Narrative	Images
	<p>Picture 4</p> <p><i>Medication Self-Management</i></p> 
<p><b>Narrator:</b> Watch Lisa, a nurse practitioner, counsel Karen about her health issues. Look for Karen’s reaction to the counseling.</p> <p><b>Lisa, NP:</b> Hello, Karen. I’m glad you came in for your health maintenance examination today. I have the results of your recent lab work that we can talk about. I also noticed that your blood pressure is slightly elevated today. What health issues would you like to talk about? (<i>open question</i>)</p> <p><b>Karen:</b> Well, I’m not happy with my weight. My clothes don’t fit and I feel more tired. Also, the medication you gave me last time ran out and I didn’t have any more refills. I haven’t been taking it for the past few months. I thought you would scold me about my cholesterol results.</p> <p><b>Lisa, NP:</b> I’m glad you told me about the medication. You are in control of taking medication or not. It’s your decision. (<i>supporting autonomy</i>) (Short pause) So we could talk about your weight, which includes diet and exercise, or we could talk about the cholesterol medication. Where would you like to start? (<i>open question and agenda mapping</i>)</p> <p><b>Karen:</b> I would really like to talk about my weight. I just can’t seem to get a handle on it. I think my cholesterol results would be better if lost</p>	<p>Picture 5.</p> <p><i>Provider on Left Talking to Patient</i></p>  <p>Picture 6.</p> <p><i>Provider Talking to Patient with Hand on Chin</i></p> 

Narrative	Images
<p>weight, too. Then I wouldn't need to take any medication. (<i>change talk</i>)</p> <p><b>Lisa, NP:</b> You're right that losing weight will lower your cholesterol. You're feeling a little discouraged about your weight. (<i>reflection</i>) What would you find most helpful for us to talk about, diet or exercise? (<i>open question</i>)</p> <p><b>Karen:</b> I seem to find every excuse in the book not to exercise. How do I stop avoiding it? (<i>change talk</i>)</p> <p><b>Lisa, NP:</b> You know that exercise is important for weight loss and for your cholesterol but it's not easy to get started. (<i>double-sided reflection</i>)</p> <p><b>Karen:</b> Yes, but I just can't get up off the couch after work. I know I need to exercise in order to lose weight but when I get home from work I'm tired and just can't make myself go for walk. (<i>ambivalence-change and sustain talk</i>)</p> <p><b>Lisa, NP:</b> So, there is something that's holding you back even though you know exercise is important. (<i>simple reflection</i>)</p> <p><b>Karen:</b> I don't like it. After a long day at work, I just want to sit back and relax. (<i>sustain talk</i>)</p> <p><b>Lisa, NP:</b> You just don't like exercise, particularly after working all day. Exercise is so unpleasant; you never will be able to work it into your routine. (<i>amplified reflection</i>)</p> <p><b>Karen:</b> Well, I could exercise some other time during the day. Then I wouldn't feel like I exercise was something else to do after work when I'm tired. (<i>change talk</i>)</p> <p><b>Lisa, NP:</b> That's a very good suggestion. (<i>affirmation</i>) Would it be OK if I shared what makes exercise more pleasant for some people?</p>	<p>Picture 7.</p> <p><i>Provider on Right Talking to Patient</i></p> 



Narrative	Images
<p><b>Karen:</b> Sure.</p> <p><b>Lisa, NP:</b> Exercise is often more pleasant and sustained for longer with social support. Exercising with friends makes it seem less like a chore. Often people don't want to let their friends down, so they exercise more regularly. How do you think exercise would fit into your schedule? <i>(open ended question/evoking)</i></p> <p><b>Karen:</b> I could exercise at lunch time. There are a couple other women who walk during lunch. I have an hour for lunch. I usually only spend 20 minutes eating and the rest of time I'm on the computer. <i>(change talk)</i></p> <p><b>Lisa, NP:</b> So, if you could exercise some time other than after work, you could work it into your day. <i>(Reflecting change talk)</i></p> <p><b>Karen:</b> Yes, it would be more difficult to avoid exercising because the other women would be expecting me to walk with them.</p> <p><b>Lisa, NP:</b> OK, on a scale of 1 to 10, one being not ready at all and 10 being very ready, how ready are you to exercise? <i>(readiness ruler; increase change talk is a sign of readiness)</i></p> <p><b>Karen:</b> I'd say a 7.</p> <p><b>Lisa, NP:</b> OK, that's pretty good. Tell me, what makes it a 7 rather than a 9.</p> <p><b>Karen:</b> I have so much going on at work. Exercise seems like another thing on my list. It will get me away from my desk, though. I need to de-stress. <i>(change talk)</i></p> <p><b>Lisa, NP:</b> You want to exercise to lose weight. Your stress level is high, and exercise will also help you reduce your stress. <i>(reflecting change talk)</i></p>	

Narrative	Images
<p><b>Karen:</b> Yes, I want to make this work. (<i>change talk</i>)</p> <p><b>Lisa, NP:</b> You are determined to exercise. (<i>complex reflection</i>)</p> <p><b>Karen:</b> Yes, and I think I can work exercise into my lunch hour.</p> <p><b>Lisa, NP:</b> On a scale of 0 to 10, zero being you are not confident at all and ten is you are very confident, how confident are you that you will be able to exercise at lunch every day. (<i>confidence ruler</i>)</p> <p><b>Karen:</b> I think I would say a nine. I will walk with my co-workers at my lunch. Once I start to walk, they'll remind me and encourage me to come along. (<i>change talk and plan</i>)</p> <p><b>Lisa, NP:</b> That's excellent! (<i>affirmation</i>) So to summarize, you want to lose weight and reduce your stress by exercising. You plan to walk on your lunch hour with your co-workers. Your co-workers will help you keep on track. You are also pretty confident that you can carry out your plan. (<i>summary</i>)</p> <p><b>Karen:</b> Yes, and my cholesterol will be better, too. (<i>additional reason for change</i>)</p> <p><b>Lisa, NP:</b> How are you feeling about your plan? (<i>eliciting commitment to change</i>)</p> <p><b>Karen:</b> I feel good and I really think I'll be able to do it. (<i>commitment to change</i>)</p>	

## Progression of Problems

The second step in the process of design is designing a progression of problems. The problem progression increases in complexity, difficulty, or the number of component skills required to solve the problem (Merrill, 2013). For this design instance, component skills were added for each problem in the progression. Miller and Rollnick (2013) recommend four processes in MI, 1) MI spirit, 2) engaging, 3) focusing and evoking, and 4) planning and integration. Tasks were assigned for each of the problems in the progression (Table 5). Each problem in the progression relies on being able to use the tasks or techniques from the previous problem. The progression of problems for the MI subject matter required the use of an increasing number of tasks to complete the problem.

Table 5.

*Processes of Motivational Interviewing Aligned with Tasks*

<b>Problem Progression</b>	<b>Tasks</b>
MI Spirit	Components of MI Spirit <ul style="list-style-type: none"> <li>• Compassion</li> <li>• Collaboration</li> <li>• Acceptance</li> <li>• Evocation</li> </ul>
Engaging	OARS: Client centered counseling skills <ul style="list-style-type: none"> <li>• <u>O</u>pen ended questions</li> <li>• <u>A</u>ffirmations</li> <li>• <u>R</u>eflections</li> <li>• <u>S</u>ummaries</li> </ul>
Focusing and Evoking	<ul style="list-style-type: none"> <li>• Recognizing change talk</li> <li>• Eliciting change talk</li> <li>• Strengthening change talk</li> </ul>
Planning and Integration	<ul style="list-style-type: none"> <li>• Recognizing readiness to change</li> <li>• Developing a change plan</li> <li>• Consolidating commitment</li> <li>• Integration of MI into NP practice</li> </ul>

The next step in designing the progression of problems is collecting a sample of problem portrayals. Various video examples of MI were collected from examples open to the public on video sharing websites, YouTube and Vimeo. The videos were chosen based on their adherence to MI principles. The length of the video was also a consideration for holding the participant’s attention. Finally, a video that demonstrated a particular stage or technique of MI was chosen for a corresponding section of the instructional instance. The collection was used as the source of demonstrations for the progression of problems.

### **Component Analysis**

The problem-solving event analysis (Table 5) involves identifying the knowledge involved to complete each problem in the progression a problem-solving event. The levels of knowledge and skill required for each of the component skills are information-about, parts-of, kinds of, how-to and what-happens knowledge (Merrill, 2013). Table 4 lists the component skill and the properties for each of the component skills.

Table 6.

*Component Skills and their Properties*

<b>Component skill</b>	<b>Properties</b>
Information-about	<ul style="list-style-type: none"> <li>• Name</li> <li>• Facts about the component skill</li> <li>• Graphic (if applicable) associated with the name</li> </ul>
Parts-of	<ul style="list-style-type: none"> <li>• Name</li> <li>• Location of the part</li> <li>• Description of the part</li> </ul>
Kinds-of	<ul style="list-style-type: none"> <li>• Categories</li> <li>• Properties of each category</li> <li>• Examples of each of the categories</li> </ul>

Component skill	Properties
How-to	<ul style="list-style-type: none"> <li>• Definition of the task to be accomplished</li> <li>• Names of the procedures</li> <li>• Steps to accomplish the task</li> <li>• Sequencing of the steps</li> <li>• Demonstration of the individual steps</li> <li>• Demonstration of the consequences of task completion</li> </ul>
What-happens	<ul style="list-style-type: none"> <li>• Situation to which the process is applied</li> <li>• Name of the process</li> <li>• A set of conditions leading to the consequence</li> <li>• The resulting consequence</li> </ul>

Merrill (2013) recommends the following steps in the problem-solving event analysis:

1. Select a typical problem portrayal
2. Identify the consequence
3. Identify the conditions that lead to the consequence
4. Identify the steps that lead to each condition
5. Identify the problems of each step

For the first process, MI spirit, the clinician enacts collaboration, acceptance, compassion, and evocation in communicating with the patient. The affective nature of MI spirit makes it more difficult to set concrete steps to enact. The steps include tone of voice, body language, and the content of the verbal communication. The defining property of the patient's condition is activation of the patient's expertise, motivation, and resources for change. The condition achieved as the results of the execution of the steps is a positive interpersonal atmosphere.

Table 7.

*Problem Solving Event Table*

<b>Demonstrate the Whole Problem: Karen</b>		
<b>Show-Q (positive consequences of the procedures)</b>	Show an instance of the consequence (Q) for the whole problem	Kind-of
<b>Show-C</b>	Show instances of conditions (C) that lead to the consequence <ol style="list-style-type: none"> <li>1. Positive interpersonal atmosphere</li> <li>2. Establish a helpful connection and a working relationship</li> <li>3. Maintain focus on a specific behavior change, Patient voices own arguments for the change</li> <li>4. Clear goal established, Steps to achieve the goal determined, Commitment to carry out plan</li> </ol>	What-happens
<b>Show-S</b>	Show instances of the steps (S) that lead to each of the conditions <ol style="list-style-type: none"> <li>1. MI spirit</li> <li>2. Engaging</li> <li>3. Focusing and Evoking</li> <li>4. Planning and Integration</li> </ol>	How-to
<b>Teach the Component Skills (Problem-Solving Events of the Whole Problem)</b>		
<b><i>Demonstrate each problem-solving event : Problem solving event 1: MI Spirit</i></b>		
<b>Tell-C</b>	Describe the condition (C): MI knowledge and spirit; how people change	Kind-of
<b>Show-C</b>	Show instances of the condition (C): example and non-example diabetic	Kind-of
<b>Tell-S</b>	Describe the step (S): Components of MI spirit: Acceptance = absolute worth + autonomy + accurate empathy + affirmation; MI spirit = compassion + evocation + collaboration + acceptance	Kind-of How-to
<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of MI spirit	Kind-of How-to
<i>Do<sub>id</sub> the problem-solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of MI spirit (step)	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of a positive interpersonal atmosphere (condition)	Kind-of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Acceptance, compassion, evocation, collaboration = MI spirit	
<b>Do<sub>id</sub>-C</b>	Identify instances of the patient reaction (condition)	
<b><i>Problem solving event 2: Engaging</i></b>		

<b>Tell-C</b>	Describe the condition (C): Description of Engaging	Kind-of
<b>Show-C</b>	Show instances of the condition (C): Example of Engaging with focus on OARS skills	Kind-of
<b>Tell-S</b>	Describe the step (S): Engaging components <ul style="list-style-type: none"> <li>• Listening</li> <li>• Open ended questions</li> <li>• Affirmations</li> <li>• Reflections <ul style="list-style-type: none"> <li>○ Simple</li> <li>○ Complex</li> </ul> </li> <li>• Summaries</li> </ul>	Kind-of How-to
<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of engaging while pointing out the component skills	Kind-of How-to
<i>Do<sub>id</sub> the problem-solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of Engaging (step)	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition: therapeutic engagement	Kind-of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Engaging: <ul style="list-style-type: none"> <li>• Listening</li> <li>• Open ended questions</li> <li>• Affirmations</li> <li>• Reflections <ul style="list-style-type: none"> <li>○ Simple</li> <li>○ Complex</li> </ul> </li> <li>• Summaries</li> </ul>	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition: therapeutic engagement	Kind-of
<i>Problem solving event 3: Focusing and Evoking</i>		
<b>Tell-C</b>	Describe the condition: decisional balance is tipped toward change	Kind-of
<b>Show-C</b>	Show instance of the condition: Show an instance of patient reaction to focusing and evoking	Kind-of
<b>Tell-S</b>	Describe the step (S): Focusing <ul style="list-style-type: none"> <li>• Agenda <ul style="list-style-type: none"> <li>○ Focus clear</li> <li>○ Sharing control—agenda mapping</li> <li>○ Searching for strengths—focus unclear</li> </ul> </li> <li>• Exchanging information <ul style="list-style-type: none"> <li>○ MI consistent/MI inconsistent information exchange</li> <li>○ Elicit-Provide-Elicit</li> </ul> </li> </ul> Evoking <ul style="list-style-type: none"> <li>• Ambivalence</li> </ul>	Kind-of How-to

	<ul style="list-style-type: none"> <li>○ Change talk <ul style="list-style-type: none"> <li>▪ Responding to change talk <ul style="list-style-type: none"> <li>• OARS skills with examples</li> <li>• Strategic responses <ul style="list-style-type: none"> <li>○ Emphasizing autonomy</li> <li>○ Reframing</li> <li>○ Agreeing with a twist</li> <li>○ Running head start</li> <li>○ Coming alongside</li> </ul> </li> <li>• Roadblocks <ul style="list-style-type: none"> <li>○ Defending</li> <li>○ Interrupting</li> <li>○ Squaring off</li> <li>○ Disengagement</li> </ul> </li> </ul> </li> </ul> </li> <li>○ Sustain talk</li> </ul> <li>• Evoking change <ul style="list-style-type: none"> <li>○ Evocative questions <ul style="list-style-type: none"> <li>▪ Desire</li> <li>▪ Ability</li> <li>▪ Reasons</li> <li>▪ Need</li> </ul> </li> <li>○ Importance ruler</li> <li>○ Querying extremes</li> <li>○ Looking back</li> <li>○ Looking forward</li> <li>○ Exploring goals and values</li> </ul> </li>	
<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of Focusing and Evoking	Kind-of How-to
<i>Do<sub>id</sub> the problem-solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of the step (S): ID instances of focusing and evoking	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): ID instances of decisional balance tipping toward change	Kind-of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Execute steps of focusing and evoking	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): ID instance of the decisional balance tipping toward change	Kind-of
<b><i>Problem solving event 4: Planning and Integration</i></b>		
<b>Tell-C</b>	Describe the condition: Intention to implement a change plan	Kind-of



<b>Show-C</b>	Show instance of the condition: Patient collaboratively develops a plan with intent to implement the change	Kind-of
<b>Tell-S</b>	Describe the step (S): Planning and Integration <ul style="list-style-type: none"> <li>• Readiness <ul style="list-style-type: none"> <li>○ Increased change talk</li> <li>○ Taking Steps</li> <li>○ Diminished sustain talk</li> <li>○ Resolve</li> <li>○ Envisioning</li> </ul> </li> <li>• Developing a Change Plan <ul style="list-style-type: none"> <li>○ Change talk</li> <li>○ Goal setting <ul style="list-style-type: none"> <li>▪ Clear goals</li> <li>▪ Clear options</li> <li>▪ Goals and options unclear</li> </ul> </li> </ul> </li> <li>• Strengthening commitment <ul style="list-style-type: none"> <li>○ Change talk</li> <li>○ Implementation intentions <ul style="list-style-type: none"> <li>▪ evoking intention</li> <li>▪ convert commitment</li> </ul> </li> </ul> </li> <li>• Supporting change</li> </ul>	Kind-of How-to
<b>Show-S</b>	Show the execution of instances of the step (S): Highlighted demonstration of planning and integration	Kind-of How-to
<i>Do<sub>id</sub> the problem-solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of the step (S): Identify the steps in planning and integration	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): Identify patient readiness, change plan and commitment/intention to change.	Kind-of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Execute steps to planning and integration	How-to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): Identify instances of patient intent to implement change	Kind-of
<i>Do the whole problem</i>		
<b>Do<sub>ex</sub>-Q</b>	Predict the consequence from a set of conditions for instances of the problem: Predict the patient's response to communication style of provider	What-happens
<b>Do<sub>ex</sub>-C</b>	Find faulted conditions or steps for an unanticipated consequence for instances of the problem: Find provider interaction that is MI inconsistent and recommend alternative response	What-happens
<b>Do<sub>ex</sub>-S</b>	Execute all of the steps for instances of the whole problem: Interact with a patient using MI for health-related behavior change.	How-to

Do<sub>id</sub> = identify an instance  
Do<sub>ex</sub> = predict the consequences  
Do<sub>ex-Q</sub> = predict consequences from a set of conditions for instances of the problem  
Do<sub>ex-C</sub> = Find faulted condition or steps for an unanticipated consequence for instances of the problem  
Do<sub>ex-S</sub> = Execute all of the steps for instances of the whole problem

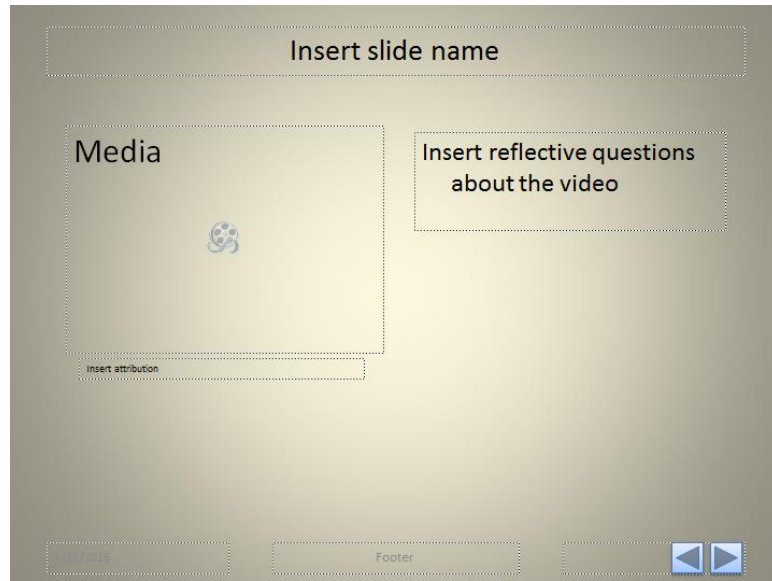
Following the prescriptions of the Pebble-in-the-Pond model of the First Principles of Instruction, an instructional event table and a checklist of prescribed instructional events of the problem progression was created for each of the four processes of MI in the researcher's design journal (Appendix D). Each problem in the progression ended with an application activity.

