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Paramedics' and Employers' Perceptions of Critical Thinking

David L. Sullivan

PARAMEDICS' AND EMPLOYERS'  
PERCEPTIONS OF CRITICAL THINKING

Presented in Partial Fulfillment of the Requirements for  
Degree of Doctor of Philosophy in  
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By

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\* \* \* \*

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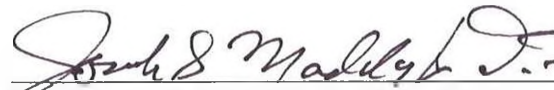
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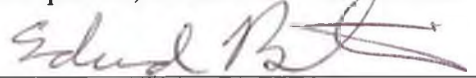
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ABSTRACT

PARAMEDICS' AND EMPLOYERS'  
PERCEPTIONS OF CRITICAL THINKING

David L. Sullivan

Barry University, 2009

Dissertation Chairperson: Dr. Joseph Maddox, Jr.

Purpose: The purpose of this qualitative, phenomenological study was to summon paramedics' and paramedic employers' perceptions of critical thinking. To explore this phenomenon, the researcher sought to answer an overarching question by collecting participant responses to interview protocol questions (Creswell, 2005; Patton, 2002).

Method: This phenomenological qualitative study was conducted with eight-paramedic and eight-paramedic employer participants that were purposively selected from a convenient sample population. The paramedic participants work for one of nineteen fire department or EMS agencies located within a single county and are required to attend a four-day paramedic orientation class. The paramedic employer participants employ the paramedic participants in this study. All nineteen employers from this county and paramedics from this orientation class were provided with a recruitment flyer via a non-partial gatekeeper. Only the first eight paramedic and first eight employer participants who completed an online anonymous, open-ended questionnaire via a secured website, were included in the study.

Participants provided their perceptions of paramedic critical thinking and included: (1) what they thought critical thinking was; (2) how important critical thinking is to the paramedic profession; (3) type of paramedic program paramedics attended and

type of program the employer preferred; (4) whether there is a difference between degree and non-degree programs; (5) whether or not paramedic programs provide adequate (if any) critical thinking education; (6) recommendations for improving or adding critical thinking education; and (7) if there was anything else that would benefit the study.

The data collected from the questionnaires was analyzed by comparing paramedic and paramedic employer responses for common themes (or differences) and aligning responses with the attributes of critical thinking using the Richard Paul Model (RPM) of Critical Thinking. The RPM of CT is an established and widely recognized model for attributes of critical thinking (Paul & Elder, 2006; Nosich, 2005).

Major Findings: Using an inductive process for analyzing participants' responses, the study revealed four common themes. First, the findings revealed that both paramedics and paramedic employers (combined) have (at least some) understanding of what critical thinking is and believed that it does have *value* within the paramedic curriculum. All (100%) paramedics understood the basic concepts of critical thinking and most (87.5%) paramedic employers revealed a grasp of the basic concepts, as well, with a minority (12.5%) of employers referring to critical thinking as only a "step-by-step", problem-solving process.

Second, both paramedics and employers revealed that they valued critical thinking ability and that critical thinking was essential to what paramedics do in the prehospital patient care setting -- take care of patients. Third, only a minority of paramedics (25%) and employers (12.5%) believed that paramedic programs offer adequate critical thinking education. And fourth, most paramedics and employers recommended significant changes to critical thinking education being offered in

paramedic programs. These recommendations included offering: (1) more “hands-on” scenarios using a thought process to work through problems; (2) “hands-on scenarios with repetition and variations”; (3) comprehensive anatomy, physiology, and pharmacology classes to strengthen understanding of body systems; (4) more student-centered dialogue and interaction to engage student groups; (5) more integration of clinical, field, and lecture material into presentations so students can “bring it all together” in the learning environment; (6) group projects with “team-based learning”; and (7) use of critical thinking processes throughout paramedic programs that allow students to evolve from “step-by-step” processes that limit the thinking and learning experience.

Other interesting findings from this study revealed that a majority (62.5 %) of paramedics attended community college programs for their initial paramedic education and half (50%) of the employers preferred that their paramedics attended a community college program. When asked about the difference between associate degree and certificate paramedic programs, a majority (62.5%) of employers believed that associate degrees were more favorable and a minority (37.5%) of paramedics believed there was no difference between degree and certificate programs.

## ACKNOWLEDGMENTS

As with any major process or endeavor that we engage ourselves with, it is our inner desire for finding purpose and meaning that drives us to succeed. Designing and developing this study was a capstone to a long and adventurous journey. Fortunately, this journey was taken with family, friends, loved ones, and colleagues. It is because of everyone who supported me with my life-long education and career that this study was possible. My appreciation and gratitude goes out to all.



## DEDICATIONS

I dedicate this project to all Emergency Medical Services personnel and educational programs who serve with a passion for patient care and safety. This study will hopefully be one of many that will strengthen a profession that has helped so many, yet faced triumphs and challenges over several decades.

I also dedicate this to my parents, family, and friends who have stood by me and sacrificed time and effort to allow me to take this long educational journey.

To my wife Angela, my daughters Maria and Emily, and my parents; Thank you for always being there.

I love you all very much.

To my university professors and colleagues; your inspiration and support has been invaluable in making this journey more meaningful. I want to especially thank Dr. Teri Melton for her countless hours of inspiration and guidance with philosophy and phenomenology.

To Dr. Joseph Maddox, my committee chairperson; I owe a great deal of gratitude for his availability and guidance for my study.

And finally, to my committee, Dr. Ed Bernstein and Dr. Greg Meek; thank you for taking the time to help me through the final process; your time and effort was very much appreciated.

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## CHAPTER I

### THE PROBLEM

#### Introduction

With a vast number of both public and private paramedic training and education programs serving our nation, there remains a variance in the quality and quantity of skills practice, hospital and field internship hours, and patient contact requirements for each program (Institute of Medicine [IOM], 2007; National Registry of Emergency Medical Technicians [NREMT], 2006). Both prehospital and allied healthcare employers continue to face shortages of competent, entry-level employees entering the workforce (Florida Hospital Association [FHA], 2005; IOM; Patterson, Probst, Leith, Corwin, & Powell, 2005). It is because of these shortages that paramedic training and education programs continue to receive pressure from employers to increase the number of paramedic graduates each year (IOM).

According to the Institute of Medicine (2004; 2007), patient medical conditions are becoming more complex as the nation's healthcare system faces increased fiscal and resource constraints. These complex medical conditions are expected to continue challenging the nation's health care resources as our national geriatric population increases (American Geriatric Society, 2004) and the number of premature patient releases from hospitals (e.g., due to insurance constraints and lack of healthcare personnel to care for them) and healthcare facilities continues (IOM, 2007). These challenges will continue to cause an increased demand for competent and well-trained prehospital care providers (IOM). To address the increasing demand for competent, entry-level prehospital care providers, paramedic training and education institutions will

continue being tasked with delivering ample numbers of competent, critically thinking paramedics to navigate these complex patient care conditions (IOM).

### Statement of the Problem

A review of the literature has revealed that not all paramedic training and education programs effectively address the critical thinking skills that are essential for paramedic students to be successful (Hauswald, 2002; Silvestri et al., 2002; Pointer et al., 2001; Hubble et al., 2000; IOM, 2004). These critical thinking skills are essential to address patient triaging and assessment, medication calculation and administration, and prioritization of patient care skills (Bledsoe et al., 2003; Bledsoe & Benner, 2006). Having a vast variety of initial-paramedic-training and education institutions across the country, there is a variation in required clinical, classroom, and laboratory skills practice hours included in paramedic programs (IOM, 2007; NREMT, 2006). Given the argument that the ability for health care providers to think critically is essential, Paul and Elder (2002; 2006) strongly recommend that critical thinking skills be taught through a structured process that will help individuals apply critical thinking in all aspects of their life.

Competent and well-prepared paramedics are in high demand and must be able to enter and negotiate through complex trauma and medical, patient care situations (IOM, 2007). Healthcare training and education programs must ensure that students entering the workforce have attained adequate training and healthcare employers are able to employ critical thinkers who can deliver timely, appropriate patient care (Banning, 2006; Bledsoe et al., 2003; FHA, 2005; IOM, 2007; Lunney, 2003).

Paramedic training and education programs are designed to teach paramedics to enter a broad range of patient care settings, recognize and appropriately identify life-threatening problems, triage patient priorities, treat emergent life-threatening situations, and transport patients to appropriate local area or specialized hospitals (Bledsoe et al., 2003; Sanders, 2007).

The competence and capabilities of any health care provider, especially paramedics, providing patient care is critical for effective patient care and patient outcomes (IOM, 2000; 2007). During initial paramedic training, it is essential for paramedic students to learn effective critical thinking skills through training and education within their program so they can not only improve didactic and psychomotor testing scores; but also, effectively apply critical thinking skills to the prehospital care setting (Bledsoe et al., 2003; Bledsoe & Benner, 2006; Sanders, 2007). To help paramedics, paramedic educators, and paramedic employers understand the importance of critical thinking in prehospital care, this study will explore paramedics' and paramedic employers' perceptions of critical thinking skills in the prehospital patient care environment.