### **Functional Prototype**

Prototype construction was based on recommendations in Merrill (2013) using PowerPoint master slides and action buttons. The PowerPoint master slides served as a skeleton for the instance. Master slides were created for each principle of instruction. Principles of instruction include activation, demonstration, application and integration. For example, a demonstration slide featured a video with reflective questions (Pictures 8 and 9). Videos were edited in Adobe Premier Pro CS6 or accessed via YouTube or Vimeo.

Picture 8.

*Demonstration Master Slide*



Picture 9.

*Demonstration Slide with Content*

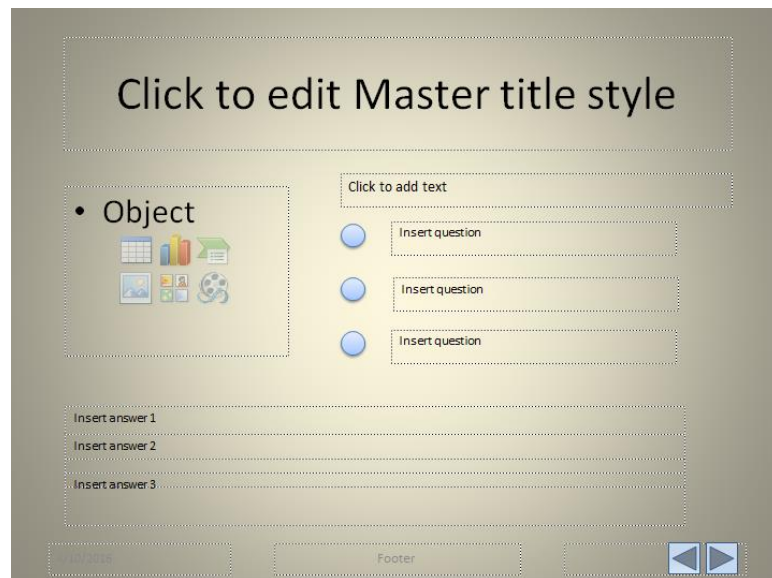


Knowledge slides containing information about MI used a Master slide with interactive buttons. The design of the knowledge slide was consistent throughout the

instance. Information about MI included kind of, how to, and what happens information. Questions about MI were asked then by clicking on the circle the answer appeared. Clicking a second time on the circle closed the answer. The combination of questions, interactive buttons, and answers was thought by the researcher to be more engaging than reading the information on the screen (Pictures 10 and 11).

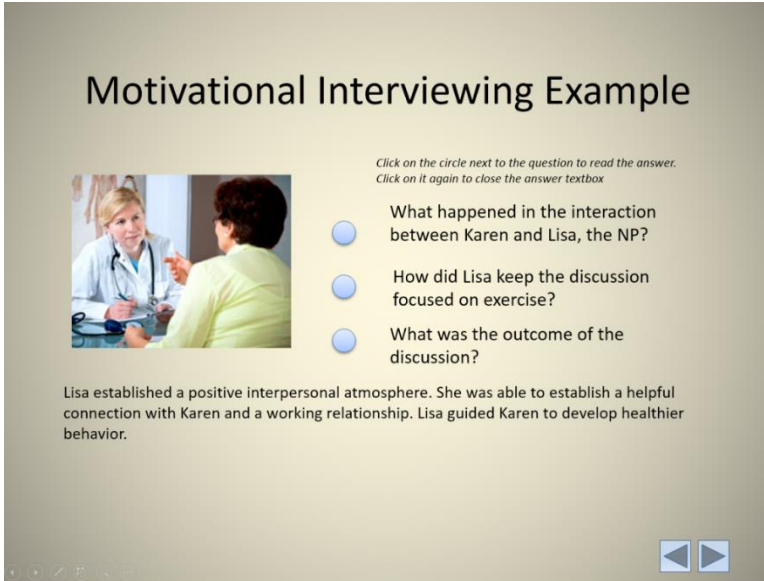
Picture 10.

*Knowledge Master Slide*



Picture 11.

*Knowledge Interactive Slide*



The slide is titled "Motivational Interviewing Example". It features a photograph of a healthcare professional (Lisa) in a white coat talking to a patient (Karen) in a yellow shirt. To the right of the photo are three questions, each preceded by a blue circle. Below the questions is a paragraph of text. At the bottom right, there are navigation arrows. At the bottom left, there are small icons for a search, a list, and a refresh.

### Motivational Interviewing Example

Click on the circle next to the question to read the answer.  
Click on it again to close the answer textbox

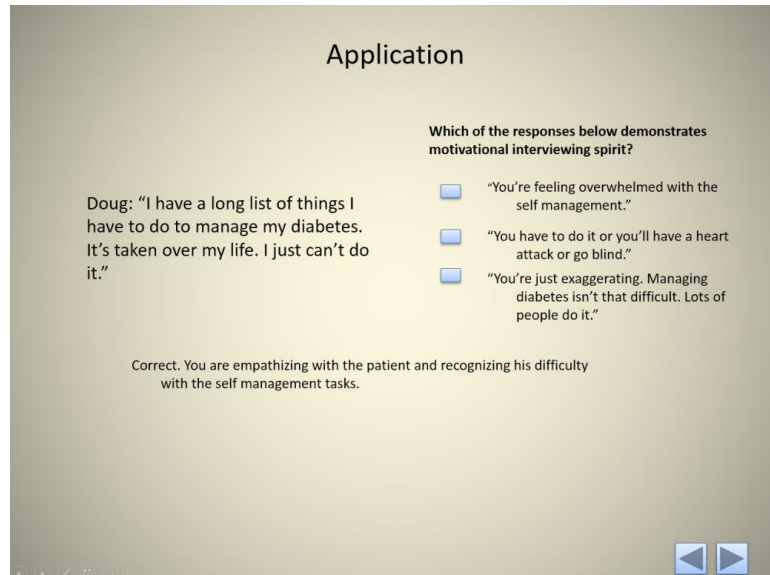
- What happened in the interaction between Karen and Lisa, the NP?
- How did Lisa keep the discussion focused on exercise?
- What was the outcome of the discussion?

Lisa established a positive interpersonal atmosphere. She was able to establish a helpful connection with Karen and a working relationship. Lisa guided Karen to develop healthier behavior.

Application of the component skills in each section took place at the end of the section. A master slide for interaction was created. The student clicked on the square next to the most helpful response. A feedback window opened for both correct and incorrect responses. The student was verbally encouraged to try again if the answer was incorrect. A positive affirmation was offered for a correct answer. Feedback embedded in the application slide was a form of coaching for the students. Multiple application activities were included at the end of each section to provide repetition of the component skills (Pictures 12 and 13).

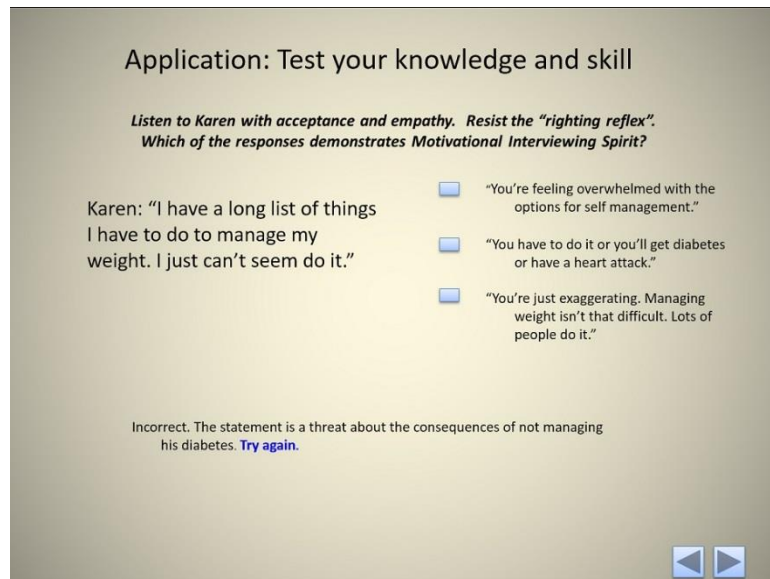
Picture 12.

*Application Slide Displaying Correct Response*



Picture 13.

*Application Slide Displaying Feedback for Incorrect Response*



To finalize the instructional design for the instance, navigation arrows at the bottom of the slides were consistent throughout the instance. Background of the slide was

neutral with black text for stronger visual appeal. The instance was linear in construction with each slide viewed by the student in sequence. Each section of the instance added component skills to increase the complexity.

The final application activity was similar in context to the demonstration of the whole problem at the beginning of the instance. However, the application activity setting was a virtual role-playing simulation. The simulation context was counseling using MI related to childhood obesity. The simulation, called Change Talk: Childhood Obesity (American Academy of Pediatrics, 2014) was open access via the internet or a mobile application. Animated figures and audio of a mother and son discussed the son's weight with their provider. The virtual role-play simulation proceeded with the provider choosing responses to the mother and son. The branching design allows for different responses from the mother and son based on provider's choice of response. Coaching is provided during the interaction based on the student's consistency with MI spirit and techniques via a pop-up box. The student can view progress by watching the change talk meter over the mother's head. Clicking on the bubble also allows the student to read hear the person's thoughts. The goal was to successfully navigate the interaction and set a follow up visit.

### **Enhancing Strategies**

Designing enhancing strategies is the next circle in the Pebble in the Pond model (Merrill, 2013). Strategies to enhance learning are used to provide guidance, coaching, and incorporate problem-solving skills. Structural framework and peer interaction are the enhancing strategies recommended. A structural framework is an organization to assist students to use past knowledge to build knowledge of the new subject. Merrill states that

effective structural frameworks “must contain some elements that are similar to the elements of the target content” (Merrill, 2013, p. 340). For the MI instance, the setting of the patient visit was used as a familiar framework in which interactions took place. Demonstrations, information about, and applications all centered on interaction with the patient in the health care setting.

Mnemonics are also considered structural frameworks. The MI instance employed mnemonics presenting information about communication techniques and recognition of change talk. MI uses the mnemonic OARS for the communication techniques of open-ended questions, affirmations, reflections, and summaries. DARN-CAT is a mnemonic outlining preparatory change talk (desire, ability, reasons, and need) and mobilizing change talk (commitment, activation, and taking steps). Both mnemonics were used as structural frameworks within the MI instance.

Guidance and coaching are enhancing strategies included throughout the instance. Guiding questions were included with demonstrations to help students focus on MI concepts (Pictures 9 and 11). Coaching was provided through feedback and redirection for each response for the application slides (Pictures 12 and 13). Additionally, coaching is embedded in the virtual role-playing simulation.

Peer interaction was not included in the instance. The intent of the instance was computer-based instruction in MI for individual students. In addition, formative design prescribes one-to-one observation and evaluation between the researcher and student. Ideally, the student would be offered an opportunity to interact with peers for role-playing and critique after interacting with the instance.



## **Finalize the Functional Prototype**

Finalizing the functional prototype involved the creation and design of the instance. The prototype was reviewed for any missing components and the learner interface was completed. As previously stated, the chosen interface was a Microsoft PowerPoint. The layout was simple, and design was standardized for the instance. Consistent navigation was designed within the between slides (Pictures 8 and 10). Learner directions were uniformly placed on each slide for consistency and easy access (Pictures 10 and 11). An introduction to the instance was created to describe the content in a video format. A decision to limit each section of the instance to approximately 15 minutes was made by the designer to optimize the learner's attention. The time limit required extra attention to the length of video demonstrations used in the instance.

Although Merrill (2013) specifies the design of the prototype interface as the fifth ripple in the Pebble-in-the-Pond model, some of the design decisions occurred simultaneously as the prototype was developed. Visual and space considerations lead to editing of the content. Video and audio content was decided as the demonstration format prior to the assembly of the instance. Demonstration format had to be consistent with the content, which necessitated verbal and non-verbal communication.

There was a missing component based on Merrill's prescriptions. Peer interaction was not included in the designed instance. The context of the instruction and evaluation as an asynchronous single learner did not allow for inclusion of peer interaction within the instance itself. Ideally, peer interaction could occur outside of the instance, either during a face-to-face meeting, through synchronous communication media, or via

computer-based discussion. A summary of the Pebble-in-the-Pond Model of instructional design appears in Table 8.

Table 8.

*Summary of Pebble-in-the-Pond Model for Instructional Design*

<b>Design Phases</b>	<b>Steps and Conditions</b>
1. Design a Problem	<ul style="list-style-type: none"> <li>• Identify the learning goal</li> <li>• Identify the learner population</li> <li>• Identify a class of problems that achieve the learning goal</li> <li>• Design a prototype problem for demonstration</li> <li>• Design an application problem</li> </ul>
2. Design a Progression of Problems	<ul style="list-style-type: none"> <li>• Identify the component skills to solve each problem</li> <li>• Sequence problems from simple to complex</li> <li>• Create a prototype demonstration for each problem in the progression</li> </ul>
3. Design Strategies for Component Skills	<ul style="list-style-type: none"> <li>• Create a demonstration for each of the component skills</li> <li>• Application of component skills required for other problems in the progression</li> </ul>
4. Design Structural Framework	<ul style="list-style-type: none"> <li>• Choose a structural framework</li> <li>• Include guidance based on framework</li> <li>• Design coaching based on framework</li> </ul>
5. Finalize the Instructional Prototype	<ul style="list-style-type: none"> <li>• Finalize navigation</li> <li>• Finalize interface</li> <li>• Provide supplemental material</li> </ul>
6. Design Assessment and Evaluation	<ul style="list-style-type: none"> <li>• Identify data sources</li> <li>• Conduct formative evaluation</li> <li>• Revise prototype</li> </ul>

**Summary**

The design of the instructional instance using the prescriptions of the First Principles of Instruction (Merrill, 2013) and the Pebble-in-the-Pond model began with the

design of a problem prototype. The problem was a conversation related to weight loss within a health maintenance visit. The situation was a familiar event for the nurse practitioner students. The four processes of MI served as the basis of the progression of problems. Attitude, skills, and techniques build on the previous process to make each problem in the progression more complex. Component skills were defined for each of the four MI processes in the instance. Enhancing strategies were used to provide structural frameworks such as mnemonics, guidance, and coaching during interaction with the instance. The instance was finalized by constructing the instance on a consistent structure while embedding the required demonstrations and applications. Evaluation is the final ripple in the Pebble-in-the Pond module. The results of the formative evaluation for the MI instructional instance are discussed in following chapters.

## CHAPTER V FINDINGS

In this chapter, the research questions are answered by analyzing the design process and outcomes using the instructional design prescriptions of the First Principles of Instruction (Merrill, 2013). Data will be presented for each of four rounds of the study. Changes in the instance during and after each round will be described. The effectiveness, efficiency, and engagement of the design of an instance of instruction in motivational interviewing (MI) for nurse practitioner students is analyzed to answer the research questions.

### **Participants**

The participants in the study were nurse practitioner students enrolled in either a master's level or doctor of nursing practice program in the state of Michigan. There were 22 students enrolled in the study. One participant's Helpful Response Questionnaire failed to be saved on computer for the pretest and posttest. The loss led to the elimination of the participant's data from the analysis. There were five participants in rounds one, two and three. There were six participants in round four. Each round had unique participants.

Demographic data was collected before interaction with the instructional instance. The NP students were 90.5% ( $N = 19$ ) female. The mean age and years of nursing experience are shown in Table 1. Of the participants, only 33.3% ( $N = 7$ ) had past motivational interviewing experience during their course work. Even fewer participants, 9.5% ( $N = 2$ ), had past training in cognitive behavioral therapy.

Table 9.

*Descriptive Statistics for Demographics of Participants All Rounds*

	N	Minimum	Maximum	Mean	SD
Participant age	21	21	61	39.05	12.09
Nursing experience (years)	21	.2	35.0	13.20	10.42

Age and years of nursing experience were similar among the four rounds of the study. In addition, the number of participants in each round with previous MI experience was similar. Demographics by round are shown in Tables 9 and 10.

Table 10.

*Participant Demographics by Round*

	N	Mean Age	Mean Years of Nursing Experience	Previous MI Experience
Round One	5	40.20	16.9	2
Round Two	5	34.40	10.24	1
Round Three	5	39	10.20	1
Round Four	6	42	15.067	3

### **Round One**

#### **Pretest and Posttest Results**

The Helpful Response Questionnaire (Miller, Hedrick, Orlofsky, 1991) was used as a measure of effectiveness for the MI instructional instance. Participants responded by typing a response to six written patient quotations both before and after interaction with the instructional instance. Responses were scored by the researcher. Participant scores ( $N = 5$ ) are reported with data from each round and are summarized for the study overall. The mean scores for round one increased from 10 ( $SD = 4.54$ ) to 12 ( $SD = 5$ ) from pretest to posttest as shown in Table 11. A paired t-test comparison of means,  $SD = 4.72$ ,  $t(4) = -.76$  demonstrated no statistically significant difference ( $p = .49$ ) between the means.

Internal consistency using Cronbach's alpha was 0.68, placing it in the questionable range for round one.

Table 11.

*Descriptive Statistics Helpful Responses Questionnaire Scores Round One*

	N	Minimum	Maximum	Mean	Median	Mode	SD
HRQ Pretest	5	6.00	18.00	10.80	9	9	4.55
HRQ Posttest	5	6.00	20.00	12.40	12	6	5.03

*Note.* HRQ = Helpful Response Questionnaire

### Pretest and Posttest Completion Times

Merrill (2013) defines efficiency in terms of learner time on problem solving. If the instruction is efficient, the learner should be able to solve the problem in less time after interaction with the instructional instance than before. Therefore, time for completion of the Helpful Response Questionnaire was measured for the pretest and the posttest. Descriptive statistics are shown in Table 12. There was a reduction in time for completion from pretest to posttest. However, a paired t-test,  $SD = 1.25$ ,  $t(4) = 1.09$  demonstrated no significant difference ( $p = .337$ , 2-tailed) in completion times from pretest to posttest.

Table 12.

*Completion Times for Helpful Responses Questionnaire Round One*

	N	Minimum	Maximum	Mean	Median	Mode	SD
Pretest time	5	5:05	12:48	8:31	8.08	5.05 <sup>a</sup>	3:05
Posttest time	5	5:04	14:11	7:49	5.57	5.04 <sup>a</sup>	3:51

<sup>a</sup>*Multiple Modes exist. The smallest is shown.*

### Observations

The researcher observed the participant during interaction with the instance. Observations gather information related to efficiency, engagement, and usability of the instance. The observation grid is in Appendix E. Originally, in the design of the instance,

the action buttons allowed text to appear when clicked. The directions stated to click to open the answer then click again to close the answer. However, the participants did not follow through on the second action of closing the text. Text overlapped and was unreadable when the next action button was clicked. The participant had to go back to the first button to close the text. It took additional time and effort to close the text, making the action less efficient.

Application questions appeared at the end of the instance for round one. Multiple choices of response to initial dialogue were offered to the participant to reflect MI spirit. Feedback was offered for each choice. However, participants did not explore the other options if the correct answer was chosen on the first choice.

### **Data from Interviews**

Themes arose from semi-structured interviews with participants conducted after interaction with the instance. Changes in the prototype were based on the themes determined from the majority of the participants in the rounds rather than divergent opinions. The participants responded to standard questions that the researcher expanded on, if needed, for clarification. The open-ended questions were framed on the effectiveness, efficiency, and engagement of the instance. The questions used in the interviews are in Appendix D.

**Effectiveness.** In the initial segment of the instance, participants remarked that effectiveness could have been enhanced by familiarity with the computer used for the interactions and use of the mouse versus a touchpad on the computer. Two of the participants would have liked additional directions before the start of the tutorial or an orientation to the user interface. The technical aspects of the instance interaction

distracted from the content. All participants expressed that the segment was effective. A participant summarized the responses, “I think that it was very effective. It was just confusing to get the handle on the first opening then clicking a second time to get that to close.”

The most valuable component of the instance was the videos. Participants expressed that the videos fit their learning style. The sequence of video demonstration of the whole task then a non-example followed by an example was valuable. The interactivity of the questions with immediate feedback was also a valuable feature of the instance. One participant stated,

I thought the videos were very realistic. I thought the information was very relevant. Um, I liked that there was diversity in the patients that were being portrayed. I thought the length was not too long and not too short.

Two of the participants focused on the pretest and posttest performance. Each suggested that the instance should show the optimal response to the statements on the Helpful Response Questionnaire. One participant stated, “. . . if you did the pretest then gave examples of how you could address each of the situations. That probably would have given me a better idea.”

**Efficiency.** The computer used for the instructional instance had a touch pad. Most of the participants expressed a better familiarity with the use of mouse for navigation. The efficiency could be improved by a familiarity with the computer and navigation used for the instruction. A participant said, “Probably just having more familiarity with the type of computer and the equipment. I think that if it were on my own computer, a program on my own computer, it would be very easy to work with.”



The participants found the directions and icons used for navigation sufficient for efficient navigation. Text directions stated to click to open then click again to close. However, a verbal reminder to close the textbox was required before clicking to open the next textbox.

Videos embedded in the instance were started on the click of the participant on the arrow overlaying the video. The researcher reasoned that the participant would control the start of the video portrayal. One participant communicated that it would be faster and more efficient if the videos started on advancing for the slide.

**Engagement.** Participants expressed the most interest in the video demonstrations. Videos were cited by all the participants as holding their attention. The interactivity of the content within the instance was also named as holding the participant's attention. The interactive buttons and questions were more appealing than reading the information in outline format.

Participants were questioned about motivation for completing the instruction. All the participants stated that the subject matter was very relevant to practice as nurse practitioners. This was cited as the reason for their interest in the subject. Additionally, participants wanted further information about how to formulate responses to patients in clinical practice. Two participants were motivated to learn the content due to a struggle in clinical practice responding to patients. One participant stated,

Yes, because I do want to use it. Because I know, especially looking at Those (pretest) questions that there were some that were pretty easy for me and then There were others that I struggled with. So, and that's pretty real life. I haven't Had those exact words but I have had somebody who beats them. What's really going through your head is probably nothing you want to put on paper.

## Changes in the Instance and Interaction

The instance for round one contained an introduction, a demonstration of the whole problem, as well as content related to MI spirit. Multiple videos were used for examples and non-examples of MI spirit. As formative research is an iterative process, changes were made in the instance and in methods for interaction after each encounter with a participant and at the end of each round. Changes in the instance during round one included correction of typos. Since participants found the scrolling text distracting and difficult to read in the introduction, it was replaced with stationary text. Additional directions were added to each of the interaction slides after the observation that participants did not know what to do. Participants had difficulty with the touchpad on the computer, so a mouse was provided for use. Noting it was difficult to hear the audio in some environments, each participant was given earbuds to listen to the audio if needed. Round one changes to the instance and interaction are listed in Table 13.

Table 13.

### *Round One Changes in Instructional Instance*

<b>Data</b>	<b>Interview (I) or Observation (O)</b>	<b>Change in instructional instance</b>
1. Participants pointed out typos	O	Typos corrected
2. Scrolling text distracting and difficult to read	I	Stationary text used for introduction
3. Did not know what to do with interaction slides	I, O	Additional directions added to the slides
4. Not able to use touchpad, lost cursor, difficulty clicking	O	Wireless mouse provided to participants
5. Difficulty hearing the video conversations due to environmental noise	I, O	New earbuds provided to each participant

## Round Two

For round two of the formative research, the next level of complexity was added to the instance. The MI content for round two, engaging, included the communication skills of open-ended questions, affirmations, reflections, and summaries. Additional videos were added for demonstration. The instance retained the same format of interactive buttons with questions and answers for the content, followed by application questions. Application questions provided immediate feedback to the participant on the choice.

### Pretest and Posttest Results

Participants for round two ( $N = 5$ ) responded to the Helpful Response Questionnaire before and after interaction with the content including the revised MI spirit content and new content on engaging. The mean score from pretest to posttest increased 12.8 points as shown in Table 14. A paired t-test,  $SD = 4.02$ ,  $t(4) = -7.11$ , was performed for a comparison of mean scores. There was a significant increase in scores from pretest to posttest ( $p = .002$ , 2-tailed). Internal consistency using Cronbach's alpha was 0.76, placing it in the acceptable range for round two.

Table 14.

*Descriptive Statistics Helpful Responses Table Questionnaire Scores Round Two*

	N	Minimum	Maximum	Mean	Median	Mode	SD
HRQ pretest	5	6.00	20.00	11.20	10	6	5.93
HRQ posttest	5	21.00	28.00	24.00	23	23	2.65

### Pretest and Posttest Completion Times

As a measure of efficiency, completion times were recorded for completion of the Helpful Response Questionnaire for the pretest and posttest for round two. As shown in

Table 15, mean times were similar. A paired t-test,  $SD = 1:09$ ,  $t(4) = .558$ , demonstrated no significant difference ( $p = .61$ , 2-tailed) in times from pretest to posttest.

Table 15.

*Descriptive Statistics Pretest and Posttest Completion Times Round Two*

	N	Minimum	Maximum	Mean	Median	Mode	SD
Pretest time	5	6:54	10:41	8:37	7.46	10.41	1:54
Posttest time	5	7:04	9:25	8:20	8.04	7.04 <sup>a</sup>	1:00

<sup>a</sup>*Multiple modes exist. The lowest is displayed.*

### **Observations**

Direct observation of the participants was completed during the interaction with the instructional instance. As in round one, once the correct response was clicked on the application items, the participants did not explore any other options with feedback. For round two, text for the action buttons was realigned so that the text boxes did not overlap. Despite the directions to click to open the answer then click again to close the answer, none of the participants followed through on the second action of closing the text. The use of a mouse for computer navigation almost eliminated difficulty with clicking on buttons and arrows. The cursor with inactivity of the mouse disappeared. Participants had to shake the mouse for the cursor to appear. However, participants were able to interact with the instance with less frustration than with the touchpad and did not have to perform a second action to close the text.

During round two, a software update was applied to Microsoft PowerPoint. As a result, there was a change in how video was embedded. Links were lost to the externally sourced videos. The researcher had to access the videos via an internet browser for two of the participants. Listening to the audio portion of the instructional instance was improved by the use of earbuds.

Two videos of the same situation, one a non-example and one an example, were used in round two. Participants began to fidget and lose interest during the non-example video. The participants, during viewing, commented to the researcher during the interview that it was painful to watch the non-example. One participant remarked during the interview that, “We all know what bad is”.

### **Data from Interviews**

**Effectiveness.** The participants all liked the video demonstrations in the instance. The effectiveness of the videos was enhanced if the duration was less than 10 minutes and targeted to the content. The non-example was thought not to be as effective as the example of what not to do. One participant commented,

Hearing the bad was like excessive at first but there are bits and pieces that I use when I talk to patients and I know that other providers have used talking to me. We try not to but there are still the slip-ups that are good to hear in the bad video.

The examples of MI were thought to be most effective to the participants. Another participant said, “I kind of know the negative stuff is bad. The positive examples give me more of an idea of how to word certain things. Seeing it over different ways helps more, I think”.

**Efficiency.** Participants found the navigation straightforward and easy to understand. The video examples required the participant to click to start. The participants saw the delay as an inefficiency. It was also commented by one participant that she was unsure if the video was over and whether she should advance the slide. The loss of the cursor during inactivity was also commented on as an inefficiency.

Instructions were consistently placed on the slide. However, participants admitted that they did not always read the instructions before interacting with the slide. One participant summarized the efficiency comments for round two,

The navigation was fine. Everything was straightforward what to do. There Was one, I forget which part it was, but I got hung up because the instructions weren't clear on what do. I think it was one with a description on the side and there were three . . . Oh, it was the first time we did like there were three options and each time you clicked on a new description popped up on the bottom. I was kind of confused at first about what was expected. So, I guess, that was really like the only thing that slowed me down.

**Engagement.** The participants indicated that the instance held their attention. It was remarked that the instance added content that built upon the previous section. The interactivity and mixture of activities was appealing. A participant responded, "It all seemed to build on each other. You would start with one video that explained the OARS, then you went through each part of that. So, it kept building on each other. That's what made me want to finish it".

As in round one, participants cited the relevance to practice as their motivation to learn MI. Some participants expressed a desire to follow the patients seen in the videos. The desire was to see whether the patient was able to make changes based on the interaction seen in the video and how to formulate new goals. One participant expressed, "This is going to be helpful to my practice. It's going to help me motivate my patients and really feel what their situation is, what their environment is and it's just . . . It's really helpful to me. It's not abstract".

### **Changes in the Instance and Interaction**

Changes were made to the instance during round two based on the observations and interviews with the participants. The videos were re-embedded by a different

procedure as dictated by the Microsoft PowerPoint software update. The videos were stable for the last two participants in round two. Some of the videos were deleted or substituted. A streamed video was removed due to commercial advertisements within the video. A decision was made to use examples rather than non-examples based on participant feedback. Rather than repeating one video for the participants to identify the OARS components, a different video was inserted.

Typos, grammar and inconsistencies were corrected in an oncoming effort throughout round two. The shapes of the buttons were changed based on the function of the slide. For example, if the slide was content based with questions and answers, the buttons were round. If the slide was an application slide, the buttons were square. Participants expressed a desire for a distinctive button based on the function.

At the end of round two, the closing of text boxes was entirely eliminated. The instructions were changed to include only the opening of the information. Instructions were centered and in red on the slide. The sequencing of the slides were re-aligned so that video was interspersed with interactive content. The videos were not placed together. A clear beginning and end of each segment was designated. Titles and text were applied to the slides to identify when a section began and when it ended. A summary of the changes to the instance and interaction at the end of round two are in Table 16.

Table 16.

*Round Two Changes in Instructional Instance*

<b>Data</b>	<b>Interview (I) or Observation (O)</b>	<b>Change in instructional instance</b>
1. Videos not stable; unable to view in the PowerPoint framework	O	New embed procedure used
2. Commercial advertisements accompanying video	O	Removed and replaced video example

<b>Data</b>	<b>Interview (I) or Observation (O)</b>	<b>Change in instructional instance</b>
3. Video repetition not appealing	I, O	Different video used for application exercise
4. Typos and grammar errors	O	Correction of spelling and grammar
5. Function should be indicated by a different interactive button	I	Buttons changed to be consistent with function: round for content interaction, square for application exercises (quiz)
6. Participants disliked having to close textboxes to see the next interactive text box	I, O	Eliminated closing textboxes, positioned textboxes not to overlap when open
7. Participants not able to locate instructions quickly	I, O	Instruction written in red on the slide to stand out to participants.
8. Participants started to lose attention with consecutive videos	O	Interactive slides interspersed with video demonstrations
9. Participants not able to determine where a section begins and ends	I	Slide added to indicate the beginning and end of a section.

### **Round Three**

Round three added content for focusing and evoking. The content built upon the MI skills in the engaging section to add information about directing the conversation and allowing the motivation and choices for change to arise from the patient. The same format was used for the interactive content, demonstration videos, and application questions. The participants viewed 3 sections of the instance for round three including MI spirit, engaging, and focusing and evoking.

### **Pretest and Posttest Results**

The participants in round three (N = 5) responded to the Helpful Response Questionnaire before and after interaction with the instructional instance. The mean score



from pretest to posttest increased 5.6 points as shown in Table 17. A paired t-test,  $SD = 1.52$ ,  $t(4) = -8.26$ , was performed for a comparison of mean scores. There was a significant increase in scores from pretest to posttest ( $p = .001$ , 2-tailed). Cronbach's alpha for round 3 was .852, placing it in the good range for internal consistency.

Table 17.

*Descriptive Statistics Helpful Responses Questionnaire Scores Round Three*

	N	Minimum	Maximum	Mean	Median	Mode	SD
HRQ pretest	5	6.00	11.00	7.20	6	6	2.17
HRQ posttest	5	11.00	15.00	12.80	12	11 <sup>a</sup>	2.05

<sup>a</sup>Multiple modes exist. The smallest value is shown.

### **Pretest and Posttest Completion Times**

As a measure of efficiency, completion times were recorded for completion of the Helpful Response Questionnaire both for the pretest and posttest for round three. As shown in Table 18, mean times were similar. A paired t-test,  $SD = 2:30$ ,  $t(4) = -.469$ , demonstrated no significant difference ( $p = .66$ , 2-tailed) in times from pretest to posttest.

Table 18.

*Descriptive Statistics Pretest and Posttest Completion Times for Round Three*

	N	Minimum	Maximum	Mean	Median	Mode	SD
Pretest time	5	5:38	20:18	9:50	7:42	5:38 <sup>a</sup>	5:57
Posttest time	5	4:48	24:44	10:22	6:32	4:48 <sup>a</sup>	8:12

<sup>a</sup>Multiple modes exist. The smallest value is shown.

There was one participant whose times were outliers with a pretest time of 20 minutes and 18 seconds and a posttest time of 24 minutes and 44 seconds. The range of completion times for other participants pretest were a minimum of five minutes and 38 seconds and a maximum of eight minutes and 18 seconds and posttest completion times

with a minimum of four minutes 48 second and a maximum of nine minutes and 27 seconds.

### **Observations**

Observations of participants during interaction with the instructional instance revealed needed content changes. Corrections were needed in font size and all slides of similar function to standardize. Templates required adjusted for consistency among slides. Video slides contained an inconsistent number of reflection questions. The video slides needed standardization to contain only two reflection questions to avoid crowding the slide and decrease distraction from the video demonstration.

Instructions were consistently placed on each slide with the same size text and font. However, some participants still required verbal direction to advance slides and click on interactive objects. Participants admitted that they did not read the instructions before asking for guidance. Participants did not consistently make a second selection if the incorrect option was chosen on application questions. A verbal prompt was required to make second selection.

The duration of some of the videos added to the instructional time and detracted from participant engagement. Participants began to fidget and lose concentration. Shorter more focused videos to demonstrate the content were needed to optimize engagement of the participants.

### **Data from Interviews**

**Effectiveness.** The participants expressed divergent views on improving the effectiveness of the instruction. One participant had difficulty understanding how to answer the application questions. It was not clear to the participant whether with question

addressed a specific aspect of MI or a more global concept. In order to understand how to answer the application questions, the participant had to re-read the stem of the application question.

Another participant thought that a longer introduction with background information would have improved the effectiveness of the instruction. A definition of motivational interviewing, an outline of the components, and the contents of the tutorial should have been included in a longer introduction. The participant expressed, “I mean, throughout the presentation it was explained really well, and by the end, I felt I knew what it was. But, it also would have been helpful to have that definition, you know, more of a breakdown of it, right at the start.”

Three participants thought the videos were the most effective part of the instance. The visual and auditory nature of the videos helped the participants to understand the process and techniques of MI. The participants visualized themselves being a part of the conversation and were anxious to know how to respond. One participant summarized the reaction,

I like the video. Since it emphasized what I was reading. When you read about a material you want to see an example of it. And not just by getting an answer, so I like the ways, you know, you tell me what it is. What evoking is, you give me what evoking is. But also an example. An example is how you can use it with the patient. I like the videos because I can picture myself as asking those questions. And also how some patients react, I was like, “Wow”.

**Efficiency.** The participants found navigation of the instance easy to understand. Various suggestions were made for the placement of instructions. In addition, font recommendations were varied from a distinct color for the instruction to placement at the left side of the slide. Participants remarked that having to click on interactive features

took more time, making it was slower to move through the instance. However, the participants felt that the interactivity outweighed the time it took to click on interactive features within the instance. As in previous rounds, the cursor disappeared on the computer during inactivity. The time to find the cursor was remarked on by the participants as an inefficiency.

As the tutorial built on previous content, the number of videos increased. The participants commented on the length of the videos. Non-examples of MI were not seen as helpful in learning MI. The recommendations were for videos that demonstrated the particular content but limited in duration.

Well, I think the videos were very nice, but I think some of them were long and some of the information irrelevant for what I needed to learn. So maybe, to shorten . . . it's hard but shorten the video to what's relevant to that specific information that we need to know.

**Engagement.** All participants found the videos held their attention. Videos were viewed as demonstrating techniques but also demonstrating the patient's reaction. "You can be the best interviewer around and you're still going to learn something from those (videos)".

Participants were motivated to complete the instance because of its relevance to clinical practice as a nurse practitioner in primary care. Participants viewed the instance as a means to improve their patient care. "I see a lot of things in there for me to work on and do better with. It will definitely make you a better listener and clinician".

### **Changes in the Instance and Interaction**

Fonts and templates were edited during round three for consistency in presentation. Slides with similar interactivity and type of content were made consistent in look and navigation if discrepancies were found during the round. Instructions were all

placed to the right over the interactive content for uniformity. The text was black and bolded. Corrections were also made to spelling and grammar in a continuous effort. As noted in observations, participants did not consistently choose a second option on application questions if the wrong answer was chosen initially. The words “Try again” were added to feedback on the application questions to prompt participants to choose another option.

Feedback from participants related to the duration and type of the videos resulted in changes to the video content. As the content increased, the duration of the instance was a concern to the participants. A longer smoking cessation video was replaced by a more targeted, shorter video of use of MI for improvement in oral health. Non-example videos were eliminated except in the first MI spirit section. Reflections adjacent to the video demonstrations were limited to no more than two per slide for consistency and efficacy. In a further effort make the best use of student time on task, some redundant content slides were eliminated to shorten the tutorial overall.

For the divergent views of the tutorial, changes were considered based on the priorities established at the beginning of the design process (Appendix F) and the feedback from the majority of the participants. A lengthy introduction to the subject matter, would be inconsistent with the First Principles of Instruction. In my experience as faculty for nurse practitioner students, a lengthy introduction results in the student inattention, for most NP students.

One student had difficulty answering questions by reading the text. Providing audio with the text, may have improved the interaction for that student. However,

financial and time resources did not allow for the addition of both audio and text application slides. Round three changes are summarized in Table 19.

Table 19.

*Round Three Changes in Instructional Instance*

<b>Data</b>	<b>Interview (I) or Observation (O)</b>	<b>Change in instructional instance</b>
Inconsistencies in font, templates and formatting	O	Corrections made in font, templates and formatting on a continuous basis
Participants did not make a second choice after choosing an incorrect answer on the application questions	O	Words added to pop-up box to “Try Again”
Participant non-verbal cues of inattention during longer videos	O	Videos edited to shorter video focused on particular aspect of MI
Redundant content slides	I,O	Slides with redundant content eliminated.