#### Purpose of the Study

The purpose of this study was to summon paramedics' and paramedic employers' perceptions of critical thinking skills in the prehospital care setting. To explore this phenomenon, the researcher sought to answer an overarching question by summoning participant responses to interview protocol questions (Creswell, 2005; Patton, 2002).



## Research Questions

In a phenomenological study, the researcher develops questions that will explore participants' responses and unveil the true meaning of their responses. These responses are based upon participants' lived experiences and perceptions (Creswell, 1998; 2003; Patton, 2002).

The overarching question for this research study was:

What are paramedics' and paramedic employers' perceptions of critical thinking?

To understand the phenomenon relating to perceptions of critical thinking and to answer the overarching question (Creswell, 1998), this study asked paramedics and paramedic employers a set of open-ended questions designed to elicit descriptive responses to a specific set of questions. These questions addressed:

1. How do participants define critical thinking?
2. How important is critical thinking to the paramedic profession?
3. What type of paramedic program did participants attend and complete (e.g., private company, hospital-based program, community college, vocational technical institution)?
4. Was the paramedic program attended and completed, a paramedic certificate or associate degree program?
5. Did the paramedic education and training program provide critical thinking education in the curriculum?

The findings of this study will offer paramedic and paramedic employer perceptions of critical thinking to paramedic training and education institutions and potentially provide vital information to guide future paramedic critical thinking education.



## Significance of the Study

A shortage of competent, entry-level paramedics and healthcare providers continues to plague health care employers (IOM, 2007) that struggle to meet patient care demands. As patient medical conditions become increasingly more complex, the nation's healthcare system faces numerous fiscal and staffing constraints (IOM, 2004; 2007) and healthcare employers must engage the task of searching for healthcare providers that have the critical thinking skills necessary to provide care to the patient care populations that exist within our nation today. This study may be important to paramedic employers as well as paramedic education and training programs because it will provide paramedics' and employers' perceptions on the critical thinking skills learned within their initial and continued paramedic education.

### Origins of the Researcher's Interest in Paramedic Critical Thinking

The researcher for this study has held several professional positions within the paramedic profession including field paramedic, tactical and critical care paramedic, training officer, supervisor, educator, and administrator for paramedic continuing education. These professional positions have exposed the researcher to both positive and negative experiences with paramedic critical thinking. It is because of the researchers' lived-experiences within the paramedic profession and paramedic standard of care (Bledsoe et al., 2003; Bledsoe & Benner, 2006; Campbell, 2008; Limmer et al., 1999; McSwain et al., 2003; Markenson, 2002; Phalen & Aehlert, 2006) that paramedic critical thinking was a topic of interest.

The researcher also conducted a pilot study in 2007 summoning paramedic supervisors' responses to how they perceived paramedic thinking in the prehospital

setting as part of a doctoral class research assignment. The pilot study findings revealed that paramedic employers were concerned with the lack of critical thinking skills in some of their employees. The findings also revealed that paramedics had to be on the job for many years before learning how to apply critical thinking skills.

A review of the literature revealed that effective use of critical thinking skills in the health care environment are essential for engaging complex patient care settings (Bledsoe et al., 2003; Bledsoe & Benner, 2006; IOM, 2000; 2004; 2007). To shed light upon the of paramedic critical thinking phenomenon, the researcher summoned paramedics' and paramedic employers' perceptions and used the Richard Paul Model (RPM) of Critical Thinking (Paul & Elder, 2002) as the theoretical framework to align participant responses with the attributes of critical thinking.

#### Theoretical Framework

The theory used to guide this study was critical thinking and the Richard Paul Model (RPM) for Critical Thinking served as the theoretical framework to construct a foundation and identify the attributes of successful critical thinking (Paul & Elder, 2002; 2006). The RPM of Critical Thinking (Figure 1) aligned participants' responses to the critical thinking model standards of thinking, elements of reasoning, and intellectual traits that develop life-long learning processes (Paul & Elder). The RPM of Critical Thinking allows for strengths and weaknesses of paramedic critical thinking to be identified and addressed within a qualitative, phenomenological research design.

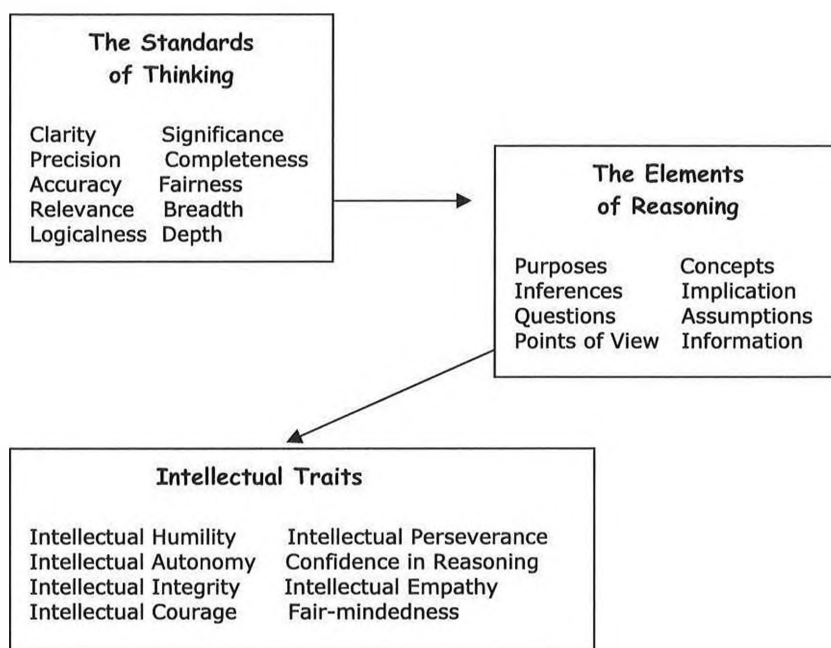
#### Research Design

Using a qualitative, phenomenological research design for this study allowed the researcher to explore paramedics' and paramedic employers' perceptions of critical

thinking. The qualitative research design was appropriate for this study because it allowed the researcher to engage participants through an inductive process by using open-ended questions that summoned their beliefs, values, and opinions on paramedic critical thinking (Creswell, 1998; 2003; Patton, 1990; 2002).

Figure 1. Richard Paul’s Model for Critical Thinking

The *Standards of Thinking* must be applied to the *Elements of Reasoning* in order to develop the *Intellectual Traits* that will establish the foundation for life-long critical thinking.



A quantitative design was not utilized for this study because the researcher sought thick, rich, descriptive responses from paramedic and paramedic employer participants based upon their opinions and perceptions of critical thinking (Creswell, 1998; 2003; Patton, 2002). Quantitative methodology employs a deductive process using statistical forms of data that does not allow for participants’ emotions, feelings, or perceptions to be

offered (Creswell, 1998; Creswell & Plano-Clark, 2007). The research data and findings sought for this study were descriptive and not based upon numerical values; therefore, a qualitative design was most appropriate for this study (Creswell; Creswell-Plano-Clark). To help explain terminology and terms used throughout this study, a definition of terms section is provided.

### Definition of Terms

This section will address terminology being used throughout the study. Based upon a review of the literature, there is no single definition for *Critical Thinking*. For the purpose of this study, critical thinking was viewed as a process and as an art. Critical thinking is a process of reflecting upon facts by means of evaluation, reasoning, and forming judgments about a situation or occurrence (Rubenfeld & Scheffer, 1995) and as an art of analyzing and evaluating thinking with the primary focus of improving thinking that is self directed, self-disciplined, self-monitored and self-corrective (Paul & Elder, 2002; 2006). Critical thinking was explored throughout this study beginning with a broad view of what critical thinking is and converged upon the attributes of critical thinking in paramedics.

To define what a paramedic is and how they are an essential part of the prehospital, patient care setting, it is essential to describe the various levels of Emergency Medical Services (EMS) certifications. According to the National Highway Transportation and Safety Administration [NHTSA], (2006), the National EMS Scope of Practice Model, a tool to promote national consistency and public understanding of EMS practice, addresses the introduction of proposed levels of emergency medical responders

(e.g., Emergency Medical Responder, Emergency Medical Technician, Advanced Emergency Medical Technician, and Paramedic).

These levels of certification are not expected to be officially implemented until after this study is completed. It is however, important to address these levels as they are expected to be implemented on a national level in the near future. For the purpose of this study however, the researcher addressed the current levels of prehospital care provider certification existing on a national level. These levels include:

*EMT-Basic* - providers are taught basic emergency care skills that include caring for respiratory, trauma, and cardiac emergencies as well as patient assessment skills. The hours spent in these areas are in addition to emergency room and ambulance clinical rotations (NREMT, 2006; IOM, 2007).