**Round Four**

Round four added content related to planning in MI. The closing section was formatted based on the previous sections of the instance and the data provided by the participants. A final application exercise was also incorporated at the end of the fourth section. The round four instance included MI spirit, engaging, focusing and evoking, and planning sections.

**Pretest and Posttest Results**

The participants in round four (N = 6) responded to the Helpful Response Questionnaire before and after interaction with the instructional instance. Table 20 shows the descriptive statistics for the Helpful Response Questionnaire both pretest and posttest. A paired t-test,  $SD = 3.31$ ,  $t(5) = -3.78$ , was performed for a comparison of mean scores.

There was a statistically significant increase from pretest to posttest in mean scores ( $p = .016$ , 2-tailed). Cronbach's alpha for round 4 was .836, placing it in the good range for internal consistency.

Table 20.

*Descriptive Statistics Helpful Responses Questionnaire Scores Round Four*

	N	Minimum	Maximum	Mean	Median	Mode	SD
HRQ pretest	6	7.00	18.00	12.17	12	7	4.75
HRQ posttest	6	12.00	20.00	17.00	17.5	20	3.22

### Pretest and Posttest Completion Times

As a measure of efficiency, completion times for both pretest and posttest were recorded for the Helpful Response Questionnaire in round four. The mean time for posttest completion decreased as compared to pretest completion time, as shown in Table 21. Five of the six participants took less time to complete the posttest and the pretest. However, a paired t-test,  $SD = 3:02$ ,  $t(5) = 1.834$ , demonstrated no significant difference ( $p = .126$ , 2 tailed) between time for completion from pretest to posttest completion.

Table 21.

*Descriptive Statistics Pretest and Posttest Completion Times Round Four*

	N	Minimum	Maximum	Mean	Median	Mode	SD
Pretest time	6	6:39	13:21	10:39	11:10	6:39 <sup>a</sup>	2:24
Posttest time	6	6:01	12:52	8:22	7:27	6:01 <sup>a</sup>	2:35

<sup>a</sup>Multiple modes exist. The smallest value is shown.

### Observations

Observations were completed during interaction with the instance. Observations guided changes made during round four. Participants needed minimal direction to interact with the instance. Navigation was completed without verbal prompts for most features.

Some delay in the interaction was again caused by the cursor disappearing during inactivity.

Participants began to shift in their seats during latter part of the instance. Loss of attention was most prominent during longer video demonstrations. The interactive features did seem to hold the participants' attention.

The addition of the words "Try Again" was effective in prompting participants to make a second selection if the first answer on the application question was incorrect. No participants explored other options if the correct answer was chosen initially. Despite consistently placed and formatted written directions, some participants required verbal prompts to click on the object to reveal an explanation of the object.

### **Data from Interviews**

**Effectiveness.** Participants commented that the time to complete the entire four sections of the instance was too long. The preference was for the four sections to be split into separate units. Each unit could be completed episodically. However, one participant thought that the instruction would not be as effective in shorter sections. Participants valued the interactive slides. One of the participants stated, "I like doing more hands on and more interactive work instead of just watching videos". Recommendations were to eliminate a video demonstration rather than the interactive slides to shorten the sections. Another participant commented, "It felt a little bit long, too. So towards the end I was kind of losing focus."

As the final application activity, each participant in round four interacted with *Change Talk: Childhood Obesity*, an interactive training virtual training simulation developed by the American Academy of Pediatrics Institute for Healthy Childhood



Weight and Kognito (American Academy of Pediatrics, 2014). The participants appreciated the opportunity to interact in the virtual simulation using the techniques from the instance. A participant commented, “I liked the questions that prompted responses to kind of apply the learning to it. It helped to see the knowledge get played out into it”.

**Efficiency.** The length influenced the efficiency of the instance. As previously stated, the length of the instance detracted from learning. A participant stated, “I’m not sure what would make it faster necessarily. Because, I think it was just the length of the individual videos”.

The navigation within the instance was clear to the participants. However, the participants admitted to not reading the instructions consistently. The instructions to the virtual training simulation were found to be confusing. Participants expressed a preference for having the virtual environment verbally explained rather than reading the diagram with words. A participant remarked, “If you verbally go over the instructions, it’s instantaneously good for the last one”.

**Engagement.** As in previous rounds, the participants were engaged in the subject matter because of its relevance to clinical practice. Participants expressed a desire to be more effective in their conversations with patients about health-related behavior change. There was an acceptance of the efficacy of MI as a clinical technique. A participant stated,

I think just the fact that I see a lot of negative behaviors and resistance to change. And I also see a lot of, you know, like road blocking in my own attitude with patients, especially over time. It’s easy to with the righting reflex and, you know, it’s easy to fall into that as a future provider. I think knowing that this is very applicable to my future practice is what kept me focused.

The participants also expressed a realization that skill at motivational interviewing would take practice. A participant responded, “One of the reasons I did this is because I’m interested in learning more about motivational interviewing. I’ve kind of bought into the efficacy of it. It’s just a matter of doing it”.

### **Changes Made During Round Four**

As round four progressed, improvements in the instance continued. The introduction was replaced with a road map to the entire content as well as an introduction to MI. The need for each content item was re-evaluated and the instance was edited to no more than one hour in length. The number and length of some videos were also reduced. Comments from participants about the length of time to complete the instance decreased by the end of round four. From a suggestion offered by a participant, a summary of content was added at the end of each section. Later participants found the review of the content helpful.

### **Answer to Research Question One**

Research question one: How could the First Principles of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?

#### **Effectiveness**

This formative research revealed a deficient in the design process and prescriptions of the First Principles of Instruction. The first round of the instructional instance did not result in a statistically significant increase posttest scores. The demonstrations, interactive content, and applications were not adequate to improve the NP student responses on posttest.

The first round of the instance included content related to MI spirit. MI spirit is the “heart-set and mind-set” underlying the communication style (Miller and Rollnick, 2013, p. 14). The practitioner of MI experiences and behaves in congruence with the four aspects of MI spirit, partnership, acceptance, compassion, and evocation. MI spirit is strongly linked to patient change talk and increases the likelihood of behavior change (Moyers, Miller & Hendrickson, 2005; Miller & Rose, 2009; Moyers, 2014). In fact, Moyers (2014) posits that the interpersonal relationship between the provider and patient is a healing ingredient. Providers that are not able to adopt MI spirit are ineffective despite their use of other MI techniques and skills. “In particular, individuals who lack a facility for imagining and conveying the perspective of another are unlikely to prosper in their use of MI” (Moyers, 2014, p. 361).

MI spirit is in the affective domain of learning. Affective content is not specifically addressed by the First Principles of Instruction. Merrill (2013) prescribes specific instructional strategies based on five component skills, information about, parts-of, kinds-of, how-to, and what-happens. Component skills in the affective domain are not addressed. The nearest example provided by Merrill (2013) is the instructional strategies for content related to a helping relationship in job counseling. The helping relationship content is broken into component skills and presented as behaviors such as verbal responses. As Moyers (2014) stated, MI spirit is more than the skills and techniques of MI. There is a gap in the instructional strategies and design process of the First Principles of Instruction for affective content.

Data from interviews in round three and four recognized a decrease in effectiveness due to the number of demonstration videos in the tutorial. In addition,

interview data revealed examples were more desirable than non-examples for MI demonstrations. The design process specifies demonstrations for each new component skill and each of the possible reactions to provider responses. However, Merrill (2013) indicates that though additional instruction for all situations could be used, it may be viewed as redundant and unnecessary by learners. The use of the demonstrations is left to the experience of the designer. The prescriptions of the First Principles of Instruction and the Pebble-in-the-Pond model do to give guidance on what can be left out of the instructional instance.

### **Efficiency**

The measure of efficiency, according to Merrill (2013), is the time required to solve a problem after instruction. If instruction is efficient, the learner should take less time solving the problem after instruction. The measure of efficiency for this formative research was the comparison of the mean time required to complete both the pretest and the posttest. There was no significant difference between pretest and posttest times in all four rounds.

In observing the NP student while taking both the pretest and posttest, I noted that the NP students took time to think about the response during the posttest. Despite having read the patient scenarios on the pretest, the students took time to develop a response. The MI techniques were not routine to the NP students. It required time to formulate an appropriate response based on the instruction. The missing element in Merrill's definition of the efficiency is consideration for the quality of the solution. In addition, it can take just as much time to have an MI inconsistent discussion with a patient than an MI consistent discussion. The outcome of the discussion is the primary consideration.

### **Answer to Research Question Two**

Research question two: How could the First Principles of Instruction have been more useful in designing the instruction in motivational interviewing to be engaging to the NP students who participated in this study?

Students were engaged by the subject matter because of the relevance to clinical practice. The demonstrations and situations used in the instance were chosen to be applicable to the settings in which the NP students practice as recommended in the First Principles of Instruction. Activation of previous mental models and experience was the source of the initial engagement for the NP students. The motivation of the NP students to help their patients lead to persistence in their engagement and desire to learn more about MI. No gaps were identified in the usefulness of the First Principles of Instruction and the Pebble-in-the-Pond model for engagement.

### **Answer to Research Question Three**

Research question three: Does knowledge of motivational interviewing in NP students participating in this study increase from before to after instruction designed using the First Principles of Instruction?

The measure of effectiveness for the instructional instance was the Helpful Response Questionnaire and interview data. Posttest scores showed a statistically significant increase from pretest scores for rounds two, three, and four of the instances of instruction. Mean posttest scores were significantly higher after three of the four rounds of prototype testing. The statistically significant increase in scores indicated that the NP students improved their responses to be more consistent with MI practice. The first section of the instance, MI spirit, did not have a statistically significant increase in the

scores from pretest to posttest. Although the attitude of MI was demonstrated and applied by the NP students, they did not yet know the techniques of MI to apply to the patient comments on the Helpful Response Questionnaire. Information about MI spirit was not enough to demonstrate it in the responses to the patient. The techniques of MI were needed to enact MI spirit in the responses.

In interviews, NP students regarded the instructional instance as effective. They liked the interactive format and the variety of activities. Some NP students expressed a desire to have examples of responses to the Helpful Response Questionnaire. The demonstration of the whole task or individual processes of MI were not viewed as sufficient in answering the patient statements on the posttest. In this setting, the NP students expressed a desire for instruction to the better answer the test questions.

### **Summary**

This formative research generated data from testing, observations, and interviews. Gaps were identified in the prescriptions and design processes of the First Principles of Instruction. First, affective content was not specifically addressed in the instructional strategies. Second, little guidance was given to the novice designer as to which demonstrations, examples and non-examples can be eliminated without influencing the outcome of effectiveness. Finally, based on the definition of Merrill (2013), the instructional instance for MI was not efficient. The gap lies in the application of the timing in the context of a counseling technique such as MI without consideration of the outcome of the counseling.

## CHAPTER VI DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

Chapter VI consists of a discussion of the research findings, implications for nurse practitioner education, and the recommendations for the First Principles of Instruction. Recommendations for future research are also presented. The goal of this chapter is to examine the findings as they relate to the subject matter, prescriptive instructional framework, and nurse practitioner education.

### **Discussion**

The purpose of formative instructional research is to improve instructional design theories (Reigeluth & Frick, 1999). In this research, an instance of the First Principles of Instruction was created on the subject matter of motivational interviewing (MI). The context of the instruction was nurse practitioner (NP) education. The instance was presented as computer-based instruction. The Pebble-in-the-Pond process of instructional design was applied using the templates and guidance provided by Merrill (2013). The outcomes measured were indicators of instructional efficiency, effectiveness, and engagement. Multiple methods of data collection were used including pretests and posttests, observations, timing, and semi-structured interviews with the participants.

MI as subject matter was difficult to capture in computer-based instruction. The techniques and examples as well as application exercises were provided to the NP students. However, MI in the clinical setting requires a blending of attitude, nonverbal behaviors, and verbal responses. Formulation of verbal responses is more difficult and requires a quicker response time than choosing a written response on an application exercise. The computer-based learning environment did not allow for realistic practice. Even the virtual simulation presented the students with written responses to from which

to choose. Practice outside of the computer-based instance is required to gain beginning proficiency in MI.

The instructional design was effective in all but the first round of the research. The first round of research addressed the affective component of motivational interviewing, MI spirit. Use of the prescriptions of the First Principles of Instruction and the Pebble-in-the Pond model (Merrill, 2013) did not result in statistically significant improved scores on the Helpful Response Questionnaire (Miller, Hedrick, & Orlofsky, 1991). The First Principles of Instruction do not specially address the affective domain of learning.

Efficiency, as defined by Merrill (2013), is the ability to complete a task in less time after instruction than before instruction. Participants in this research were not able to complete the posttest in significantly less time than the pretest. Merrill's definition of efficiency does not seem applicable to communication techniques. Efficiency in communication is not necessarily reflected in the time to complete the communication. The outcome of the communication as well as the time required to complete the communication are factors in efficiency. In fact, an NP using traditional communication techniques could take longer to argue for change in the patient's behavior than using motivational interviewing techniques.

Engagement is persistence in completion of the instruction as well as persistence in solving the problem (Merrill, 2013). In addition, engagement is the motivation of the learner to seek additional instruction on the same subject matter. The participants in this research were motivated to learn the subject matter because it was directly related to their clinical work. The MI subject matter was valued by the NP students as a method of



achieving better patient outcomes. It was another clinical skill to be learned on their journey to be a nurse practitioner in primary care.

In the past, NP education research has focused on student reaction and knowledge acquisition using various technologic media (Corbridge, Robinson, Tiffen, & Corbridge, 2010; Lancaster, Wong, & Roberts, 2012; Stiffler, Stoten, & Cullen, 2011). Instructional design theories are seldom used to design the instruction. Rather, theory is used to explain learning or serve as a theoretical point of view. This research applied a prescriptive instruction design theory to the design of instruction. Multiple data points included interviews with participants, observation during interaction with the instruction as well as a pretest and posttest. The pretest and posttest was not merely a test of knowledge about MI. Rather, the test required the participant to construct a response to a statement that combined both the attitude and techniques of MI.

The benchmark randomized controlled trial for MI training demonstrated higher MI proficiency among participants who received coaching and feedback on performance (Miller, Yahne, Moyer, Martinez, & Pirritano, 2004). Subsequent research supported the findings that additional peer coaching and feedback result in increased provider proficiency with MI (Fu, et al., 2015). Unfortunately, this research focused on the application of an instruction design theory, the First Principle of Instruction (Merrill, 2013) to an educational module for individual use. The module did not include interaction with peers for practice or coaching within the module. Coaching and feedback over time would have to occur after completion of the module.

The First Principles of Instruction (Merrill, 2013) was derived from multiple instructional design theories and research about how people learn. The Pebble in the Pond

module prescribes the steps and design features that the instructional designer follows to result in instruction that is effective, efficient and engaging. Merrill (2013) includes tools and instructional sequencing for several types of component skills. These types of component skills include information-about, parts-of, kind-of, how-to and what-happens (Table 6). Component skills then are arranged into a problem-solving instructional strategy. In this study, the counseling technique of MI was broken down into component skills and sequenced to form a problem-solving instructional event. Complexity was added to the instruction by including another phase of the MI process prior to the next round of data collection. The formative research design, used in this study, is meant to inform the First Principles of Instruction, as applied in the context of NP education and with MI as the subject matter.

### **Recommendations for the First Principles of Instruction**

#### **What Worked**

Design of the instructional instance was accomplished using the prescriptions and template provided by the Pebble-in-the-Pond model. The templates guided the design step by step. Deciphering the meaning of the notations initially was challenging. A notation such as  $DO_{id-C}$  is not immediately identifiable as identifying kinds-of conditions for a problem-solving event. However, once the definitions were decoded, the design went smoothly for the entire MI instructional instance. The pretest and posttest score comparison demonstrated overall effectiveness for the instructional design.

Motivation to learn the subject matter was based on the belief that MI is a clinical skill needed to be a good NP. The demonstrations and implementations used clinical situations common in NP primary care practice, thus, increasing the relevance of the

subject matter and increasing the engagement of the NP students. NP students wanted to learn the techniques and apply them in clinical practice. MI was viewed as a method to improve patient health outcomes. Engagement was largely connected to the subject matter rather than the design of the instance. Engagement data from the subjects in this study cannot be generalized to all NP students. Subjects who volunteered would have been expected to be interested in the subject matter.

### **What Did Not Work**

Merrill's definition of efficiency was inadequate when applied to a communication technique such as MI. The time required to complete communication with a patient is not the most important consideration. Rather, the outcome of communication between patient and provider is the most important aspect. Patient behavior change is why MI is used in clinical practice. Adherence to the principles and practices of MI is more important in behavior change than duration of the conversation. In addition, from observation of the subjects while completing the posttest, subjects took time to think and craft the responses to the patient comments included in the Helpful Response Questionnaire (Miller, Hedrick, & Orlofsky, 1991). It would be expected that posttest time would be shorter based on the subject having read the patient comments during the pretest. This was not consistently demonstrated in the results of this study.

The duration of the instance was a concern in this study. As sections were added to the instance, the duration of the instruction increased. A limit was set of 60 minutes by the researcher for the entire instance. The researcher noted from observation during interaction with the instance that subjects became more inattentive after 60 minutes. The decision was also made so that each section could be completed in no more than 15

minutes. The researcher shortened the instance by changing demonstrations and eliminating content based on post-encounter interviews with the subjects. Subjects admitted that they would be more likely to complete the tutorial in sections rather than interacting with the entire instance for an hour. Interviews also revealed that subjects would like to view sections of the instance more than once.

Scores on the Helpful Response Questionnaire were not statistically higher on posttest after the first section about MI spirit than pretest. There are several possible reasons for the results. First, MI spirit is in the affective learning domain. Merrill (2013) does not specifically address techniques for the affective domain. In a demonstration of a friendly greeting, Merrill equates overt behavior such as a hand shake and a verbal greeting with being friendly. Schultz (2009), in the Schultz Model of Affective Teaching-Learning in Nursing Education posits that observed behavior is only a small part of learning in the affective domain. In addition, instructional strategies for the affective domain are different from those used in the cognitive and psychomotor learning domains. The use of storytelling, reflection, and writing are most often used as teaching strategies in the affective learning domain (Schultz, 2009). Non-instructional strategies such as role modeling also influence attitudes and values. Affective development as an NP takes time. The affective component of MI, MI spirit, may require more teaching than a single instructional instance can provide and may need to incorporate instructional strategies beyond computer technology for full development.

Secondly, Merrill (2013) uses the terminology, problem solving, for the type of learning framework used by the instructional designer. The terminology, problem solving, is inconsistent with the fundamental attitude of MI as the subject matter. The

affective component of MI, MI spirit specifies an attitude that is opposed to solving the patient's problem. The righting reflex in MI is the health care provider's impulse to fix what is wrong with the patient or solve the patient's problem for him. MI encourages the health care provider to allow the patient to solve his own problem while being the guide. As an instructional designer, it is difficult to use a problem-solving framework to teach NP students not to solve the patient's problem. It is a fundamental contradiction. The problem-solving framework is better suited to providing in the cognitive and psychomotor learning domains.

Finally, NP students, as registered nurses, have accepted the helping role of nursing. The goal of hospital nursing is to resolve the patient's acute health problems and return the patient home. The righting reflex is deeply ingrained. The difficulty for the primary care NP students is adopting MI spirit. The NP students must change their attitude and values to be effective in the use of the techniques of MI. In addition, current influences within primary care promote achievement of quality metrics such as smoking cessation. Primary care practices are given incentives for achievement of the quality metrics. The primary care providers feel compelled to change patient behavior. It is difficult to understand and accept patient ownership of the health outcomes when monetary reimbursement depends upon it. Acceptance of MI spirit as a means of achieving quality goals seems to most NP students as in conflict with the reimbursement system. The righting reflex is particularly problematic if there is a lack of role models in clinical practice. In post tutorial interviews, NP students still discussed fixing the patient's behavior rather than acting as a guide in collaboration with the patient.

### **Improvements to the Pebble-in-the-Pond Model**

The Pebble-in-the-Pond model (Pebble) of instructional design guides the instructional design process while applying the First Principles of Instruction (Merrill, 2013). The Pebble-in-the-Pond model is conceptualized as six ripples of concentric circles. The first ripple of the model begins with the identification and design of a whole problem that the learners will be able to solve following instruction. The problem sits at the center of the concentric circles which illustrate the model.

In the case of this MI instruction, the problem was a typical health related behavior change situation that would be encountered in practice as an NP in primary care. The model's terminology of solving a problem is contradictory to the principles of MI. Instead, the NP student would be expected to adopt the attitude, MI spirit, and use the techniques of MI to guide the patient to make her own plans and set her own goals for behavior change. Depending on the patient's readiness to make changes, the encounter may end in a commitment to behavior change or an agreement to discuss behavior change again at the next visit. The patient's behavior may or may not change even if the NP student uses MI spirit and techniques proficiently. The concept of problem-solving is not universal for all instruction. Many nurse practitioner practice situations have more than one solution. Problem-solving is particularly difficult to apply in the affective domain of learning. Affective learning is a developmental process that "evolves as the student matures and is challenged to engage with ideas that call values into question" (Schultz, 2009, p. 218). Thus, adopting MI spirit while participating in a behavior change discussion with the patient is more than a problem to be solved.

The next ripple of the Pebble-in-the-Pond model is to design a progression of problems. The progression involves problems that increase either in the number of skills used, the complexity of the problem solving, or the difficulty in solving the problem (Merrill, 2013). In the designed instance of this research, the MI content determined the progression of problems. Developing the progression of problems was the most time-consuming ripple in the Pebble-in-the-Pond model. Fundamental to MI is underlying attitude of the provider, MI spirit. Miller and Rollnick (2013) also sequence MI into the phases of the behavior change process, engaging, focusing, evoking, and planning. The four segments of the designed instance are MI spirit, engaging, focusing and evoking, and planning. However, there are feasible alternative progressions such as the patient's readiness to change or the complexity of the behavior change itself. The model gives no guidance on the most effective progression based on subject matter.

The design of strategies to teach component skills is the third ripple in the Pebble-in-the-Pond model. Tasks for the designer include developing an instructional event table that includes demonstrations and applications for the conditions and steps in a problem-solving event such as motivational interviewing. "A condition is a property of a situation that can assume different values" (Merrill, 2013, p. 53). In the motivational interviewing instruction, conditions are the type of behavior to be changed, the readiness of the patient to change, and patient characteristics such as age and gender. Each component skill has multiple instructional events that describe and demonstrate conditions and steps as well as identification and execution of the steps that result in the response. However, Merrill notes that "When a condition is already familiar to learners, then having learners identify unencountered instances of the condition would probably be perceived as unnecessary

and may be seen as boring by learners” (Merrill, 2013, p. 145). Furthermore, Merrill relies on the expertise of the designer to decide which conditions and steps can be omitted in the instructional event. For novice designers, there is no guidance on the type and number of demonstrations and applications that can be eliminated to create effective instruction while avoiding redundancy.

The fourth ripple in the Pebble-in-the-Pond model is the design of instructional strategy enhancements. Enhancement strategies include a framework in which to present the instruction and the provision of diminishing guidance and coaching as the instruction progresses. Another enhancing strategy is peer interaction. Peer interaction fosters collaboration, critique, and discussion when done in pairs or small groups focused on a specific task. However, in an asynchronous online learning environment, peer interaction is more challenging than in face-to-face instruction. Merrill (2013) recommends the use of wiki applications for sharing in the electronic environment. With MI as the subject matter, a wiki or discussion board could be used to develop a conversation between a patient and NP. However, this instructional strategy is not in keeping with the nature of a real-world conversation with a patient. Even virtual simulations for health professionals, developed by the American Academy of Pediatrics and Kognito (2014) to improve MI skills, require only one person for interaction with the simulation. A verbal communication skill such as MI is difficult to enact asynchronously in the online environment. Timely verbal responses and body language are key factors in developing MI skills in clinical practice. MI is best applied and integrated into practice with synchronous peer interaction, role playing, or simulations. Peer critique could be integrated into synchronous MI practice. The Pebble-in-the-Pond model should expand



recommendations for additional appropriate online modalities to foster peer interaction. Additional recommendations for online peer interaction modalities should be based on the type of skill or task for completion.

The fifth ripple in the Pebble-in-the-Pond model is to finalize the instructional design. Activities within the ripple are related to the actual construction of the instructional prototype, including navigation, instructional interface design, and supplemental materials. The description of the activities within the ripple are brief. Advice for clear navigation and aesthetically pleasing interface is given. The interface chosen for the MI instruction was a PowerPoint linear design demonstrated by Merrill (2013). However, the quality of a more complex navigation and interface is likely to depend on the expertise and budget of the designer. The novice designer must have knowledge and skill aside from the Pebble-in-the-Pond model's guidance to construct the navigation and interface to match the instructional strategy and content. Supplemental materials to accompany computer-based instruction are also recommended in this ripple. Merrill's (2013) definition of supplemental materials is broad. It includes examples from an online mentor available 24 hours a day seven days a week to a list of frequently asked questions. The Pebble-in-the-Pond model should give additional guidance on the type of supplemental materials based on subject matter, cost, production time, and effectiveness.

The sixth and final ripple in the Pebble-in-the-Pond model is the design assessment and evaluation. The designer is encouraged to do a formative evaluation using user data to inform the prototype revision. Data sources for the MI instruction designed in this research included multiple qualitative and quantitative measures (Appendix E). One difference from the Pebble-in-the-Pond model specifications was the iterative process of

revisions in this research. After each round of data collection, revisions were made in the design of the MI instruction. Iterative revision would also be helpful to the instructional designer of any course.

### **Implications for Nurse Practitioner Education**

NP education has shifted emphasis from content to competency-based curriculum. “A competency is an expected level of performance that integrates knowledge, skills, abilities, and judgment” (American Nurses Association, 2013). Competency-based curriculum design fits well with problem-centered instruction with the focus on doing complex real-world tasks. (Merrill, 2013). Utilizing a progression of problems allows for increasing complexity of problems and tasks to match with student progression through NP education. Improved educational outcomes can be achieved by application of instructional design theory to NP curriculum development.

Although experts in NP practice, NP faculty are seldom aware of the prescriptions of instructional design theories. Instruction relies on traditional methods of teaching such as lecture and clinical practice. Leaders in nursing education call for transformation to more active forms of learning. However, a specific framework has not been recommended. NP education promises to be effective, efficient, and engaging instruction when instructional design theory transforms teaching topics into helping students to develop the clinical skills and judgment to be competent practitioners.

Improvement of instructional design theory relies on application in many different educational contexts. Affective learning is a vital component of NP education. It is important for the NP to develop good interpersonal skills to promote behavior change with patients in primary care. MI spirit, the basis of the MI counseling method, is

affective and requires the learner to adopt a specific attitude toward the patient. Moyers, Miller, and Hendrickson (2005) established a strong link between clinician interpersonal skill and client collaboration. Moreover, MI spirit is more important in effective behavior change than use of specific communication techniques. The NP's interpersonal relationship is critical to evoking a change in patient health behaviors. The prescriptions of the First Principles of Instruction did not specifically address affective learning or give guidance on sequencing affective instruction.

One of the components of MI spirit is accurate empathy. Learning empathy has been studied in nursing. Use of experiential learning methods such as role play, case-based scenario and simulation are recommended to teach empathy (Brunero, Lamont, and Coates, 2009). The nurse is placed in the role of the patient to have an opportunity to reflect and understand the patient's emotional state. Reflection encourages the nurse to establish a link between empathy and the effect of empathetic responses on patient behaviors. The reflection component was not present in the tutorial in this research. Reflection on empathy in patient interactions is a separate activity outside the confines of an asynchronous computer assisted tutorial.

### **Limitations**

There are several limitations in this study. It was a single instance of instruction within a specific context of graduate nursing education for NPs. It, therefore, limits the generalizability of the findings. Selection bias was another limitation. The participants were limited as those who volunteered their time for the study. Therefore, the subject matter was of interest to the participants. The participants were also in a particular geographic location that allowed the researcher to drive to the location. There was also a

relatively small number of NP students in the study (N = 21). Statistical significance of the findings was not established.

Measurement of the effectiveness and efficiency of the instructional instance were not specific to a verbal communication method such as MI. Time to completion of the written posttest as compared to the pretest was the measure of efficiency. Speed is not the only factor in efficiency in communication methods. In addition, composing an answer in writing is different from verbally responding to a patient in real time.

Finally, the researcher was a novice instructional designer. The researcher did not have the experience and expertise of an expert instructional designer. There were points in the design process in which a decision made was random when Merrill (2013) indicates that the designer uses expertise to make a decision. Errors in judgment may have occurred due to lack of expertise and technical skill.

### **Future Research**

Additional formative research is needed to refine the prescriptions in the First Principles of Instruction in various contexts. The current research used a small population of NP students located in the Midwest United States. Varied geographic locations and NP students would add to the diversity of the population using the instruction. Furthermore, replication of the current study would further define the strengths and limitations of the prescriptions of First Principles of Instruction.

The design of the tutorial in the present research was linear and used a common presentation software. The financial constraints of the current study limited the sophistication of the design and software used. Kognito and the American Academy of Pediatrics (2014) developed an immersive simulated primary care visit using virtual

humans to help health professionals learn motivational interviewing. The virtual simulation included feedback and coaching based on the multiple-choice response to the patient and family. An instructional design framework was not specified for the simulation. However, Kognito reports using the Kognito Behavior Change Model based on “the science of education and learning theory” along with “evidence-based communication strategies drawn from models in social cognition and neuroscience” (Albright, Adam, Serri, Bleeker, & Goldman, 2016, p. 4). Participants in prototype testing completed a questionnaire assessing acceptability, feasibility, technology quality, convenience and portability, and innovation. (Radecki, Goldman, Baker, Lindros, and Boucher, 2013). The effectiveness of the virtual simulation was not assessed. The relative effectiveness of the virtual simulation design framework as compared with established instructional design framework prescriptions requires evaluation of knowledge, use of MI techniques, and the presence of MI spirit in future research.

Effectiveness in the current research was defined as MI consistent written responses on the Helpful Response Questionnaire (Miller, Hedrick, and Orlofsky, 1991). However, it is not a substitute for the unpredictability and time demands of actual patient encounters. The most accurate measurement of the effectiveness of the instructional design prescriptions is observation of MI performance during a patient encounter in clinical practice. It was not feasible in the present research to observe patient encounters to assess motivational interviewing proficiency. Additional research should include additional measures of effectiveness such as observation of NP students during patient encounters.

The design of the computer-assisted tutorial for MI was the instance used to evaluate the First Principles of Instruction. However, training plus feedback and coaching is more effective than training alone to teach clinicians MI (Miller, Yahne, Moyers, Martinez, & Pirritano, 2004).

Additional research should include the design of an instance that incorporates synchronous practice with feedback and coaching.

### **Conclusion**

The findings from this formative research study contributes to the prescriptive design theory of the First Principles of Instruction including the Pebble-in-the-Pond process. They apply the process and model to within the context of NP education for the communication method of MI. The formative research demonstrated gaps in the process of instructional design for the affective component that is foundational to motivational interviewing. The findings also revealed shortcomings in Merrill's definition of efficiency of instruction as time to completion of the task after instruction. In MI, the time it takes for an MI conversation is not a reflection of the efficiency of the instructional instance.

In conclusion, this study demonstrated that prescriptive instructional theory applied to instructional design in NP education. Limitations of the study requires additional applications for complex interpersonal skills. The study expands on the previous studies of the First Principles of Instruction. The findings add to knowledge of instructional design within the context of NP education and the complex skills required of a primary care NP.

## APPENDIX A

### Outcome Measures

Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
<b>Demographics</b>	Before interaction with instruction (4 rounds of data collection)	Nominal scale  Reliability (assure similar participant characteristics in each round of evaluation)  Nature of the learners (Collins, Joseph, & Bielaczyc, 2004)	NA	NP students	All
<b>Design Journal</b>	Design phases (5 collection points) --Initially --After each of 4 rounds of evaluation	<u>Qualitative</u>  How and what design decisions were made using systematic analytic steps <ul style="list-style-type: none"> <li>• Required resources and support for implementation               <ul style="list-style-type: none"> <li>○ Includes materials, technical support, administrative support</li> <li>○ Requirements for success need to be identified (Collins, Joseph, &amp; Bielaczyc, 2004)</li> </ul> </li> </ul> What changes were made after each round of evaluation	Design decision-making	Designer	How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?

Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
		Clarification of the designer's assumptions, biases and theoretical orientation (Reigeluth & Frick, 1999)			
<b>Detailed Description of the Instruction</b>	Final version of the instruction	<u>Qualitative</u> Transferability (Lincoln & Guba, 1985) <ul style="list-style-type: none"> <li>• Provide the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility</li> </ul> Construct Validity (Reigeluth & Frick, 1999, p. 647) <ul style="list-style-type: none"> <li>• “operationalization of the methods and analysis of relevant situations should be done by an expert in the theory”</li> </ul>	NA	Designer	All
<b>Interview</b> <u>Initial questions</u> 1. What could be done to improve the effectiveness of the instruction? 2. What aspects of the instruction were most valuable?	Semi-structured interview during and after each encounter with instruction (4 rounds of data collection)	<u>Qualitative</u> Interview audio recorded for transcription, member checks, and later review Meets qualitative data quality points of : <ul style="list-style-type: none"> <li>• Chain of evidence</li> <li>• Member checks</li> </ul>	Effectiveness Efficiency Engagement	NP students	How could the First Principles of Instruction have been more useful in designing the instruction in motivational interviewing to be engaging to the NP students who participated in this study?



Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
<p>3. What aspects of the instruction were least valuable? (Frick &amp; Boling, 2002)</p> <p>4. What would make it easier or faster to move through the instruction?</p> <p>5. What held your attention?</p> <p>6. What made you want to complete the instruction?</p> <p>7. What more would you like to learn about the subject matter?</p>		<ul style="list-style-type: none"> <li>• Persistent observation</li> <li>• Triangulation</li> </ul> <p>Dependability</p> <ul style="list-style-type: none"> <li>• Auditor authenticates the process by which the accounts were kept and examines the product for accuracy</li> </ul> <p>Referential adequacy</p> <ul style="list-style-type: none"> <li>• Recorded material provides a kind of benchmark against which later data analyses and interpretations could be tested for adequacy (Lincoln &amp; Guba, 1985)</li> </ul> <p>Thoroughness of data collection (Reigeluth &amp; Frick, 1999)</p> <ul style="list-style-type: none"> <li>• Advanced preparation of participants</li> <li>• Emergent data collection process</li> <li>• Decreasing obtrusivity</li> <li>• Iteration until saturation</li> <li>• Identification of strengths and weaknesses</li> </ul>			
<p><b>Observation</b></p> <p>Observe:</p> <p>1. Subjects getting stuck and giving up on a task</p>	<p>During interaction with Instruction (4 rounds of data collection)</p>	<p><u>Qualitative</u></p> <p>One observer, no inter-rater reliability</p>	<p>Efficiency</p> <p>Engagement</p>	<p>NP students</p>	<p>How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to</p>

Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
<p>2. Subjects doing things you didn't expect them to do</p> <p>3. Subjects not doing things that you expected them to do</p> <p>4. Subjects making self-deprecating remarks</p> <p>5. Subjects doing things right but doing so fearfully</p> <p>6. Subjects doing things wrong but with great confidence</p> <p>(Frick &amp; Boling, 2002)</p> <p>Observation checklist for each page or slide of the course (Table E)</p> <p>1. Content (Does the learner find the content confusing or difficult to follow?)</p> <p>2. Direction (Does the learner have difficulty following the direction for interaction?)</p> <p>3. Navigation (Does the learner have difficulty following the navigation?)</p> <p>4. Demonstration (Is the learner confused by a demonstration or guidance?)</p>					<p>the NP students participating in this study?</p> <p>How could the First Principles of Instruction have been more useful in designing the instruction in motivational interviewing to be engaging to the NP students who participated in this study?</p>

Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
5. Guidance 6. Application (Does the learner have difficulty with an application or coaching?) 7. Coaching (Merrill, 2013)					
<p><b>The Helpful Responses Questionnaire</b></p> <p>Questionnaire is open-ended. It is scored based on the response using a 5-point ordinal scale:</p> <p>1 = no reflection + roadblock            2 = reflection + roadblock or no reflection + no roadblock            3 = simple reflection            4 = reflection with inferred meaning            5 = reflection of feeling or appropriate metaphor or simile</p> <p>The higher the scores more consistent with accurate empathy than lower scores (Miller, Hedrick, &amp; Orlofsky, 1991; Gordon, 1970) Martino, et al. (2007) also counted the number of open and closed questions in each response.</p>	Pretest Posttest	<p>Interrater reliability .71 to .91            Internal consistency satisfactory</p> <p>Inter-item correlation .67 pre-training to .57 post training</p> <p>Cronbach's alpha .92 at pre and .89 post</p> <p>Test-retest reliability with correlation coefficient of .45 (Miller, Hedrick, &amp; Orlofsky, 1991)</p> <p>Interclass correlation coefficients &gt; 0.90 or excellent (Martino, Haeseler, Belitsky, Pantaloni, &amp; Fortin, 2007)</p> <p>The Officer Responses Questionnaire (modification of HRQ for correctional officers)</p> <ul style="list-style-type: none"> <li>• ICC for 5 items .726-.893 (excellent) (Walters, Alexander &amp; Vader, 2008)</li> <li>• ORQ was correlated with empathy (<math>r = 0.52, p &lt; .0001</math>) and percent MI adherent (<math>r = 0.50, p &lt; .0001</math>) (Walters,</li> </ul>	Effectiveness	NP students	<p>How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?</p> <p>Does knowledge of motivational interviewing in NP students participating in this study increase from before to after instruction designed using the First Principles of Instruction?</p>

Measurement	Timing of Measurement	Reliability and Validity	Concept	Source of Data	Research Question
		Vader, Nguyen, Harris & Eells, 2010)			
<b>Timing of Interaction</b>	During encounter with instruction (4 rounds of data collection)  Time to complete pretest and posttest.	Interval scale	Efficiency	NP students	How could the First Principle of Instruction have been more useful in designing instruction in motivational interviewing to be effective and efficient to the NP students participating in this study?

## APPENDIX B

### Helpful Responses Questionnaire

Miller, W. R., Hedrick, K. E., & Orlofsky, D. (1991). The Helpful Responses Questionnaire: A procedure for measuring therapeutic empathy. *Journal of Clinical Psychology, 47*, 444-448.

The following six paragraphs are things that a person might say to you. With each paragraph, imagine that someone you know is talking to you and explaining a problem that he or she is having. You want to help by saying the right thing. Think about each paragraph. On a separate sheet of paper write, for each paragraph, the *next thing* you might say if you wanted to be helpful. Write only one or two sentences for each situation.