*EMT-Intermediate* - providers may be trained in intravenous techniques, advanced airway devices, fluid resuscitation, evaluation of heart electrical rhythms, and administration of advanced medications. This continuation of training typically includes 35 to 55 hours of additional training beyond EMT-Basic and a specific amount of clinical experience (NREMT, 2006; IOM, 2007).

*EMT-Paramedic* - the most advanced level of training for the out of hospital or prehospital care provider. This level is the highest level attained by pre-hospital care providers and includes additional training in pathophysiology, body functions, advanced patient care skills, and a significant amount of clinical, field experience. This program can take up to two years to complete and commonly includes an associate degree in applied science. Graduates of this type of program will typically be able to take state and

NREMT examinations to become certified as an EMT-Paramedic (NREMT, 2006; IOM, 2007).

Introducing and describing the specifics of each certification level are important to understand how paramedics evolve through an academic process and the opportunities provided to help them develop critical thinking skills. As this study explored paramedic critical thinking, there were limitations and delimitations. To address these, a limitations and delimitations section was provided.

### Limitations and Delimitations

#### *Limitations*

A limitation in research refers to weaknesses in data collection and the processes that analyze the findings and data collected (Creswell, 2003; Patton, 2002). Because this study limited participation to paramedics and employers within a single county, a list of associated limitations needed to be addressed. The following were recognized as potential limitations of this study:

1. The sample for this qualitative study was eight (8) newly hired paramedics working for one of nineteen fire department and EMS agencies within a single, Florida, urban, high-performance EMS system and the first eight (8) out of nineteen agencies as paramedic employment agencies participating in this study.
2. Many of the participants know the researcher as a paramedic and educator. This may have created some level of intimidation or apprehension in participant's willingness to participate or in providing complete, honest responses to the questions posed to them.

As these limitation potentials were acknowledged, the researcher made every effort to be open and honest with the paramedics and paramedic employers who were participants in this study (Creswell, 2003; Patton, 2002). As the researcher collected data and responses from a secured online anonymous questionnaire, the researcher had no way

of knowing the individual identities of participants. To address the rationale for what was not being done, delimitations are addressed.

### *Delimitations*

Delimitations in a research study refers to constraints and rationale for what is not being performed within a study and why (Creswell, 2003). The researcher for this study was seeking a limited number of paramedics and paramedic employers to conduct a qualitative, phenomenological study. Due to the nature of this qualitative study, time and resources created foreseeable constraints, so a large participant population was not appropriate (Creswell). The following were recognized as potential delimitations of this study:

1. Paramedic participants were selected from a single, local orientation process over a two-month period that all new-hired paramedics are required to attend as part of the employment requirements for the agency employing them. The study did not seek other applicants outside of this population.
2. As this study explored paramedics' and employers' perceptions of critical thinking, it only sought and collected data from paramedic participants attending a required orientation, without consideration for race, gender, years of experience, or identity information.

As this study presents a broad overview of critical thinking and how it relates to the paramedic profession, a section to discuss organization of the study is provided.

### Organization of the Study

This study was organized into five chapters with references and appendixes. The following chapters provide essential components for a comprehensive, qualitative, phenomenological study that explored paramedics' and paramedic employers' perceptions of critical thinking. Chapter One provides an introduction, statement of the problem, purpose of the study, research questions, significance of the study, origins of the



researcher's interest in the topic, theoretical framework, research design, definition of terms, limitations and delimitations, organization of the study, and a chapter summary. Chapter Two includes a chapter introduction, setting of where the study took place, theoretical framework, and chapter summary.

Chapter Three provides a chapter introduction, philosophical framework, rationale for a qualitative study, research questions, methods, standards of quality and verification, ethical considerations, and a chapter summary. Chapter Four includes an introduction to the chapter, demographics of the participants, study findings, summary of the study findings, and chapter summary. Chapter Five includes an introduction to the chapter, summary of the study, discussion of the findings, recommendations for further research, implications for practice, and a chapter summary.

In addition, an appendices section is provided that includes participant recruitment flyers, online informed consent forms, critical thinking questionnaires, participant questionnaires, and protecting human research participant's course completion certificate.

### Chapter Summary

As patient care continues to become increasingly complex, a paramedic's ability to apply critical thinking skills in the prehospital setting becomes crucial (Bledsoe et al., 2003; Larmon & Snyder, 2007; Sanders, 2007). Timely and appropriate patient care is critical to patient well-being and survival (IOM, 2000; 2004; 2007) so paramedic education and training programs must be diligent with infusion of critical thinking applications in the paramedic curriculum. This qualitative, phenomenological study of the paramedic critical thinking phenomenon allowed the researcher to delve into paramedics'



and paramedic employers' perceptions of critical thinking in the prehospital patient care setting and sought to make sense of this phenomenon.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### Introduction

The purpose of this qualitative, phenomenological study was to summon paramedic and paramedic employers' perceptions of critical thinking in the prehospital setting. This chapter introduces a review of the literature on critical thinking and explored the phenomenon of paramedic critical thinking.

The notion of critical thinking in prehospital patient care has been evolving for many years and has been (is) infused into paramedic education and learning materials (Bledsoe et al., 2003; Larmon & Snyder, 2007; Sanders, 2007). As prehospital patient care continues to become more challenging for paramedics and emergency care personnel (Alexander, 2006; American Heart Association [AHA], 2003), so does the challenge of prehospital care employers in finding ample numbers of competent, critical thinking personnel to staff response and transport vehicles in their communities (Institute of Medicine [IOM], 2007).

Chapter Two examined the need for this study and provides a review of literature that addresses the importance of critical thinking skills for paramedics. Paramedic training and education (initial and continuing education) programs are held to local, state, and national standards in addition to receiving increased pressure from local employers to graduate ample numbers of trained personnel to meet the demand of local communities (NREMT, 2006; IOM, 2007). The Institute of Medicine confirmed that the high pressure to produce adequate numbers of emergency care personnel, to include paramedics, causes need for alarm. Because of this demand; critical thinking has become a priority topic for

discussion in many educational institutions and is becoming commonplace in prehospital educational texts and learning resources (Bledsoe et al., 2003; IOM, 2007; Limmer & LeBaudour, 2005). In order to function effectively in the prehospital care environment, prehospital providers must attain the skills and competencies required to fulfill the roles and responsibilities with a high level of critical thinking skills (Bledsoe et al; Limmer& LeBaudour).

### Roles and Responsibilities of Paramedics

A paramedic, as an extension of an emergency care physician, is the highest level of prehospital care provider and regarded as a critical link in the continuum of patient care (Bledsoe et al., 2003; IOM, 2007; NREMT, 2006). While some communities provide paramedic services and personnel with extended skill sets (e.g., home health care related visits to reduce use of local emergency departments), the primary role of a paramedic is to provide emergency care to patients in the prehospital, patient care setting (Bledsoe et al; Mason, Knowles, Freeman, & Snooks, 2008).

According to Bledsoe et al. (2003) and NREMT (2006), paramedics must meet specific national, state, and local requirements in addition to licensing and credentialing agencies. As extensions of emergency physicians, paramedics work under the constraints of a physician's medical authority and licensure (Bledsoe; Sanders, 2007). Paramedics and prehospital care providers typically work in a structured environment in collaboration with field training personnel, field supervisors, and always work under the direct or indirect supervision of a medical director physician (Bledsoe et al; IOM; NREMT).

The medical director or designee is available for in-person, radio, or telecommunication consult during real-time patient care situations (Bledsoe et al., 2003;

Sanders, 2007). The medical director physician providing oversight for paramedics has the role of consulting resource, encouraging paramedic involvement in patient care decision-making process, and relying heavily upon the patient care presentation provided from various levels of prehospital care providers in the field (Bledsoe et al.). To understand a medical director's expectation of prehospital patient care providers, comfort in paramedic practice, and provider competence, a review of EMS certification and licensure levels are addressed.

### Levels of Certification

To understand prehospital patient care provider certification levels and training requirements placed upon paramedic training and education programs and building a medical director's comfort in prehospital care provider abilities (and limitations), it is essential to describe each level of training and certification of prehospital care providers. As prehospital patient care guidelines continue to evolve, so do certification and educational standards. In 2009, new levels of certification and licensure for prehospital emergency care providers (e.g., Emergency Medical Responder, Emergency Medical Technician, Advanced Emergency Medical Technician, and Paramedic) will be implemented (NHTSA, 2006). For the purpose of this study however, the researcher addressed the current levels of prehospital care provider certification and licensure existing on a national level.

A paramedic is an advanced level of Emergency Medical Technician [EMT] (Bledsoe et al., 2003; NREMT, 2006; IOM, 2007). There are three levels of prehospital patient care providers or EMT's that are nationally recognized (at the time this study was conducted) in the United States. These three levels include EMT-Basic, EMT-

Intermediate, and EMT-Paramedic. The following descriptions outline the training components that are typically included in each level of emergency medical technicians (NREMT).