**1. A forty-one-year-old woman says:**

*"Last night Joe really got high and he came home late and we had a big fight. He yelled at me and I yelled back and then he hit me hard! He broke a window and the TV set, too! It was like he was crazy. I just don't know what to do!"*

**2. A thirty-six-year-old man says:**

*"My neighbor really makes me mad. He's always over here bothering us or borrowing things that he never returns. Sometimes he calls us late at night after we've gone to bed and I really feel like telling him to get lost."*

**3. A fifteen-year-old girl says:**

*"I'm really mixed up. A lot of my friends, they stay out real late and do things their parents don't know about. They always want me to come along and I don't want them to think I'm weird or something, but I don't know what would happen if I went along either."*

**4. A thirty-five-year-old parent says:**

*"My Maria is a good girl. She's never been in trouble, but I worry about her. Lately she wants to stay out later and later and sometimes I don't know where she is. She just had her ears pierced without asking me! And some of the friends she brings home--well, I've told her again and again to stay away from that kind. They're no good for her, but she won't listen."*

**5. A forty-three-year-old man says:**

*"I really feel awful. Last night I got drunk and I don't even remember what I did. This morning I found out that the screen of the television is busted and I think I probably did it, but my wife isn't even talking to me. I don't think I'm an alcoholic, you know, 'cause I can go for weeks without drinking. But this has got to change."*

**6. A fifty-nine-year-old unemployed teacher says:**

*"My life just doesn't seem worth living any more. I'm a lousy father. I can't get a job. Nothing good ever happens to me. Everything I try to do turns rotten. Sometimes I wonder whether it's worth it."*

APPENDIX C

Demographic Survey

Please circle the category that best describes you:

1. Please state your age \_\_\_\_\_
  
2. Gender:
  - a. Female
  - b. Male
  - c. Transgender
  - d. Prefer not to answer
  
3. How many years of experience do you have as a registered nurse? \_\_\_\_\_
  
4. Have you had training in motivational interviewing?
  - a. Yes
  - b. No

If yes, describe the training in motivational interviewing have you had?

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5. Do you have experience in counseling or cognitive behavioral therapy?
  - a. Yes
  - b. No

If yes, describe the training in counseling or cognitive behavioral therapy have you had?

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## APPENDIX D

### Post Instruction Interview Questions

1. What could be done to improve the effectiveness of the instruction?
2. What aspects of the instruction were most valuable?
3. What aspects of the instruction were least valuable?
4. What would make it easier or faster to move through the instruction?
5. What held your attention?
6. What made you want to complete the instruction?
7. What more would you like to learn about the subject matter?



APPENDIX E

Researcher Observation Form

<b>Element</b>	<b>Observation</b>
1. Content (Does the learner find the content confusing or difficult to follow?)	
2. Direction (Does the learner have difficulty following the direction for interaction?)	
3. Navigation (Does the learner have difficulty following the navigation?)	
4. Demonstration (Is the learner confused by a demonstration or guidance?)	
5. Guidance	
6. Application (Does the learner have difficulty with an application or coaching?)	
7. Coaching	

## APPENDIX F

### Design Journal

#### **Problem and Problem Progression**

##### **Initial Design Decisions**

The structure of the design journal is the first consideration in documenting decision-making. I have decided on a narrative format with categories for the decisions at the end of the entry. It will be easier to fully explain decisions with the narrative background information represented. Categories for the decisions are:

1. First Principles of Instruction mandates
2. Subject matter specifications (motivational interviewing)
3. Professional expertise (advanced practice nursing) of the designer
4. Design resources (money, time, technical skills)
5. Findings from usability testing
6. Effectiveness
7. Efficiency (student time for task completion)
8. Engagement (student wants to learn more about the subject and plans to use in clinical practice)

##### **Design a Problem Prototype**

- a. Identify the content area, primary goal, and learner population for the instruction
  - a. Content area = Motivational interviewing (MI) for health-related behavior change
  - b. Learner population = nurse practitioner students
  - c. Primary goal = As a novice nurse practitioner, using MI, you will be able to effectively counsel your patients to make changes in their health-related behaviors. The target audience is nurse practitioner students who have experience as registered nurses teaching patients about their health. The techniques of MI involve an attitude of acceptance, reflective listening, engaging the patient, focusing and evoking in a goals-directed way, planning and integrating MI into every day clinical skills.

The first step in the Pebble-in-the-Pond model is specifying a whole problem that the learner will be able to solve at the end of instruction. For this formative research, the student demonstrates beginning proficiency in motivational interviewing (MI). As such, the student should be able to adopt an attitude of acceptance of the patient (MI spirit), engage, focus and evoke, and plan for health-related behavior change (Miller & Rollnick,

2013). Merrill (2013) recommends starting by specifying an instance as a demonstration of the whole problem. There are several examples of MI addressing various behaviors on video via DVD and the internet. The examples show all the components and steps in MI.

The second step in the process of design is design a progression of problems. The problem progression increases in complexity, difficulty, or the number of component skills required to solve the problem (Merrill, 2013). Miller and Rollnick (2013) recommend four components of skill in MI,

1. MI knowledge and spirit
2. Engaging
3. Focusing and Evoking
4. Planning and Integration

In an earlier work, Miller & Moyers (2007) also proposed eight stages of learning motivational interviewing and list the eight tasks:

1. Overall spirit of MI
2. OARS: Client-centered counseling skills
3. Recognizing change talk and sustain talk
4. Eliciting and strengthening change talk
5. Rolling with sustain talk and resistance
6. Developing a change plan
7. Consolidating commitment
8. Transition and blending

The alignment of the components posited by Miller and Rollnick (2013) and tasks by Miller and Moyers (2007) below demonstrate a de-emphasis of sustain talk.


<b>Component</b>	<b>Tasks</b>
MI knowledge and spirit	Overall spirit of MI
Engaging: OARS combined with accurate empathy	OARS: Client centered counseling skills
Focusing and Evoking: Goal directed evoking, strengthening change talk	Recognizing change talk, eliciting and strengthening change talk
Planning and Integration: Skills include timing developing a change plan, evoking commitment to change, and integrating MI with other clinical skills needed for the implementation of change.	Developing a change plan, consolidating commitment

Merrill uses examples of Excel spreadsheets. I did not find it helpful in designing a progression of problems. I have also considered using the readiness of the patient to change, based on the Transtheoretical Model (Prochaska & DiClemente, 1983) as another layer of difficulty in a progression of problems. Identification of the problem is not as

difficult as designing the progression. Figure 1 is the storyboard for the whole problem to be accomplished by the instruction.

Figure 1.

*Prototype Demonstration for Problem Progression (Storyboard)*

<b>Narrative</b>	<b>Images</b>
<p><b>Narrator:</b> This program will help you develop the skills necessary to counsel patients to adopt healthy behaviors and manage their chronic diseases. You will have trusting and mutually respectful relationships with your patients and your patient's will have improved health outcomes.</p>	

**Narrator:** Watch Lisa, a nurse practitioner, counsel Karen about her health issues. Look for Karen's reaction to the counseling.

**Lisa, NP:** Hello, Karen. I'm glad you came in for your health maintenance examination today. I have the results of your recent lab work that we can talk about. I also noticed that your blood pressure is slightly elevated today. What health issues would you like to talk about? (*open question*)

**Karen:** Well, I'm not happy with my weight. My clothes don't fit and I feel more tired. Also, the medication you gave me last time ran out and I didn't have any more refills. I haven't been taking it for the past few months. I thought you would scold me about my cholesterol results.

**Lisa, NP:** I'm glad you told me about the medication. You are in control of taking medication or not. It's your decision. (*supporting autonomy*) (Short pause) So we could talk about your weight, which includes diet and exercise or we could talk about the cholesterol medication. Where would you like to start? (*open question and agenda mapping*)

**Karen:** I would really like to talk about my weight. I just can't seem to get a handle on it. I think my cholesterol results would be better if I lost weight, too. Then I wouldn't need to take any medication. (*change talk*)

**Lisa, NP:** You're right that losing weight will lower your cholesterol. You're feeling a little discouraged about your weight. (*reflection*) What would you find most helpful for us to talk about, diet or exercise? (*open question*)

**Karen:** I seem to find every excuse in the book not to exercise. How do I stop avoiding it? (*change talk*)



**Lisa, NP:** You know that exercise is important for weight loss and for your cholesterol but it's not easy to get started. (*double-sided reflection*)

**Karen:** Yes, but I just can't get up off the couch after work. I know I need to exercise in order to lose weight but when I get home from work I'm tired and just can't make myself go for walk. (*ambivalence-change and sustain talk*)

**Lisa, NP:** So there is something that's holding you back even though you know exercise is important. (*simple reflection*)

**Karen:** I don't like it. After a long day at work, I just want to sit back and relax. (*sustain talk*)

**Lisa, NP:** You just don't like exercise, particularly after working all day. Exercise is so unpleasant; you never will be able to work it into your routine. (*amplified reflection*)

**Karen:** Well, I could exercise some other time during the day. Then I wouldn't feel like I exercise was something else to do after work when I'm tired. (*change talk*)

**Lisa, NP:** That's a very good suggestion. (*affirmation*)  
Would it be OK if I shared what makes exercise more pleasant for some people?

**Karen:** Sure.

**Lisa, NP:** Exercise is often more pleasant and sustained for longer with social support. Exercising with friends makes it seem less like a chore. Often people don't want to let their friends down so they exercise more regularly. How do you think exercise would fit into your schedule? (*open ended question/evoking*)

**Karen:** I could exercise at lunch time. There are a couple other women who walk during lunch. I have an hour for lunch. I usually only spend 20

minutes eating and the rest of time I'm on the computer. (*change talk*)

**Lisa, NP:** So if you could exercise some time other than after work, you could work it into your day. (*Reflecting change talk*)

**Karen:** Yes, it would be more difficult to avoid exercising because the other women would be expecting me to walk with them.

**Lisa, NP:** OK, on a scale of 1 to 10, one being not ready at all and 10 being very ready, how ready are you to exercise? (*readiness ruler; increase change talk is a sign of readiness*)

**Karen:** I'd say a 7.

**Lisa, NP:** OK, that's pretty good. Tell me, what makes it a 7 rather than a 9.

**Karen:** I have so much going on at work. Exercise seems like another thing on my list. It will get me away from my desk, though. I need to de-stress. (*change talk*)

**Lisa, NP:** You want to exercise to lose weight. Your stress level is high and exercise will also help you reduce your stress. (*reflecting change talk*)

**Karen:** Yes, I want to make this work. (*change talk*)

**Lisa, I NP:** You are determined to exercise. (*complex reflection*)

**Karen:** Yes, and I think I can work exercise into my lunch hour.

**Lisa, NP:** On a scale of 0 to 10, zero being you are not confident at all and ten is you are very confident, how confident are you that you will be able to exercise at lunch every day. (*confidence ruler*)

<p><b>Karen:</b> I think I would say a nine. I will walk with my co-workers at my lunch. Once I start to walk, they'll remind me and encourage me to come along. (<i>change talk and plan</i>)</p> <p><b>Lisa, NP:</b> That's excellent! (<i>affirmation</i>) So to summarize, you want to lose weight and reduce your stress by exercising. You plan to walk on your lunch hour with your co-workers. Your co-workers will help you keep on track. You are also pretty confident that you can carry out your plan. (<i>summary</i>)</p> <p><b>Karen:</b> Yes and my cholesterol will be better, too. (<i>additional reason for change</i>)</p> <p><b>Lisa, NP:</b> How are you feeling about your plan? (<i>eliciting commitment to change</i>)</p> <p><b>Karen:</b> I feel good and I really think I'll be able to do it. (<i>commitment to change</i>)</p>	
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### **Progression of problems**

Each problem in the progression relies on being able to use the skills or techniques from the previous problem. The dimension that is missing is the client's readiness to change.

Before designing a progression, Merrill (2013) mandates problem portrayals with which to form the progression sequence. "Having specified a typical problem for the goals of the instruction, the next ripple in the pond is to specify a progression of problems that gradually increase in complexity, difficulty or the number of component skills required to complete the task" (p. xx). The progression of problems for the motivational interviewing subject matter requires an increasing number of component skills to complete the task.

### **Problem 1: MI Knowledge and Spirit**

Karen is a 55-year-old female who presents to the clinic for a health maintenance examination. She also has a diagnosis of hyperlipidemia. She was prescribed medication last year but stopped taking it when the prescription ran out. Karen's cardiovascular risk is in the moderate risk category. She is a non-smoker. Her blood pressure is 142/94 with a body mass index of 31. Listen to Karen with acceptance and empathy. Resist the "righting reflex" and map the agenda for the discussion.



## **Problem 2: Engaging**

Engage Karen in a client-centered counseling using OARS skills in a guiding manner.

## **Problem 3: Focusing and Evoking**

Guide Karen toward the goal of changing behaviors that will help improve her health. Use MI skills of focusing, recognizing, evoking, and responding to strengthen change talk.

## **Problem 4: Planning and Integration**

Involve Karen in the planning process to negotiate a change plan. Use the additional MI skills of timing, developing a change plan, evoking commitment to change, and integrating MI with other clinical skills needed for the implementation of change.

## **Collect a sample of problem portrayals**

1. Parent quitting smoking—example <http://youtu.be/URiKA7CKtfc> and non-example <http://youtu.be/80XyNE89eCs>
2. Diabetic coach—example and non-example MP4 file
3. Medication adherence—example and non-example MP4 file
4. MI for alcohol during medical visit—DVD
5. MI for alcohol (Alan Lyme) <http://youtu.be/67I6g1I7Zao>
6. MI for hypertension <http://youtu.be/uLhQGFfeE5XE>
7. MI for quitting smoking <http://youtu.be/31UwtqdT-zw>
8. MI for Diabetes <http://youtu.be/hPp9J8wPxMc>
9. MI with Geriatric patients at high risk for falls <http://youtu.be/IZR4Njufxs4>
10. Evoking commitment to change <http://www.youtube.com/watch?v=dm-rJJPCuTE>
11. Adolescent alcohol behaviors  
<http://youtu.be/JZrYk86EDIQ?list=UU0F8psmVBMxUfZdsGGnzFjA>
12. Motivational interviewing linking behaviors  
<http://youtu.be/5ePJw0NjEec?list=UU0F8psmVBMxUfZdsGGnzFjA>
13. Motivational Interviewing - Diabetes (Medication Compliance)  
[http://youtu.be/ZixZu1Y8x\\_A](http://youtu.be/ZixZu1Y8x_A)
14. Motivational interviewing--diabetes--Pulling his own strings (instructional)  
<http://youtu.be/6aA27IAm15g>
15. Motivational Interviewing in Primary Care: Smoking Cessation  
<http://vimeo.com/18577370>
16. Agenda setting conversation with “Sal” (agenda setting, Engaging)  
[http://youtu.be/klnHJ4coG8o?list=PLmLKlp1R6077N8\\_9AHmQ54JpkKu1B2bK](http://youtu.be/klnHJ4coG8o?list=PLmLKlp1R6077N8_9AHmQ54JpkKu1B2bK)

y

17. Motivational Interviewing: A conversation with "Sal" about managing his asthma (effective) <http://youtu.be/-RXy8Li3ZaE>
18. MI inconsistent conversation with Sal about managing his asthma [http://youtu.be/kN7T-cmb\\_10](http://youtu.be/kN7T-cmb_10)
19. Tobacco cessation-first follow up visit [http://youtu.be/\\_X2xXvC7QPs?list=UUTi-owCnkGmOB15MnTyXag](http://youtu.be/_X2xXvC7QPs?list=UUTi-owCnkGmOB15MnTyXag)
20. Part one: Motivational interviewing in an integrated care setting (nurse practitioner scenario) <https://vimeo.com/109552200>
21. Part two: Motivational interviewing in an integrated care setting (counselor setting) <https://vimeo.com/109546082>
22. Part three: Motivational Interviewing in an Integrated care setting (social worker scenario) <https://vimeo.com/109594861> \
23. TEACH Project: The Effective Health Practitioner <https://youtu.be/dvEAMoDTg9w>
24. Motivational Interviewing 3: Change Plan <https://youtu.be/HOWvpl06zoQ>

### **Identifying Component Skills for the Problem Portrayals**

Problem solving event analysis

1. Select a typical problem portrayal
  - a. Diabetic coach
2. Identify the consequence.
  - a. This progression is difficult to follow. Merrill does not define consequence for the problem portrayal. Is the consequence of motivational interviewing positive health related behavior change? The figures of instruction use concept diagrams. I could not find a definition of a consequence. The example used in the book is *Selling Furniture*.

“The content for many problems is often represented as a set of steps that leads to some consequence, as shown in Figure 2; such a representation is incomplete. The steps executed by the learner do not in and of themselves cause the consequence. In real-world problems, every step is a trigger that changes some condition, and it is the set of changed conditions that bring about the consequence, as show in Figures 3 and 4. The steps, rather than leading directly to the consequence, each bring about a condition that, together with the other conditions in the set, brings about the consequence” (p. 122).

Figure 2.

*Typical Content Elements for How-to Component Skill*

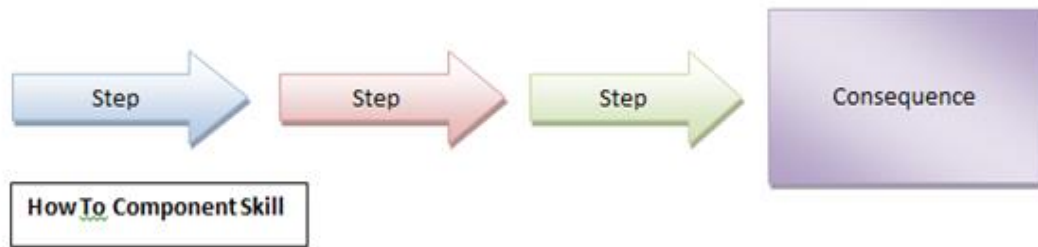
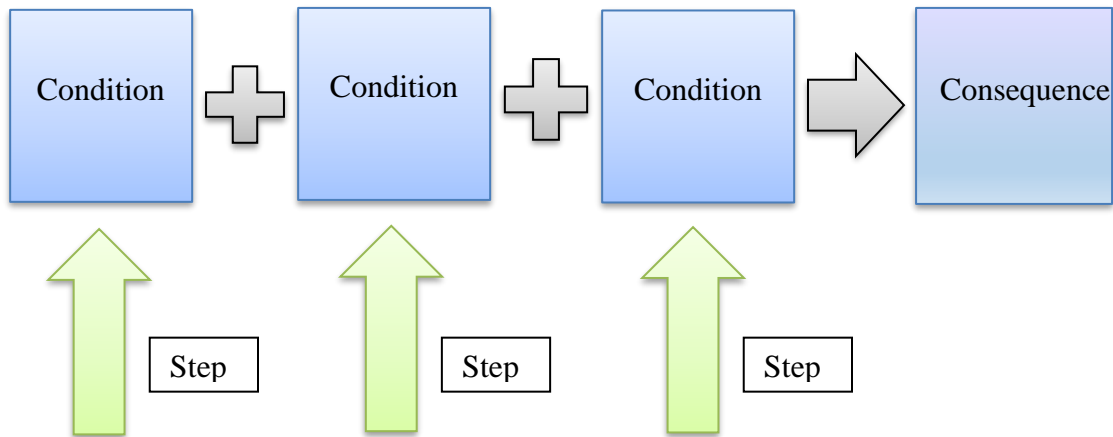


Figure 3.

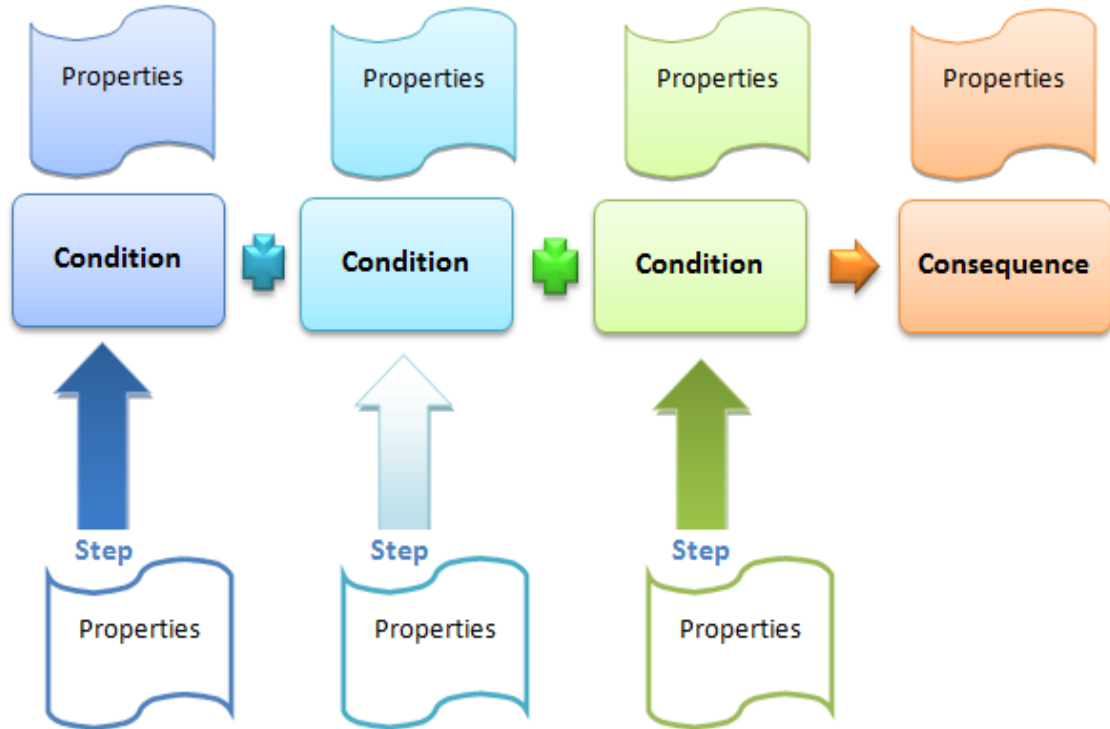
*Steps Bring About Conditions That Lead to the Consequence*



3. Identify the conditions that lead to the consequence
4. Identify the steps that lead to each condition
5. Identify the properties of each step

Figure 4.

*Content Elements for a Whole Problem*



Instead of using all the figures, I designed a table to use for the *Whole Problem-Solving Event of Motivational Interviewing*.

Table 22.

*Motivational Interviewing Whole Problem Content Elements*

<b>Properties (Defining properties of the client's condition)</b>	Activation of client's expertise, motivation, and resources for change	Therapeutic engagement (retention and persistence)	Decisional balance is tipped toward change	Intention to implement the change plan (taking steps)	<b>Properties</b> New behavior established
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<b>Condition (What happens— reaction of the client)</b>	Positive interpersonal atmosphere	Establish a helpful connection and a working relationship	Maintain focus on a specific behavior change  Voices own arguments for the change	Clear goal established  Steps to achieve the goal determined  Commitment to carry out plan	<b>Consequence</b>  Targeted behavior change
<b>Step (How to— ID steps +execute steps)</b>	MI spirit	Engaging	Focusing and Evoking	Planning and Integration	
<b>Properties (Clinician)</b>	Collaboration  Acceptance  Compassion  Evocation	Trusting and mutually respectful relationship  Agreement on treatment goals  Collaboration on mutually negotiated tasks to reach the goals  OARS Skills	Finding a clear focus/goal  Exchanging information  Exploring ambivalence and developing discrepancy  Recognizing, evoking, and responding to strengthen change talk  Strengthen hope and confidence	Recognizing readiness to change  Formulating a specific plan of action  Strengthen commitment to change  Supporting change	

**Prescribed instructional events for a whole problem**

**Demonstrate the Whole Problem: Karen**

<b>Show-Q (positive consequences of the procedures)</b>	Show an instance of the consequence (Q) for the whole problem	Kind of
<b>Show-C</b>	Show instances of conditions (C) that lead to the consequence 5. Positive interpersonal atmosphere 6. Establish a helpful connection and a working relationship 7. Maintain focus on a specific behavior change, Patient voices own arguments for the change 8. Clear goal established, Steps to achieve the goal determined, Commitment to carry out plan	What happens
<b>Show-S</b>	Show instances of the steps (S) that lead to each of the conditions 5. MI spirit 6. Engaging 7. Focusing and Evoking 8. Planning and Integration	How to
<b>Teach the Component Skills (Problem-Solving Events of the Whole Problem)</b>		
<i>Demonstrate each problem-solving event : Problem solving event 1: MI Knowledge and Spirit</i>		
<b>Tell-C</b>	Describe the condition (C): MI knowledge and spirit; how people change	Kind of
<b>Show-C</b>	Show instances of the condition (C): example and non-example diabetic	Kind of
<b>Tell-S</b>	Describe the step (S): Components of MI spirit: Acceptance = absolute worth + autonomy + accurate empathy + affirmation; MI spirit = compassion + evocation + collaboration + acceptance	Kind of How to
<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of MI spirit	Kind of How to
<i>Do<sub>id</sub> the problem solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of MI spirit (step)	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of a positive interpersonal atmosphere (condition)	Kind of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Acceptance, compassion, evocation, collaboration = MI spirit	
<b>Do<sub>id</sub>-C</b>	Identify instances of the patient reaction (condition)	
<i>Problem solving event 2: Engaging</i>		
<b>Tell-C</b>	Describe the condition (C): Description of Engaging	Kind of
<b>Show-C</b>	Show instances of the condition (C): Example of Engaging with focus on OARS skills	Kind of

<b>Tell-S</b>	Describe the step (S): Engaging components <ul style="list-style-type: none"> <li>• Listening</li> <li>• Open ended questions</li> <li>• Affirmations</li> <li>• Reflections <ul style="list-style-type: none"> <li>○ Simple</li> <li>○ Complex</li> </ul> </li> <li>• Summaries</li> </ul>	Kind of How to
<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of engaging while pointing out the component skills	Kind of How to
<i>Do<sub>id</sub> the problem solving event</i>		
<b>Do<sub>id</sub>-S</b>	Identify instances of Engaging (step)	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition: therapeutic engagement	Kind of
<i>Do<sub>ex</sub></i>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Engaging: <ul style="list-style-type: none"> <li>• Listening</li> <li>• Open ended questions</li> <li>• Affirmations</li> <li>• Reflections <ul style="list-style-type: none"> <li>○ Simple</li> <li>○ Complex</li> </ul> </li> <li>• Summaries</li> <li>• Discord and response to discord <ul style="list-style-type: none"> <li>○ Apologizing</li> <li>○ Affirming</li> <li>○ Shifting focus</li> </ul> </li> </ul>	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition: therapeutic engagement	Kinds of
<b><i>Problem solving event 3: Focusing and Evoking</i></b>		
<b>Tell-C</b>	Describe the condition: decisional balance is tipped toward change	Kinds of
<b>Show-C</b>	Show instance of the condition: Show an instance of patient reaction to focusing and evoking	Kinds of
<b>Tell-S</b>	Describe the step (S): Focusing <ul style="list-style-type: none"> <li>• Agenda <ul style="list-style-type: none"> <li>○ Focus clear</li> <li>○ Sharing control—agenda mapping</li> <li>○ Searching for strengths—focus unclear</li> </ul> </li> <li>• Sources of focus <ul style="list-style-type: none"> <li>○ Patient</li> <li>○ Setting</li> <li>○ Clinical expertise</li> </ul> </li> <li>• Counseling styles <ul style="list-style-type: none"> <li>○ Following</li> <li>○ Directing</li> </ul> </li> </ul>	Kinds of How To

	<ul style="list-style-type: none"> <li>○ Guiding</li> <li>● Ethical considerations <ul style="list-style-type: none"> <li>○ Nonmaleficence</li> <li>○ Beneficence</li> <li>○ Autonomy</li> <li>○ Justice</li> </ul> </li> <li>● Exchanging information <ul style="list-style-type: none"> <li>○ MI consistent/MI inconsistent information exchange</li> <li>○ Elicit-Provide-Elicit</li> </ul> </li> </ul> <p>Evoking</p> <ul style="list-style-type: none"> <li>● Ambivalence <ul style="list-style-type: none"> <li>○ Change talk <ul style="list-style-type: none"> <li>▪ Responding to change talk <ul style="list-style-type: none"> <li>● OARS skills with examples</li> <li>● Strategic responses <ul style="list-style-type: none"> <li>○ Emphasizing autonomy</li> <li>○ Reframing</li> <li>○ Agreeing with a twist</li> <li>○ Running head start</li> <li>○ Coming alongside</li> </ul> </li> <li>● Roadblocks <ul style="list-style-type: none"> <li>○ Defending</li> <li>○ Interrupting</li> <li>○ Squaring off</li> <li>○ Disengagement</li> </ul> </li> </ul> </li> </ul> </li> <li>○ Sustain talk</li> </ul> </li> <li>● Evoking change <ul style="list-style-type: none"> <li>○ Evocative questions <ul style="list-style-type: none"> <li>▪ Desire</li> <li>▪ Ability</li> <li>▪ Reasons</li> <li>▪ Need</li> </ul> </li> <li>○ Importance ruler</li> <li>○ Querying extremes</li> <li>○ Looking back</li> <li>○ Looking forward</li> <li>○ Exploring goals and values</li> </ul> </li> <li>● Evoking hope and confidence <ul style="list-style-type: none"> <li>○ Confidence talk</li> <li>○ Confidence ruler</li> <li>○ Identifying and affirming strengths</li> <li>○ Reviewing past successes</li> <li>○ Brainstorming</li> <li>○ Hypothetical thinking</li> <li>○ Reframing</li> </ul> </li> </ul>	
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<b>Show-S</b>	Show the execution of instances of the step (S): Demonstration of Focusing and Evoking	Kinds of How To
Do <sub>id</sub> the problem solving event		
<b>Do<sub>id</sub>-S</b>	Identify instances of the step (S): ID instances of focusing and evoking	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): ID instances of decisional balance tipping toward change	Kinds of
Do <sub>ex</sub>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Execute steps of focusing and evoking	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): ID instance of the decisional balance tipping toward change	Kinds of
<b><i>Problem solving event 4: Planning and Integration</i></b>		
<b>Tell-C</b>	Describe the condition: Intention to implement a change plan	Kinds of
<b>Show-C</b>	Show instance of the condition: Patient collaboratively develops a plan with intent to implement the change	Kinds of
<b>Tell-S</b>	Describe the step (S): Planning and Integration <ul style="list-style-type: none"> <li>• Readiness <ul style="list-style-type: none"> <li>○ Increased change talk</li> <li>○ Taking Steps</li> <li>○ Diminished sustain talk</li> <li>○ Resolve</li> <li>○ Envisioning</li> <li>○ Testing the water <ul style="list-style-type: none"> <li>▪ Recapitulation</li> <li>▪ Key Question</li> </ul> </li> </ul> </li> <li>• Developing a Change Plan <ul style="list-style-type: none"> <li>○ Change talk</li> <li>○ Goal setting <ul style="list-style-type: none"> <li>▪ Clear goals</li> <li>▪ Clear options</li> <li>▪ Goals and options unclear</li> </ul> </li> </ul> </li> <li>• Strengthening commitment <ul style="list-style-type: none"> <li>○ Change talk</li> <li>○ Implementation intentions <ul style="list-style-type: none"> <li>▪ evoking intention</li> <li>▪ convert commitment</li> </ul> </li> </ul> </li> <li>• Supporting change</li> </ul>	Kinds of How To
<b>Show-S</b>	Show the execution of instances of the step (S): Highlighted demonstration of planning and integration	Kinds of How To
Do <sub>id</sub> the problem solving event		
<b>Do<sub>id</sub>-S</b>	Identify instances of the step (S): Identify the steps in planning and integration	How to

<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): Identify patient readiness, change plan and commitment/intention to change.	Kinds of
Do <sub>ex</sub>		
<b>Do<sub>ex</sub>-S</b>	Execute instances of the step (S): Execute steps to planning and integration	How to
<b>Do<sub>id</sub>-C</b>	Identify instances of the condition (C): Identify instances of patient intent to implement change	Kinds of
<b><i>Do the whole problem</i></b>		
<b>Do<sub>ex</sub>-Q</b>	Predict the consequence from a set of conditions for instances of the problem: Predict the patient's response to communication style of provider	What happens
<b>Do<sub>ex</sub>-C</b>	Find faulted conditions or steps for an unanticipated consequence for instances of the problem: Find provider interaction that is MI inconsistent and recommend alternative response	What happens
<b>Do<sub>ex</sub>-S</b>	Execute all of the steps for instances of the whole problem: Interact with a patient using MI for health related behavior change.	How to
Do <sub>id</sub> = identify an instance Do <sub>ex</sub> = predict the consequences Do <sub>ex</sub> -Q = predict consequences from a set of conditions for instances of the problem Do <sub>ex</sub> -C = Find faulted condition or steps for an unanticipated consequence for instances of the problem Do <sub>ex</sub> -S = Execute all of the steps for instances of the whole problem		

Instructional Event Table for MI Knowledge and Spirit

<b>Portrayal</b>	<b>Demo Condition</b>	<b>Demo Step</b>	<b>Apply Condition</b>	<b>Apply Step</b>
Diabetic coach/non-example MP3	Collaboration	<ul style="list-style-type: none"> <li>Partnership</li> </ul>		
Diabetic coach/example	Acceptance	<ul style="list-style-type: none"> <li>Absolute worth</li> <li>Affirmation</li> <li>Autonomy</li> <li>Accurate empathy</li> </ul>		
Diabetic coach/example	Evocation, Compassion	<ul style="list-style-type: none"> <li>Ask patient for ideas/ambivalence</li> </ul>		

		<ul style="list-style-type: none"> <li>• Avoiding the righting reflex</li> <li>• Help patient to find the way to change</li> </ul>		
Senora Romero: I eat 5 tortillas with every meal. Do you think that brings my blood sugar up?			Collaboration	<ul style="list-style-type: none"> <li>• Partnership</li> </ul>
Senora Romero: So you're saying that my number should be at a 7 and I'm at a 10.			Acceptance	<ul style="list-style-type: none"> <li>• Absolute worth</li> <li>• Affirmation</li> <li>• Autonomy</li> <li>• Accurate empathy</li> </ul>
Senora Romero: I don't think I can give up my tortillas.			Evocation, Compassion	<ul style="list-style-type: none"> <li>• Ask patient for ideas/ambivalence</li> <li>• Avoiding the righting reflex</li> <li>• Help patient to find the way to change</li> </ul>

Instructional Event Table for Engaging

Portrayal	Demo Condition	Demo Step	Apply Condition	Apply Step
Dialogue example from workbook	Listening	<ul style="list-style-type: none"> <li>• Roadblocks to communication</li> </ul>		
Pediatric smoking example and non-example	Engaging	Core skills <ul style="list-style-type: none"> <li>• Open questions</li> <li>• Affirming</li> <li>• Reflective</li> </ul> Listening: Simple & complex reflections <ul style="list-style-type: none"> <li>• Summarizing</li> </ul>		

Non-example of pediatric smoking			Listening	Roadblocks to communication
<p>Example of pediatric smoking</p> <p>Aidan's mother: It's pretty stressful for both of us when he's sick.</p> <p>Aidan's mother: I try really hard not to smoke around him. I don't smoke in the car. When he's at home, I go outside to smoke. I know it's bad and I know it's bad for him. I don't want him to be around it so I try really hard.</p> <p>Aidan's mother: I've thought about quitting but it's really hard. I just don't know how to do it.</p> <p>Samples responses to client statements in workbook—page 54</p>			Engaging	<p>Core skills</p> <ul style="list-style-type: none"> <li>• Open questions</li> <li>• Affirmations</li> <li>• Reflections <ul style="list-style-type: none"> <li>-Simple</li> <li>-Complex</li> </ul> </li> <li>• Summarizing</li> </ul>

Instructional Event Table for Focusing and Evoking

<b>Portrayal</b>	<b>Demo Condition</b>	<b>Demo Step</b>	<b>Apply Condition</b>	<b>Apply Step</b>
Motivational Interviewing: A conversation with "Sal" about managing his asthma (effective)	Focusing (guiding)	<ul style="list-style-type: none"> <li>• Agenda mapping</li> <li>• Source of focus</li> <li>• Tools for focusing</li> </ul>		Example of each of the communication styles from health care book

<p><a href="http://youtu.be/-RXy8Li3ZaE">http://youtu.be/-RXy8Li3ZaE</a></p> <p>Motivational Interviewing: A conversation with “Sal” about managing his asthma</p> <p><a href="http://youtu.be/kN7T-cmb_10">http://youtu.be/kN7T-cmb_10</a> (ineffective)</p> <p>Agenda setting conversation with “Sal” (agenda setting, Engaging)</p> <p><a href="http://youtu.be/klnHJ4coG8o?list=PLmLKlp1R6077N8_9AHmQ54JpkKu1B2bKy">http://youtu.be/klnHJ4coG8o?list=PLmLKlp1R6077N8_9AHmQ54JpkKu1B2bKy</a></p>		<p>(bubble sheet, prioritizing)</p>		
<p>Health care book examples of dialog</p> <p>Conversation with "Sal" about managing his asthma #17</p>	<p>Informing and Advising</p>	<ul style="list-style-type: none"> <li>• Asking permission</li> <li>• Elicit- Provide- Elicit</li> </ul>		<p>Health care book examples of dialog</p>
<p>Narcotics addiction video</p>	<p>Evoking</p>	<ul style="list-style-type: none"> <li>• Ambivalence</li> <li>• Change talk (DARN)</li> <li>• Sustain talk</li> <li>• Motivation for change (importance ruler)</li> <li>• DARN questions for evoking</li> <li>• Responding to change and sustain talk</li> </ul>		

		<ul style="list-style-type: none"> <li>• Hope and confidence (confidence ruler)</li> <li>• Strengths (successful changers, reviewing past successes, brainstorming, reframing, hypothetical thinking)</li> </ul>		
<p>Book dialogue/workbook examples</p> <p>Strategies with Older Adults at Risk for Falls (non-example Tai Chi) #9</p>	Counseling with neutrality	<p>Decisional balance worksheet</p> <p>Emotional support</p>		
Example of a patient with obesity			Focusing (guiding)	<ul style="list-style-type: none"> <li>• Agenda mapping</li> <li>• Source of focus</li> <li>• Tools for focusing (bubble sheet, prioritizing)</li> </ul>
Example of medication adherence in hypertension			Informing and Advising	<ul style="list-style-type: none"> <li>• Asking permission</li> <li>• Elicit-Provide-Elicit</li> </ul>
Short Dialogue examples			Evoking	<ul style="list-style-type: none"> <li>• Ambivalence</li> <li>• Change talk (DARN)</li> <li>• Sustain talk</li> <li>• Motivation for change (importance ruler)</li> </ul>

				<ul style="list-style-type: none"> <li>• DARN questions for evoking</li> <li>• Responding to change and sustain talk</li> <li>• Hope and confidence (confidence ruler)</li> <li>• Strengths (successful changers, reviewing past successes, brainstorming, reframing, hypothetical thinking)</li> </ul>
Situation example of smoking cessation			Counseling with neutrality	Decisional balance worksheet  Emotional support

Instructional Event table for Planning

<b>Portrayal</b>	<b>Demo Condition</b>	<b>Demo Step</b>	<b>Apply condition</b>	<b>Apply step</b>
Motivational interviewing-- diabetes--Pulling his own strings #14	Readiness to change	<ul style="list-style-type: none"> <li>• 3 planning scenarios</li> <li>• CATs</li> </ul>		
Motivational Interviewing in Primary Care: Smoking Cessation #15 <i>Too long—changed to shorter video # 22</i>	Strengthening commitment	<ul style="list-style-type: none"> <li>• Intention</li> <li>• Commitment</li> <li>• Reluctance</li> </ul>		

Examples of supportive language for change	Supporting change	<ul style="list-style-type: none"> <li>• Persistence</li> <li>• Flexible Revisiting</li> </ul>		
Short dialogue examples			Readiness to change	<ul style="list-style-type: none"> <li>• Planning</li> <li>• CATs</li> </ul>
Short dialogue examples			Strengthening commitment	<ul style="list-style-type: none"> <li>• Intention</li> <li>• Commitment</li> <li>• Reluctance</li> </ul>
Short situation example <a href="https://www.kognito.com/changetalk/web/">https://www.kognito.com/changetalk/web/</a>			Supporting change	<ul style="list-style-type: none"> <li>• Persistence</li> <li>• Flexible revisiting</li> </ul>

### **Prototype**

Prototype construction based on recommendations in Merrill, 2013 using PowerPoint master slides and action buttons. Audio recorded using Audacity software. Videos edited and constructed with Windows Movie Maker and Adobe Premier Pro CS6.