#### *EMT-Basic*

To understand the required initial education requirements for paramedics, it is essential to explore the fundamental building blocks that all paramedics must attain prior to becoming a paramedic. The initial level of certification for all paramedics is the EMT-Basic certification. EMT-Basic providers are taught basic emergency care skills that include caring for respiratory, trauma, and cardiac emergencies as well as patient assessment skills. The hours spent in these areas are in addition to emergency room and ambulance clinical rotations. Those who complete approved EMT-Basic training programs and pass both written and practical examinations administered by their state certifying agency or the National Registry of Emergency Medical Technicians (NREMT), receive the title “Registered EMT-Basic.” The basic training program is also the foundation and building block for the more advanced EMT-Intermediate and EMT-Paramedic training programs (NREMT, 2006; IOM, 2007).

#### *EMT-Intermediate*

Although not required for continuation to paramedic certification, an EMT-Intermediate level of certification is available to those who seek a higher level of prehospital care provider. The EMT-Intermediate care provider may learn intravenous techniques, advanced airway devices, intravenous fluid resuscitation, evaluation of heart electrical rhythms, and administration of advanced medications. This continuation of

training typically includes 35 to 55 hours of additional training beyond EMT-Basic and a specific amount of clinical experience (NREMT, 2006; IOM, 2007).

### *EMT-Paramedic*

The most advanced and highest level of training for the prehospital care provider occupation is EMT-Paramedic. The EMT-Paramedic level is the highest level attained by prehospital patient care providers and includes additional training in pathophysiology, body functions, advanced patient care skills, and a significant amount of clinical field experience. This program can take up to two years to complete and commonly includes an associate degree in applied science. Graduates of this type of program will typically be able to take state and national examinations to certify as an EMT-Paramedic (NREMT, 2006; IOM, 2007).

Each prehospital care provider with an EMT-B, EMT-I, and EMT-P certification level must attain specific competencies based upon their certification level, meet specific recertification criteria, and be able to perform specific patient care skills (NREMT, 2006; IOM, 2007). While all levels of prehospital care providers should have a high level of accountability and provide quality patient care, paramedics must hold the highest-level of accountability and patient care standards (Bledsoe et al., 2003; Sanders, 2007).

Paramedics are responsible for identifying and leading the care of all patients in the prehospital care setting, so accountability, competence in all patient care situations, and being able to think critically towards life threatening situations, are all essential traits for paramedics.

To prepare paramedics as successful patient-care team leaders and critical thinkers, paramedic students must be afforded the opportunity to practice within a

progressive and active learning environment that allows them to evolve from mistakes, strengthen their application of problem-solving, and think through learning scenarios (Alexander, 2006; Limmer & LeBaudour, 2005). Problem-solving and critical thinking scenarios provided within the paramedic learning environment provide a fundamental foundation for paramedic critical thinking (Paul & Elder, 2006) in the prehospital patient care setting (Alexander, 2006).

### The Paramedic Learning Environment

Paramedic students learn to provide patient care through a progressive learning process that allows building upon an ongoing foundational knowledge-base gained through learning experiences (Paul & Elder, 2006) in initial and continuing paramedic education (Alexander, 2006). Emergency Medical Services (EMS) and paramedic programs are taught by a variety of public and private, higher education and vocational institutions (Alexander; IOH, 2007). Educational institutions that teach EMS students include public secondary schools, career centers, hospitals, fire departments, private and municipal ambulance services, government agencies, law enforcement academies, community colleges, and universities (Alexander; Cherry, 1998). For paramedic students to be successful in their initial and ongoing education, they must have access to credentialed and qualified paramedic instructors, appropriate learning environment, and access to training equipment that provides realistic learning experiences (Fernandez, Studnek, & Margolis, 2008). This education includes didactic [lecture], laboratory [skills and hands-on practice], and clinical [real-life patient care setting] components. In addition to classroom and face-to-face meetings, the online or distant learning format has become commonplace for some paramedic education and learning programs (Alexander).

Within the EMS and paramedic learning environment, paramedic students are taught knowledge and skills based upon cognitive, psychomotor, and affective domains (Bloom, 1956) that is guided by national education standards (Alexander, 2006; Bledsoe et al., 2003; NHTSA, 2006). The national education guidelines align skills and knowledge requirements with curriculum to prepare students to be successful in the prehospital patient care environment (Salzman, Page, Kaye & Stetham, 2007).

Bloom's Taxonomy establishes standard and widely accepted learning domains that address knowledge, skills, and attitude criteria (Bloom, 1956). The three criterion categories provided include: cognitive (knowledge) domain with intellectual knowledge with subcategories of knowledge comprehension, application, analysis, synthesis, and evaluation; the psychomotor (skills ability) domain with seven sub categories of perception, addressing set, guided response, mechanism, complex overt response, adaptation, and origination; and the affective (attitude) domain that addresses emotions, feelings, values, appreciation, enthusiasms, motivations, and attitudes with five sub categories of listening, responding, valuing, organizing, and internalizing values.

Using these domains, paramedic education institutions effectively educate and evaluate (Bloom) paramedic student proficiency in knowledge and skills learned (NHTSA, 2006). Regardless of where paramedics receive initial education, the institution that establishes a paramedic's learning foundation must provide opportunity for growth and development in clinical decision-making, problem-solving and critical thinking skills that are essential to cultivating entry-level patient care providers (Alexander, 2006).



## Critical Thinking in Academia

A review of the literature reveals that not all students learn to think critically and the concept of critical thinking is not always taught successfully in the academic environment. In addition, some students and teachers lack understanding of critical thinking so it is not always addressed in the classroom (Pithers & Soden, 2000; Paul & Elder, 2006). Critical thinking, as a way of thinking about thinking, evolved into a process of questioning knowledge by using deep-probing questions to shed clarity and high confidence upon what is believed to be true (Paul & Elder). This way of thinking about thinking and questioning, known today as a method of Socratic questioning, was practiced by Athenian Socrates, a philosopher who set the benchmark for philosophical standards of today (Sharpes, 2002).

Others to follow a Socratic questioning process included Plato and Aristotle (Paul, Elder, & Bartell, 1997; Sharpes, 2002). Plato learned and believed that dialectic questioning was essential to finding truth by continually delving into and expanding upon known assumptions to ensure all possibilities were explored. Socrates inspired many Greek skeptics and philosophers, such as Plato and Aristotle to immerse in the concept of thinking critically and to apply independent thoughts towards a holistic thinking process of deep, thought-provoking questioning to find truth (Paul, Elder, & Sharpes).

As this thought-provoking and questioning process continued to evolve into a modern day thinking philosophy, John Dewey, a philosopher and educational theorist, questioned and expanded upon Plato's passive viewing of knowledge and proposed a more participative interaction with ones' surroundings and environment to gain a more comprehensive understanding of meaning and lived experiences (Audi, 2001). Dewey

also proposed reflective thinking as a way to gain knowledge through analyzing beliefs and understanding, as well as learning to make logical, thoughtful decisions through a process of thinking critically (Audi; Boris & Hall, 2005). According to Paul and Elder (2006), thinking critically is applicable to all aspects of life and is essential to making logical, meaningful decisions.

### Critical Thinking Concept

To understand the importance of critical thinking to the paramedic profession, it is important to define what critical thinking is. According to Paul and Elder (2006), critical thinking is an art that analyzes and evaluates thinking with the viewpoint of improving thinking. Critical thinking is self-directed, self-disciplined, self-monitored and self-corrective. Critical thinking requires rigorous standards with communication and problem-solving abilities, as well as commitment of the thinker to look beyond egocentrism and sociocentrism (Nosich, 2005). Paul and Elder also stated that critical thinking allows thinkers to raise questions, formulate those questions into a clear and concise manner, gather and assess all relevant information with the use of abstract ideas used to correctly interpret information, come to well-reasoned conclusions based upon relevant standards, and work with others to navigate through complicated problems encountered.

Critical thinking is dependent upon a person's disposition (Nosich, 2005; Paul & Elder, 2002). In other words, the disposition to think critically can be defined as consistent willingness and motivation to be engaged in critical thinking while reflecting on significant issues, making decisions and solving problems. Critical thinking is also a careful exploration of a thinking process to enhance and clarify understanding so

intelligent decisions can be made (Chaffee, 2004). Chaffee stated that critical thinking is active exploration of situations, considering all perspectives presented, and being able to support other perspectives through reasoning and evidence.

### Critical Thinking Theoretical Framework

In order to establish a foundation that allows active exploration of all possibilities through a comprehensive reasoning and assessment process, the application of theory to logically structure the process is necessary (Chaffee, 2004; Nosich, 2005; Paul & Elder, 2002; Sousa, 2006). The Richard Paul Model (RPM) for Critical Thinking was the theoretical framework for this paramedic critical thinking study because it permitted exploration and effective assessment of participants' perceptions in the area of critical thinking (Paul & Elder, 2006). The RPM for Critical Thinking (Figure 3) was appropriate for this paramedic critical thinking study because it constructs a foundation and structure to identify attributes of successful critical thinking and allowed the researcher to align participants' responses to specific components of a critical thinking model (Paul & Elder, 2002; 2006).

### Richard Paul Model of Critical Thinking

The RPM for Critical Thinking used as a theoretical framework established what critical thinking is, how it evolves, and how it is nurtured into a life-long learning habit that is adaptable to any domain of life and thought (Nosich, 2005; Paul & Elder, 2002; 2006). Critical thinking is not constrained to just gaining and retaining knowledge or learning skills and competencies but is instead, is a life-long behavior process of intellectual commitment (Paul & Elder, 2002). This life-long learning behavior process is outlined within the RPM for Critical Thinking.

The RPM of Critical Thinking (Figure 3) revolves around three major sections with essential components that drive a life-long venture for thinking critically (Nosich, 2005; Paul & Elder, 2002) The three sections are *Standards of Thinking*, *Elements of Reasoning*, and *Intellectual Traits* (Paul & Elder, 2002; 2006). Within these sections are concepts of thinking. The standards of thinking section addresses clarity, accuracy, relevance, logicalness, breadth, precisions, significance, completeness, fairness and depth. These standards must be applied to the elements of reasoning that include purpose, questioning, points of view, information, inferences, concepts, implications, and assumptions. These elements can then be applied to develop the intellectual traits that include humility, autonomy, integrity, courage, perseverance, reasoning, empathy, and fair-mindedness.

Understanding the attributes of critical thinking will help EMS educators, paramedic students, and paramedics establish the initial and continued progression through sound thinking and judgment, fostering a productive learning environment, and creating a collaborative role in learning development (Paul & Elder, 2003; 2005). Derry (1999) stated that engaging a leading role and using a “take-charge” approach to learning and problem-solving processes is essential to effectively engaging and solving problems. Taking charge of the learning environment is also an important component of developing a personal critical thinking process (Nosich, 2005; Paul & Elder, 2002; 2006).

### Critical Thinking and Paramedics

According to Paul and Elder (2003; 2005), the critical thinking process for (paramedic) students encompasses many stages and sequences. Similar to the RPM of Critical Thinking, Paul, Elder (2002) and Nosich (2005) agree that all stages of thinking

and sequences are critical for a quality, holistic thinking approach. These stages and sequences include forming concepts, interpreting data, applying principles, evaluating a situation, and reflecting upon actions (Paul & Elder, 2006). Forming concepts is important for paramedics to be able to enter a scene and assess the situation, while seeking a chief complaint or presentation and obtaining medical history from a variety of patients (Bledsoe et al., 2003; Sanders, 2007). In addition, paramedics must be able to implement an initial and physical assessment while utilizing diagnostic testing equipment to determine patient severity (Maggiore, 2008; Sanders).

The data interpretation phase is especially important for paramedics so a “field impression” and working diagnosis to address the working phase of patient care situations can be made (Sanders, 2007). Effectively evaluating and treating patients in the prehospital, patient care field requires paramedics to have a strong, working knowledge of human anatomy, physiology, and pathophysiology that can collectively lead paramedics to proper treatment decisions (Campbell, 2008; McSwain et al., 2003; Martini & Bartholomew, 2000; Nguyen, 2008; Sanders).

In addition to this working knowledge, paramedics must also effectively present their findings and patient care observations to distant, on-line physicians who assist in determining appropriate patient care (Sanders, 2007; ACEP, 2005). Once determination of proper treatment is made, paramedics must then be able to apply appropriate patient care treatments to patients using information obtained from patient presentation and chief-complaints, determine their interpretation of patient condition, apply standing orders or preauthorized treatment procedures, and utilize on-line physician consultation as appropriate (Bledsoe et al., 2003; Sanders).

Application of treatment requires assessment for effectiveness, which requires healthcare providers such as paramedics to continue reevaluating for positive or negative responses and patient progress (Bledsoe et al., 2003; Rubenfeld & Scheffer, 1995; Sanders, 2007). In evaluating and reevaluating patient conditions, it is imperative that any negative outcomes be addressed with appropriate re-evaluation of working diagnosis and treatment protocol being applied to the situation (Sanders). Paramedics must be able to effectively evaluate and re-evaluate their treatment process for effectiveness to build upon both positive and negative experiences encountered during patient care (Bledsoe et al; Sanders). This continuous reflection upon patient care for quality assurance may be accomplished in a call-review process that allows paramedics to build upon previous experiences to enhance future, similar experiences that may be encountered (Sanders). Reflection upon these lived experiences and application of thought in any situation will yield the most positive results (Nosich, 2005; Paul & Elder, 2006).

#### Attributes of Critical Thinking for the Paramedic

As the prehospital patient care field offers exciting and extremely challenging situations, it is common for new (and seasoned, experienced) paramedics to encounter a natural response of hormonal release in a *fight-or-flight* response that induces increased visual acuity and hearing enhancements while dealing with life threatening patient care situations (Sanders, 2007; Zautra, 2003). The negative aspect of the *fight-or-flight* response is a decline in critical thinking ability that causes an inability to concentrate or properly assess patient conditions (Siddle, 2008; Zautra). This deficiency is why continued practice of patient care skills and competency assessments are essential for

paramedic students and paramedics. The need to continually train and practice paramedic skills and scenarios is important to mentally prepare for such situations (Sanders; Siddle).

Paramedics should be educated and trained to form structured responses to prepare for such potential encounters (Sanders, 2007). Sanders and Zautra (2003) stated that encountering challenging situations with mental overload of information in critical patients can be effectively addressed by stopping and thinking, scanning the situation, deciding and acting, maintaining clear and effective control, and reevaluating patient condition regularly (Siddle, 2008). Constant infusion of critical thinking throughout paramedic initial and continuing education affords paramedic students and practicing paramedics the opportunity to be more successful in their training and educational process (Paul & Elder, 2002; 2006; Sanders).

#### Critical Thinking in the Paramedic Curriculum

A review of the literature reveals that critical thinking is being infused into the paramedic national educational standards for initial and continuing education of paramedics (Larmon & Snyder, 2007; 2008; NHTSA, 2006). Critical thinking cannot be accomplished by a single session of learning but will instead, require a long-term infusion of critical thinking ideology accepted as routine practice (Nosich, 2005; Creswell, 2006). Continuous infusion of critical thinking is essential but educators must be diligent in continued student engagement to establish and maintain a successful, meaningful learning process (Alexander, 2006; Tennant, 1997).

Teachers as educators are essential to traditional and non-traditional learning as are facilitators and coaches (Alexander, 2006). Facilitators play a significant role in paramedic education and training environments and are more effective than those who

teach without two-way interaction and dialogue with students (Alexander). Student engagement encourages teachers to participate in facilitator roles to help students discover critical thinking skills that instill construction of knowledge within a social environment. This process helps students learn to solve real-world problems (Resnick & Klopfer, 1989). This facilitator-guided and reinforcement approach is appropriate for paramedic training and education programs because paramedic students are required to gather information and lead patient care treatment scenarios based upon their ability to: formulate and ask questions; gather critical information; and determine appropriate, timely care interventions based upon their findings (Alexander).

Paramedic students need to be actively engaged and challenged in a variety of learning environments that are similar to what they will encounter in the workplace. Paramedic students must be able to function independently with little guidance and assistance from teachers or mentors (Alexander, 2006; Resnick & Klopfer, 1989). Paramedic students must be able to apply their perception of findings by creating a *reality* of what is occurring with patients based upon assessment findings and interpretations of those findings (Bledsoe et al., 2003; Edie, 1962; NHTSA, 2006).

Virtual and patient simulation may also prove to be beneficial in bringing real-world experience and learning to paramedics and paramedic students (Von, Zuecher, Amsler, Walter, & Ummenhoffer, 2009). To encourage critical thinking skills, paramedic training and education institutions must allow educators to share relevant, real-life stories pertaining to learning topics that foster an avenue for useful feedback that students can use to enhance their learning and critical thinking potential (Howard, 1991). Building



upon and learning from experiences enables an ongoing learning process (NHTSA; Bledsoe et al.).

A review of the literature revealed that studies conducted in the 1990's evaluated critical thinking applications based upon continued research from previous years in higher education (King, Wood, & Mines, 1990; Vickers, 1997). These studies pertain to paramedic and health care provider education and are important to address because of the foundation they secure for future studies to build upon. According to Greive (1991), the 1990's were recognized as a period of technological advances and challenges when students became increasingly demanding. Greive revealed that students in the 1990's began seeking relevance and immediate application of newly learned skills to the subject being taught.

Immediate application of learned skills is important for students to strengthen their learning foundation (Greive, 1991). This learning foundation can be established if instructors implement the six, basic adult teaching functions that include: (1) reviewing previously learned skills; (2) presentation and demonstration based upon previously gained knowledge; (3) guided practice by facilitation; (4) corrected feedback to achieve corrected responses; (5) being able to work independently; and (6) having regular review of progress and success. These six basic teaching functions allow students to not only engage effective learning but also form a natural imbedded culture of dynamic, ongoing learning and critical thinking (Paul & Elder, 2006; Greive) that is especially important for the paramedic education and training process (Bledsoe et al., 2003; Larmon & Snyder, 2007).