### **Changes in Round One during data collection**

1. Typos corrected
2. Removed scrolling from introduction
3. Added additional directions for use of each of the slide interactions
4. Made sure to have a mouse for use by participants—difficulty by some participants using a touchpad.
5. Access to ear buds to listen to audio if needed

### **End of Round One**

1. Data from interviews (themes)
  - a. Participants would like examples of each of the MI spirit components
  - b. Videos or audio preferred over reading
  - c. Helpful Response Questionnaire pretest resulted in participants wanting examples of how they should have responded.
2. Data from observations
  - a. Participants do not explore other options if the correct answer is chosen on the first choice



- b. Clicking the text off took time during the interaction with instruction, some did not click to close the text before clicking on the next option and not being able to read the new selection.
- 3. Timing of Helpful Response Questionnaire pretest versus posttest
  - a. No consistent pattern
- 4. Helpful Response Questionnaire scores
  - a. Better scores posttest
  - b. One participant with worse scores after the instruction
- 5. Demographics
  - a. 5 participants
  - b. All female
  - c. Ages 27-55
  - d. 3 with No previous training in MI
  - e. 1 with previous CBT training

### **Changes in prototype based on round 1 data**

- 1. Add demonstrations of each of the components of MI spirit
- 2. Eliminate the Venn diagram
- 3. Add video/audio for some of *knowledge about* slides to reduce reading
- 4. Add 2-3 additional application interactions

### **Changes in prototype during round 2**

- 1. Remove Rollnick video via YouTube due to advertisements
- 2. Show example of *Effective Physician* video only once
- 3. Update in PowerPoint changed how video is embedded. Lost links more than once
- 4. Make interactive shapes different for interactive learning slides and application slides
- 5. Decision to use examples rather than non-examples for demonstration from interview feedback.
- 6. Re-embedded videos by new method—videos were stable for last round.
- 7. Typos, grammar, and inconsistencies corrected.

### **End of Round 2 data summary**

- 1. Data from interviews
  - a. Participants liked the video examples
  - b. Participants like the varied activities—intermix of reading and clicking with videos
  - c. Some videos were too long
- 2. Data from observations
  - a. Participants do not close responses
  - b. Typos

3. Timing of Helpful Response Questionnaires
  - a. No pattern
4. Helpful Response Questionnaire scores
  - a. Post scores higher than pre-scores
5. Demographics
  - a. 5 participants
  - b. All female
  - c. Average age 34 years
  - d. 4 of 5 without MI previous knowledge

### **Changes in prototype based on round 2 data**

1. Eliminated closing the text boxes
2. Instructions in a distinct color at the top of the interactive slides
3. Interspersed video with interactive slides
4. Made clear beginning and end of each segment

### **End of Round 3 data summary**

1. Data from interviews
  - a. Improvement of effectiveness
    - i. Difficulty understanding instructions/Placement of instructions
    - ii. Stronger introduction
    - iii. More examples of MI
    - iv. Make into separate segments so could do parts at a time
  - b. Most valuable
    - i. Techniques of MI section
    - ii. Videos
  - c. Least valuable
    - i. Nothing, no redundancy
    - ii. Charts/diagrams
    - iii. Non-examples
  - d. Efficiency
    - i. Clicking was excessive in sections
    - ii. Cursor disappearing during interaction slowed the interaction
    - iii. Some videos too long
  - e. Held attention
    - i. Videos
    - ii. Interaction with tutorial
  - f. Motivation
    - i. Relevance to practice
2. Data from observations
  - a. Content

- i. Corrections to font size and consistency
    - ii. Inconsistency in templates
    - iii. Minimize questions next to video for focus
    - iv. Volume adjustment between videos needed
  - b. Direction
    - i. ? Text above arrows to advance slides
    - ii. Click on picture of bubble sheet guidance needed
    - iii. Participants don't read the instruction
  - c. Navigation
    - i. Losing cursor
  - d. Demonstration
    - i. Change out longer pediatric smoking example for dentist with explanations
  - e. Feedback
    - i. Embedded rationale in responses with Try Again
    - ii. No affirmation after correct answer for application slides
- 3. Timing of Helpful Response Questionnaire
  - a. 4 participants took longer to complete posttest
  - b. 2 participants took less time to complete posttest
- 4. Helpful response Questionnaire scores
  - a. All had higher posttest scores
- 5. Demographics
  - a. 6 participants, one with lost data on demographics and pre-/posttests
  - b. Average age 39
  - c. one of five with previous MI instruction
  - d. 4 females, one male

### **Changes in prototype based on round 3 data**

1. Edited fonts and templates for consistency during round 3
2. Replaced smoking cessation video with more targeted shorter video of dentist with oral care
3. Eliminated non-example videos except in first section
4. Deleted some slides that were redundant and shorten the tutorial overall
5. Standardized position of directions right about interactive boxes. Make all directions bold and in black
6. Limited directive question next to videos to two

### **End of Round 4 data**

1. Data from interviews
  - a. Improvement of effectiveness
    - i. Too long

- ii. Stable volume to videos
    - iii. Eliminate application question in the middle of content in last section
    - iv. Break into segments for episodic viewing
  - b. Most valuable
    - i. Interactive virtual simulation at the end of the tutorial
    - ii. Interactive questions
    - iii. Videos
    - iv. Summary at the end of sections
  - c. Least valuable
    - i. Too many videos—reduce the number
    - ii. Video using still photographs rather than video
  - d. Efficiency
    - i. No recommendations
    - ii. Summary or key points at the end of each section.
    - iii. More navigation instructions
    - iv. No interactivity on information slides
  - e. Held attention
    - i. Interactive exercises
    - ii. Videos
  - f. Motivation
    - i. Relevance to practice
    - ii. Belief in efficacy
- 2. Data from observations
  - a. Content
    - i. Shorten content—need to edit to essential information about, how to, what happens and demonstrations
  - b. Direction
    - i. Little needed
  - c. Navigation
    - i. Verbal explanation for navigation for virtual simulation
    - ii. Cursor arrow disappeared
    - iii. Verbal prompt to click on picture for explanation
  - d. Demonstration
    - i. Longest parts are videos
    - ii. Cite all videos consistently
    - iii. More targeted videos to sections
  - e. Feedback
    - i. Try again worked
  - f. Application

- i. Quiz question in planning section should follow pattern for application questions
3. Timing of Helpful Response Questionnaire
  - a. 5 of 6 participants took less time for HRQ
  - b. 1 of 6 participants took more time for HRQ
4. Helpful response Questionnaire scores
  - a. All 6 participants scored higher for the posttest
5. Demographics
  - a. 6 participants
  - b. 5 female, one male participant
  - c. Mean age of 42
  - d. 3 had previous MI training

**Changes during round 4 data collection**

1. Introduction replaced including a clearer roadmap to the tutorial
2. Typos corrected
3. Re-evaluated need for each content item and edited to no more than 1 hours in length

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- Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Los Angeles, CA: Sage Publications, Inc.

## CURRICULUM VITAE

Mary Jane Cook

### EDUCATION

- |           |   |
|-----------|---|
| 2009-2019 | PhD, Indiana University, School of Nursing.   |
| 1997-2000 | Master of Science in Nursing, Michigan State University,<br>Family Nurse Practitioner Program |
| 1972-1976 | Bachelor of Science in Nursing, Michigan State University                                     |

### LICENSE & CERTIFICATION

- |                        |  |
|------------------------|--|
| Current thru 3-31-2019 | Registered Nurse, Advanced Practice Nurse—<br>Michigan             |
| Current thru 8-31-2020 | Family Nurse Practitioner, American Nurses<br>Credentialing Center |
| Current thru 8-2020    | BLS, American Heart Association                                    |

### PROFESSIONAL EMPLOYMENT

- |              |  |
|--------------|--|
| 2007-present | Michigan State University, Faculty for Nurse Practitioner<br>Program, Family Nurse Practitioner Provider – MSU<br>Health Team, MSU Family Health Center  |
| 2000-2007    | St. Johns Family Health Center, St. Johns Michigan,<br>Family Nurse Practitioner, Clinical preceptor, Family and<br>Adult Nurse Practitioner students  |
| 1976-2008    | Ingham Regional Medical Center, Critical Care<br>Nurse/Educator, Adult Critical Care Nurse, Contact nurse<br>with responsibility for bed control, staffing and triage,<br>Developed and taught in-service educational programs on<br>12-Lead EKG interpretation, CPR, cardiovascular<br>medications, physical assessment and nursing care of the<br>patient with an intra-aortic balloon pump. Preceptor,<br>baccalaureate nursing students in critical care, Chairperson,<br>RN Clinical Ladder Committee 1992-1996 |

### RESEARCH FUNDING

- |      |  |
|------|--|
| 2014 | Sigma Theta Tau International, Alpha Psi Chapter |
|------|--|



--Chapter Research Grant (\$1000)

2011 Michigan State University College of Nursing  
2009 --Summer Scholarship Grant (\$1000)  
--Summer Scholarship Grant (\$1000)

### **PUBLICATIONS IN REFEREED JOURNALS**

Cook, M. J. (2012). Design and initial evaluation of a virtual pediatric primary care clinic  
In Second Life®. *Journal of the American Academy of Nurse Practitioners*, 24 (9),  
521-527. doi: 10.1111/j.1745-7599.2012.00729.x

### **OTHER PUBLICATIONS**

Cook, M. J. & Dontje, K. (2014). Educating meaningful users: Using an EHR for nurse  
practitioner education. In L. Caputi (Ed.), *Innovations in nursing education:  
Building the future of nursing* (25-30). Washington, DC: National League for  
Nursing.

### **PRESENTATIONS – REFEREED**

April 2018	42 <sup>nd</sup> Annual Research Conference, Midwest Nursing Research Society, Podium Presentation: <b>Professional Identity and Hierarchy Issues Impact on Interprofessional Education</b>
April 2018	NONPF 44 <sup>th</sup> Annual Conference. Podium presentation: <b>Academic and Community Partnerships for Interprofessional Education in Primary Care</b>
April 2017	41 <sup>st</sup> Annual Research Conference, Midwest Nursing Research Society; <b>Graduate Interprofessional Education in the Primary Care Setting: Teaching Strategies and Learner Outcomes</b>
April 2017	NONPF 43 <sup>rd</sup> Annual Meeting, Poster: <b>Simulation Design to Implement Interprofessional Practice in Primary Care</b>
October 2014	NLN 8 <sup>th</sup> Annual Health Information Technology

	Conference, Poster presentation, <b>Integrating Millie into the EHR: An Innovative Use of ACES Cases for Nurse Practitioner Students</b>
October 2013	NLN 7 <sup>th</sup> Annual Health Information Technology Conference, Panel and Poster presentation, <b>Implementing an EHR: Strategies from Four HIT Scholar Projects</b> (panel) and <b>Linking Electronic Health Record Curriculum to Nurse Practitioner Competencies and Meaningful Use</b> (poster)
March 2013	MNRS 37 <sup>th</sup> Annual Research Conference, Poster Discussion presentation, <b>Nurse practitioner student proficiency in motivational interviewing</b>
Fall 2011	NLN 6 <sup>th</sup> Annual Health Information Technology Conference, Poster presentation, <b>The simulated electronic record: Increasing informatics knowledge for nurse practitioner students</b>
Spring 2011	NONPF 37 <sup>th</sup> Annual Conference, Poster presentation <b>Technology as a tool for teaching decision-making: Development of a virtual clinic in Second Life®</b>
Spring 2011	MSU Technology Showcase, Demonstration <b>Introducing the Granger Primary Care Clinic in Second Life®</b>
Fall 2010	NLN 5 <sup>th</sup> Annual Health Information Technology Conference, Poster presentation, <b>Utilizing a Simulated Electronic Health Record to Improve Informatics Knowledge and Capabilities</b>
Spring 2010	NONPF 36 <sup>th</sup> Annual Conference, Podium presentation <b>Improving Informatics Knowledge and Skills Through the Use of the Electronic Health Record</b>

#### **INVITED PRESENTATIONS**

November 2013	42 <sup>nd</sup> Biennial Convention Sigma Theta Tau International, Rising Stars of Research and
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Scholarship Invited Poster presentation; **Designing Instruction in Motivational Interviewing for Nurse Practitioner Students**

January 2011

MSU College of Nursing, Teaching Commons:  
**Health Information Technology Scholars  
Project: Integration of EHR in an APN program  
& Introducing the Granger Clinic: Second Life**

## **HONORS & AWARDS**

2014	Graduate Teaching Award Michigan State University College of Nursing
2013	Rising Stars of Research and Scholarship at the 42nd Biennial Convention Sigma Theta Tau International
2010-2011	Nightingale Scholarship: Indiana University Purdue University Indianapolis, School of Nursing
2009-2010	AANP Foundation Scholarship NP Doctoral Education
1992	RN of the Year, Ingham Medical Center

## **PROFESSIONAL MEMBERSHIPS**

- American Academy of Nurse Practitioners
- American Nurses Association
- American Association of Critical Care Nurses
- Michigan Council of Nurse Practitioners
- Midwestern Nursing Research Society
- National Organization of Nurse Practitioner Faculties
- National League for Nursing
- Sigma Theta Tau International, dual membership, Alpha and Alpha Psi Chapters

## **EDITORIAL BOARDS/REVIEWER**

2016-present	National Organization of Nurse Practitioner Faculties, <b>Abstract Reviewer</b>
2017-2018	Midwest Nursing Research Society, Annual conference

**Abstract Reviewer** (general submission abstracts, student poster abstracts, and “late breaking” abstracts)

2013-present	The McMaster Online Rating of Evidence (MORE) System <b>Rater</b>
2013	Anatomical Sciences Education <b>Article Reviewer</b>
2011	Journal of the American Academy of Nurse Practitioners <b>Article Reviewer</b>

#### **ACADEMIC SERVICE**

2008—present Faculty advisor to NP students

#### **UNIVERSITY & COLLEGE SERVICE**

2016—present	Family Health Center, Workflow committee
2015—present	Family Health Center, College of Nursing NP leadership liaison
2014—2016	Health Team, Clinical Informatics Steering Committee Representative
Fall 2013--2017	Member, Graduate Programs Committee
Fall 2012--2014	Doctorate of Nursing Practice Task Force Member
Fall 2011	Technology Breakfast Series, presentation and discussion of experiences with Moodle during limited field trial of learning management software
2007—12/2013	MSU Health Team Credentialing Committee

#### **OTHER**

Fall 2016	Nurse practitioner profession, MSU Human Biology Club presentation
Spring 2016	Online Learning: The Faculty Perspective, Presentation to incoming graduate students

Fall 2011—2012      Advanced practice nursing, Guest presentation to Early Access program students

Summer 2012      Graduate programs in nursing, Guest presentation in NUR480 Nursing Role Transition Seminar

## **TEACHING**

2007-present      Michigan State University

**Assistant Professor—Health Programs**, Faculty for Nurse Practitioner Program.

Interdisciplinary Education, Simulation workgroup, HRSA Grant, Summer 2016 to Summer 2018

NUR 821, Management of Family I, clinical faculty, Summer 2017, Summer 2018

NUR 809, Applied Pharmacology for Advanced Practice Nurses, course coordinator, didactic content provided by PharmD faculty, Summer 2017

NUR 807, Clinical Decision-making, course coordinator and clinical faculty, Spring 2017, Spring 2018

NUR 822/832, Clinical Practicum I, course coordinator and clinical faculty, Fall 2016, Fall 2017, and Fall 2018

Faculty Clinical Placement Liaison, Summer 2016 to January 2017

NUR 821/836, Management of Family/Adult-Gerontology Patient I, Summer 2016, course coordinator and clinical faculty

NUR 807 Clinical Decision-Making for Nurse Practitioners, course coordinator, Spring 2016

NUR 960, Foundations of Nursing Science—co-taught with Dr. Horodyski, Fall 2013

Course development for NUR 960: Philosophy of Nursing Science, joint PhD/DNP course. Summer and Fall 2012

NUR 820, Advanced Health Assessment, Clinical Faculty and Course Coordinator. Fall 2008-2012

NUR 824, Primary Care Practicum II, Clinical Faculty. 2008-2011

NUR 426, Theoretical Basis of Critical Care Nursing, Course Coordinator, Summer 2011, 2012, 2013

Participated in MSU Moodle Limited Field Trial--Summer semester 2011

2007-2009 Voting member of Graduate Programs Committee, College of Nursing, Fall 2007-Spring 2009; Fall 2013-present; Chairperson of DNP subcommittee Spring 2009.

Clinical preceptor for NP students.

2005-2007

**Clinical Instructor**

2007 Clinical Decision Making (NUR 807) – Spring

2005 Foundations of Nursing (NUR 204) – Spring

2005 Health and Physical Assessment (NUR 316) – Fall

2005-2006

**Instructor**, Theoretical Basis of Critical Care (NUR 426)

2010

**Projects**, Health Information Technology Scholars Program

**PRACTICE**

2007-present

Michigan State University, Family Nurse Practitioner Provider – MSU Health Team, MSU Family Health Center, Voting member of Health Team Credentialing Committee (2008-2013), Health Team Clinical Informatics Steering Committee (2014)

2000-2007

St. Johns Family Health Center, St. Johns, Michigan. Family Nurse Practitioner, Clinical preceptor for Family and Adult Nurse Practitioner students

1976-2000

Ingham Regional Medical Center, Registered Nurse, Adult Surgical Intensive Care Unit