If critical thinking is to be implemented into curriculum and disciplines, its philosophy must be understood and implemented into educational programs by use of creative and interactive applications using everyday life examples (Vickers, 1997). Understanding critical thinking includes the importance of why critical thinking is essential (Nosich, 2005; Paul & Elder, 2006) to those functioning in the prehospital care field. Because critical thinking skills are essential, it continues to be implemented into paramedic initial and continuing education curriculum (Bledsoe et al., 2003; NHTSA, 2006; Dalton et al., 2003; 24-7 EMS, 2007; Larmon, & Snyder, 2007; 2008). A review of the literature however, reveals negative results in some studies for the effective application of critical thinking skills in the prehospital patient care field (Pointer et al., 2001; Hauswald, 2002; Silvestri et al., 2002; Vilke et al., 2007).

#### Need for Critical Thinking in Paramedic Education

The literature reveals studies addressing the inability of paramedics to apply critical thinking skills to patient care situations (Hauswald, 2002; Silvestri et al., 2002; Pointer et al., 2001). The deficiencies noted shed light upon issues to be addressed in both initial and continuing medical education (IOM, 2000) for prehospital patient care providers and paramedics. These deficiencies include the inability of paramedics to triage patients for necessity of ambulance transport to local emergency departments, inability to properly calculate and deliver medication infusions, and inability to consistently secure (with a high rate of success) patient airways with advanced airway management procedures (i.e., endotracheal intubation).

### *Patient Assessment Deficiencies*

The literature reveals some deficiency in paramedic and prehospital care provider critical thinking abilities during assessment of patients (Maggiore, 2008). One in-hospital, emergency room based study revealed that paramedics were unable to determine, with a high rate of success, if patients needed ambulance transport and/or emergency room care (Hauswald, 2002). A second study conducted within an urban-based, prehospital patient care setting in Florida also discovered that paramedics were unable to predict which patients do and do not require transport to local emergency departments for care (Silvestri, Rothrock, Kennedy, Ladde, Bryant & Pagane, 2002).

A third California prehospital care study revealed that paramedics yielded poor results in their ability to triage treatment priorities of patients in the prehospital field while using written guidelines or protocols (Pointer, Levitt, Young, Promes, Messina, & Ader, 2001). Each of the studies concluded that paramedics lacked essential critical thinking skills that would allow them to effectively triage and care for critically ill or injured patients and non-critical patients (Hauswald, 2002; Silvestri et al., 2002; Pointer et al., 2001). In addition, a review of the literature also identified deficiency in medication calculations that may benefit from ongoing research and study (Hubble et al., 2000; Nguyen, 2008).

### *Medication Calculation Deficiencies*

Paramedics and other health care providers tasked with appropriate medication selection and administration sometimes encounter improper medication decisions that can adversely cause harm to patients (Vilke et al., 2007). One medication calculation study noted in the literature evaluated medication calculation skills among a group of practicing

paramedics that included the computation types they had the most difficulty with, the relationship between drug calculation skills and various demographic characteristics (Hubble, Paschal & Sanders, 2000). This study included a demographic survey with a ten-item, drug calculation examination and was administered to a convenience sample of 109 practicing paramedics. This group represented a cross-section of the emergency medical services (EMS) system characteristics in North Carolina. The examinations were scored independently by two graders and error types were assigned to incorrect responses; the examination results were correlated with demographic and EMS system characteristics.

The Hubble et al. medication calculation study yielded a poor performance on the drug calculation examination. The mean (average) score was 51 percent for successfully determining proper medication dosage. The intravenous (IV) flow rate problems and medication bolus problems yielded a 69 percent success in correct answers. Non-weight-based medication infusions yielded a 34 percent success in correct answers, weight-based medication infusions yielded a 32 percent success in correct answers, and percentage-based medication infusions were five percent for correct answers. Findings revealed that examination scores were higher among paramedics with college level education and scores were found to be lower with paramedics with greater numbers of years in EMS experience.

The Hubble et al. study also revealed that there were significant deficiencies noted with setting up calculation problems, weight conversions, and gram to milligram conversions. In this study, participants reported that drug calculations were performed infrequently in daily practice and were very seldom addressed in continuing education

programs. These findings shed light on a need to enhance critical thinking practice skills in paramedics to allow them to provide a standard level of care that is expected and deserved by all patients (IOM, 2000).

Similar to many allied health professions, medication calculation skills are essential for paramedics to master as detrimental patient outcomes can occur if improperly applied (Hubble et al., 2000; Bledsoe et al., 2003; Nguyen, 2008). In addition, paramedics in the Hubble et al. study reported infrequent opportunities to perform drug calculation skills in the clinical setting and that medication calculations were not a routine part of their EMS continuing education programs.

Paramedics routinely administer medications to patients in the field and must be competent in identifying specific criteria and application of medications in the pre-hospital care setting (Nguyen, 2008; Bledsoe et al., 2003). The findings in the Hubble et al. study indicated urgency for paramedic training and education programs to make enhancements to initial and continuing education curriculum for competent delivery of medications (Hubble et al.).

The Hubble et al. study concluded that paramedic participants lacked the essential (critical thinking) skills that would allow them to effectively determine and administer medications for patients. Paul and Elder (2002; 2006) stated that critical thinking training incorporated into training curriculum will help students achieve higher-order critical thinking skills to help them gain higher success rates with proper use and application of information provided. This is true for learning proper medication administration as well. Regular training and practice with patient care scenarios, cognitive [knowledge] and

psychomotor [skills] medication practice, as well as reviewing local medication protocols frequently are all effective deterrents to medication errors (Bledsoe et al., 2003).

The Institute of Medicine (2004) found that medication errors in allied health care exist because care providers fail to administer proper medication dosage and proceeded in administration of medications without proper authorization or physician orders. Although not part of this study, the phenomenon of why these errors and omission occur in allied health care as a whole, may also be worthy of future exploration that will benefit the paramedic training and education curriculum (Nguyen, 2008).

Medication administration competence must receive a high priority from paramedics, paramedic employers, and medical direction as improper dosing or administration can induce grave consequences for patients (Nguyen; IOM, 2000). While medication administration practice and application is important, what paramedics consider as priority skills (Brown et al., 1997) and airway management competencies (Thomas et al., 2007; Wang et al., 2006) are other areas to be addressed as well.

#### *Emphasis on Paramedic Skills and Airway Management*

Paramedic competency is essential for patient and public safety, so regularly scheduled practice and medical direction verification of patient care skills competence is critical for retention of the cognitive [knowledge] and psychomotor [skills] aspects of training (Bledsoe et al., 2003). Paramedics working within prehospital care environments may not be afforded optimal training opportunities or opportunity to regularly practice certain skills in the patient care setting. This limitation is sometimes due to low call [response] volume or high number of paramedic personnel (Vrotos, Pirrallo, Guse, & Aufderheide, 2008).

In a study to evaluate the importance of paramedic skills and emphasis received on specific paramedic procedures (Brown, Dunn & Pollock, 1997), it was revealed that inadequate scientific evidence existed (at the time of study) to validate what improves prehospital care patient outcomes. This study provided surveys listing 21 paramedic skills to 41 Directors of EMS agencies who agreed to participate in the study. These surveys were then distributed to 1,364 paramedics working within those organizations. Paramedic participants were asked to rate the importance of each skill, and the emphasis placed on each skill during their initial and continuing education using a scale of zero to four, with zero representing no importance or emphasis and four representing the most importance.

Only 600 of the 1,364 (44%) the surveys were returned. Those who did respond reported a range of 5.6 to 9.9 years of EMS experience and a range of 4.0 to 5.6 years practicing as paramedics. The surveys revealed that respondents rated advanced airway management, defibrillation, and patient assessment as the skills with the highest importance. Airway management today, remains to be one of the top concerns for both paramedics and medical direction responsible for the basic and advanced airway procedures and care that paramedics provide (Bledsoe et al., 2003; Thomas, Abo, & Wang, 2007).

According to Wang et al. (2006), placing breathing tubes into the trachea (endotracheal intubation) of critically ill patients to maintain the flow of oxygen to the brain and other vital organs is an essential skill of paramedic patient care and brings with it a high level of risk and liability. This skill called endotracheal intubation is common practice for paramedics, physicians, and advanced care providers, but many times affords



limited practice and opportunity for paramedic students due to limited access in clinical facilities providing intubation procedures (Johnston et al., 2006).

One study sought to summon paramedic and physician perceptions regarding challenges and problems of prehospital intubations (Thomas, Abo, & Wang, 2007). This study reported that problems with prehospital intubation do exist and identified education, learning proper skills, and maintaining those skills as priority concerns with intubation of patients.

While advanced care procedures with use of equipment and medications is preferable by many prehospital clinicians, they have inherent risks to the patients they are intended to help (Bledsoe & Gandy, 2009). Emergency airway management includes basic and advanced airway devices that help to secure and maintain airway control. When inserting and securing an endotracheal tube (ETT), it must be done efficiently and safely. A study to characterize the relationship between the number of out-of-hospital intubation attempts, intubation success, and repeated intubation attempts was conducted using data from 42 emergency medical services agencies from an 18-month period with 1,941 cases (Wang & Yearly, 2006). This study found that more than 30 percent of patients received greater than one intubation attempt and that prehospital rescuers often require multiple attempts to accomplish tube placement. This study also found a need for compliance with limited number of attempts of intubation of no more than three.

One prehospital study found that clinicians (paramedics) often fail to accomplish endotracheal intubation (ETI) in patients requiring invasive airway management (Wang, Kupas, Paris, Bates, Costantino, & Yealy, 2003). This observational study involved 45 advanced life support (ALS) emergency medical services systems and 663 adult



intubation attempts between June 2001 and November 2001 yielding 89 cases (13.4%) of failed intubations. Findings from this study established a basis for establishing clinical protocols that minimize prehospital intubation failures.

Prehospital intubation problems (Johnston et al. as cited in Bledsoe, 2006) stem from inadequate initial education and continuing education. A study to investigate this problem prompted sending anonymous surveys to directors of 192 paramedic education programs accredited by the Commission on Accreditation of Allied Health Programs (CAAHP) and received 161 (85%) completed surveys. The results found that 97 percent of programs had limited intubation training for their students.

Additional research to investigate effective intubation success conducted by St. Luke's-Roosevelt Hospital, Columbia University in 2004 found that intubation efforts by paramedics over a ten-month period yielded approximately 29 percent of intubated patients arriving at emergency rooms with improperly placed endotracheal tubes (Eisele & Meurrens, 2007). Another study conducted by the University of Pittsburgh, School Of Medicine in 2006 found that out of approximately 2,000 intubated patients, there was a 23 percent error rate associated with paramedic prehospital intubations. These studies prompted a need for post-intubation management to minimize complications from intubation attempts.

Any effort to access or maintain airway patency in patients is critical to patient survival. Regardless of airway management efforts performed, a greater emphasis should be placed upon paramedic critical thinking skills to help them work through any patient care situations that evolve (Bledsoe et al., 2003; Larmon & Snyder, 2007; 2008).

Paramedic education and training institutions, employers, and medical directors of

paramedics can modify, adjust, and improve paramedic education as needed to address these patient care encounters (Bledsoe et al.). Regardless of skill priorities or emphasis being placed upon each, paramedic students must learn how to think critically about what they are doing and why it is being done (Paul & Elder, 2002; 2006; Nosich, 2005).

In order to attain a high level of patient care competence, paramedic students and paramedics must practice critical thinking skills throughout their education and career to ensure their competence in life-saving skills (Bledsoe et al., 2003; Dalton et al., 2003; 24-7 EMS, 2007; Larmon, & Snyder, 2007; 2008) To be effective, this learning should continue throughout their continuing education venture (Paul & Elder, 2002).

#### EMS Continuing Education

Critical thinking education in initial paramedic training is regarded as essential and can only be effective if continued and reinforced (Paul & Elder, 2002). One study (Herman, Koenigsberg, McDonald, Ward, & Willoughby, 1996) compared EMS continuing education for paramedics in the United States and revealed that some EMS agencies relied only on didactic, lecture-based continuing education to meet their paramedic training requirements and nearly half of the systems required clinical continuing education as using time spent in-field credit to fulfill these requirements.

This study included a survey of 95 metropolitan areas from each state in the United States. The participants for this study were EMS medical directors, EMS coordinators, and EMS administrators. The results of this study came from a population of 56 respondents. Within this study population, 23 percent were from population regions of one million people or more, 61 percent were from areas with populations of 100,000 to one million, and 16 percent from areas populated by less than 100,000 people. In the 95

systems surveyed, 98 percent of them mandated didactic continuing education requirements. Clinical continuing education was required by 34 percent of the systems responding to this study. Ten systems (18%) in this study awarded continuing education hours for documented in-field experience. The in-field experience method did not have a specific structure by the majority of users. Both written and skills testing were used by most EMS systems to evaluate paramedic competency (Herman et al., 1996).

Paramedic education programs today have paramedic educational products available that allow for infusion of critical thinking into their curriculum (24-7 EMS, 2007; Bledsoe et al., 2003; Dalton et al., 2003; Larmon & Snyder, 2007; 2008; Limmer & LeBaudour, 2005). These educational products (and many others) provide common ground for critical thinking education and use cognitive (knowledge) material to allow paramedic graduates entering the workforce to adapt to an increasingly complex patient care environment (Maggiore, 2008; IOM, 2007). As paramedic education programs infuse critical thinking into their curriculum, there is a greater exposure to critical thinking concepts and ideology in the student learning culture (Paul, 1993; Larmon & Snyder). This is especially true for paramedics in the prehospital setting.

Continuous infusion of critical thinking concepts and practice into the paramedic curriculum further enhances paramedic education and yields positive influence for paramedic graduates entering the workforce (IOM, 2007; Bledsoe et al., 2003). The literature reveals (e.g., Hauswald, 2002; Silvestri et al., 2002; Pointer et al., 2001) that paramedic ability to apply appropriate treatment in various patients has shown deficiencies that need to be addressed. This sheds light upon a need to provide ongoing critical thinking education in the paramedic curriculum.

If critical thinking is to be effectively implemented into health disciplines, the critical thinking philosophy must be understood and introduced into all components of the educational curricula by use of creative and interactive approaches with real-life examples (Nosich, 2005; Paul & Elder, 2006). It is also important to address the importance of why critical thinking is essential to functioning in the prehospital care field (Vickers, 1997; Paul & Elder).

#### Chapter Summary

A review of the literature reveals critical thinking application to be an essential part of paramedic education. Paramedic students and practicing paramedics greatly benefit from exposure to critical thinking education and must apply critical thinking skills effectively (Paul & Elder, 2002; 2006) in the prehospital patient care environment (Bledsoe et al., 2003). Paramedic employers and paramedic education programs have a significant investment in the competency of students graduating from their program (IOM, 2007). Ongoing research and exploration in paramedic critical thinking may provide positive influence upon paramedic education and help paramedics foster the critical thinking skills that they will use as entry-level paramedics in the prehospital patient care setting (IOM).

## CHAPTER III

### RESEARCH METHODOLOGY

#### Introduction

The purpose of Chapter Three is to discuss the methodology of this qualitative, phenomenological study that summoned and collected paramedic and paramedic employer perceptions of critical thinking in paramedics. This study was built upon phenomenology as a philosophical framework to explore participants' perceptions (Creswell, 2003; Patton, 2002) and sought thick, rich, descriptive responses to delve into the critical thinking phenomenon.

#### Philosophical Framework

Using phenomenology as the philosophical framework to explore paramedics' and employers' perceptions of critical thinking allowed the researcher to frame the study, address what phenomenology truly is and why it was appropriate for this study, and identify the philosophical assumptions that accompany the ideology that allows phenomenology to explore the philosophical world (Creswell & Clark, 2007).

A framework is a structure used to solve or address complex issues (The American Heritage Dictionary of the English Language, 2000). A philosophical framework is a structure that supports assumptions, concepts, values, and practices that constitute the way reality is viewed (Edie, 1962). A philosophical framework is a fundamental structure and scaffolding used to support a basis for something being constructed (Minai, 1993; Patton, 2002). The philosophical framework is important in qualitative methodology because it establishes the ideology and foundation for the topic and information being presented (Minai; Patton). The philosophical framework creates a

skeletal structure for collecting and presenting knowledge from ideas, concepts and viewpoints (Minai; Patton). The nature and scope of this knowledge can be presented in an epistemological sense by addressing truths and beliefs of a subject or phenomenon (Minai; Patton).

### Epistemology

Epistemology is the nature and origin of knowledge that allows researchers to be engaged with participants without barriers or obstacles (Creswell, 1998; Lincoln & Guba, 1985). Epistemology allows truth and beliefs to construct knowledge and is essential for qualitative studies because it creates a relationship between researcher and participants with unrestricted access to participant responses (Creswell). For this study, epistemology allowed the researcher to explore paramedic and paramedic employer participants' perceptions of critical thinking as a phenomenon by soliciting open and honest responses from participants in a secured, online, anonymous questionnaire setting (Creswell; Patton, 2002). A phenomenological perspective also allowed the researcher to explore the critical thinking phenomenon by allowing participants to reveal their perception of critical thinking as lived experiences (Creswell).

### Phenomenological Perspective

The philosophical perspective chosen as the tradition for this qualitative study is phenomenology. The phenomenological tradition is a foundation of building blocks for exploring a philosophical phenomenon (Husserl, 1970). Phenomenology was established as a movement based on an ideology that reality consists of objects and events as they are perceived and understood in the human consciousness (Husserl). Chisholm (1960) expanded the use of the phenomenology to include discovering definite and needed

results and described psychological phenomena as extraordinary, perplexing problems, that phenomenology can help to explain.

### Phenomenology

Phenomenology is a reflection of phenomena in human life as the basis of all thought (Eddie, 1962) relating to Husserl's phenomenology with a continuous unveiling of a phenomenon. Creswell (1998) built upon perceptions and revelations of what phenomenology is and expanded the use of the framework to include discovering solutions to perplexing and extraordinary problems that can be explained.

Phenomenology is also a philosophy of dynamic construction with logical constellations of representations and perceptions (Lewandowski, 2001). The phenomenological framework used in a phenomenological study can help the researcher navigate through an over-abundance of information (Creswell, 2003).

Phenomenology has a purpose of probing the thinking life hidden within and describes a philosophy of dynamic representations to explore *who* living beings are with broad spectrums of perception (Patton, 2002; Rosenberg, 2000). “Phenomenology turns our attention to how we encounter the world as meaningful through our active and engaged participation in it, and so we can see that the underlying purpose of this sort of more natural approach to interface design is that it allows us to engage” (Dourish, 2001, p. 238). Phenomenology allows understanding of meaning within a social setting and relates to all actions of individuals (Patton, 2002). Phenomenology also delves into reasoning about why individuals act the way they do, creating mutual understandings, and exploring types of behavior identified among groups (Dourish, 2001).

Phenomenological studies probe into the thinking life hidden within as well as the perception of what is occurring and what is truly occurring (Lewandowski, 2001).

Probing into the thinking life hidden within is essential to understanding phenomenology and allows viewing reality of objects and events with an awareness of experiences (Lewandowski). Phenomenology is not the only accepted philosophical framework but it does allow philosophical investigators and researchers to view concepts and viewpoints intuitively and to explore them in a holistic fashion (Creswell, 1998; 2003; Creswell & Plano-Clark, 2007).

Information and perception of occurrences can create mazes of philosophical riddles and puzzles that require deep probing into what is known and to view dynamic representations (Creswell, 1998; 2003; Creswell & Plano-Clark, 2007). Phenomenology allows researchers to explore the nature of participant's knowledge, their presuppositions, philosophical foundations, and the extent of validity in participants' responses to the study questions being posed (Patton, 2002).

#### Assumptions of a Phenomenological Framework

Research using a philosophical framework requires that researchers use philosophical assumptions to guide a study (Creswell, 1998). There are five philosophical assumptions that were used to guide this phenomenological study. These assumptions include: ontology; epistemology; axiology; rhetorical; and methodology (Creswell).

This study was ontological with multiple realities and perceptions being construed with subjective data and diversity of perceptions from participants. In a phenomenological sense, this study allowed the researcher to delve into the essence of participants' perceptions of critical thinking (Creswell, 1998). This study was



epistemological as the researcher engaged participants in learning and work environments to report a philosophical phenomenon of perception. In the phenomenological sense, this study explored the nature of knowledge in critical thinking, its presuppositions, philosophical foundations, and the extent of validity the participants' responses will have in the phenomenon being studied (Creswell).

This study was axiological as it provided value-laden data and had biased perceptions from participants. In the phenomenological sense, this study included the nature of participants' values and value-judgments of participants (Creswell, 1998). This study was rhetorical with a narrative approach for perceptions and responses from participants as well as allowing for very-detailed descriptions within an informal setting. In the phenomenological sense, this study can have a very persuasive effect upon the views and perceptions of participants (Creswell). This study was methodological with usability that can offer generalized information and continual emergence into future studies. In the phenomenological sense, this study allowed for regular, diversified, and systematic ways of reporting the perceptions and data received from study participants (Creswell).

Searching for an appropriate philosophical framework in research can be challenging as there is no single framework that will meet needs of all phenomenological studies (Creswell & Clark, 2007). For the purpose of this study however, the researcher used phenomenology as it parallels the ideology and needs of the researcher by allowing deep exploration into the participant responses (Patton, 1990; 2002).

## Rationale for a Qualitative Study

The type of research being conducted determines research methodology (Creswell, 2003). The research will determine the method that is most appropriate to seek answers to the research questions (Creswell, 1998). The researcher for this study explored the phenomenon of paramedic and employer perceptions of critical thinking and sought thick, rich, descriptive responses from participants to answer critical thinking questions (Creswell; Patton, 2002). Qualitative research allows participants to provide descriptive answers and allows the researcher to delve into the phenomenon being studied while deeply exploring the meaning of participant's responses (Creswell, 1998; Patton).

A quantitative research methodology allows for analysis and interpretation of data with a process that describes trends and compares or predicts outcomes (Creswell, 2003). Quantitative sampling is rigid and has less flexibility than qualitative research. Quantitative samples are large and are randomly selected. Quantitative research uses predetermined instruments to collect numerical data (Creswell; Creswell & Plano-Clark, 2007).

Because this study explored the phenomenon of human experiences and perceptions of critical thinking, a qualitative, phenomenological approach was used for this qualitative study (Creswell, 1998; 2003; Patton, 2002). Reviewing the literature on a phenomenon is the foundation for identifying a problem that needs to be explored (Creswell, 1998). Qualitative researchers explore their phenomenon by using open-ended questions that allow participants to offer their perceptions, opinions, and viewpoints (Creswell, 2003). Qualitative research also allows the researcher to become immersed in

the literature and explore deep into the phenomenon as an instrument of direct contact with participants (Creswell, Patton, 2002).

Qualitative research identifies a research problem with a general approach to gain knowledge or understanding of a phenomenon. Qualitative studies allow for researcher flexibility and require small, purposive sample sizes to understand participant experiences or a phenomenon (Creswell, 1998; Patton, 2002). Qualitative research allows data to be collected via interview, observation, or open-ended questionnaire to improve knowledge about the phenomenon being studied (Patton). Qualitative research allows for data collection and analysis through descriptive responses and common themes. The qualitative method also allows for researcher-participant interactions while in naturalistic settings. This allows the researcher to explore a holistic, real world setting while collecting participant responses (Creswell, 2003).

Because this study relied upon thick, rich, descriptive participant responses to explore perceptions about critical thinking, the qualitative methodology was most appropriate (Creswell, 1998; 2003). The quantitative method was not appropriate for this phenomenological study because a quantitative research methodology does not allow for holistic, inductive presentation of participants' lived experiences (Creswell & Plano-Clark, 2007).

The researcher for this study explored the phenomenon of paramedic and employer perceptions of critical thinking and relied upon the descriptive responses from participants to address the research questions (Creswell, 1998). A phenomenological, qualitative approach allows participants to provide descriptive answers that the researcher

used to delve into the phenomenon of perceptions of critical thinking (Creswell; Patton, 1990; 2002).

### Rationale for a Phenomenological Study

A tradition has influence on what is to be explored and who the participants will be (Creswell, 1998). The phenomenological tradition is a perspective that uses the values and beliefs about a phenomenon and questions the structure and essence of what people perceive in the world around them (Patton, 1990). The phenomenological tradition allows a researcher to delve into the essence of lived and shared experiences within a group (Creswell).

The phenomenology tradition also allows those lived experiences to be interpreted and analyzed for a holistic view about what occurred during a phenomenon (Patton, 1990). This study used the phenomenological tradition because it sought ideas, essences, and the perceptions (Moustakas, 1994; Patton, 2002; Rosenberg, 2000) of paramedics and paramedic employers about critical thinking. Using the phenomenological tradition for this study allowed the researcher to explore the critical thinking phenomenon by using lived experiences of paramedics and paramedic employers on critical thinking (Patton).

As phenomenology allows researchers to explore the beliefs and values of the participants (Edie, 1962), the researcher in this study was engaged in a deep exploration of the meaning and relationship of participant's knowledge in the phenomenon of critical thinking while it is being explored (Moustakas, 1994). Phenomenology allowed the researcher for this study to explore how participants' experiences are transformed into realizations and conscious meanings about critical thinking (Patton, 2002).

## Research Questions

To conduct a phenomenological study, researchers must form research questions that delve into and explore participant's lived experience through participant responses (Creswell, 1998; Patton, 2002). These questions help the reader verify and understand the true meaning of participants' responses. This study addressed what critical thinking is, how important critical thinking is, and how well paramedic training and education institutions prepare paramedic students to be successful in the prehospital patient care setting. The overarching question of how paramedics and paramedic employers perceive critical thinking established the interview protocol questions (Creswell; Patton) posed to both paramedic and employer participants.

Participant responses and data from this study offer valuable information to paramedic education programs, paramedic employers, and paramedics who seek to enhance their critical thinking knowledge. The literature indicates that a strong emphasis should be placed on critical thinking education in all aspects of paramedic education if paramedic students are to become effective, critical thinkers in today's fast-paced prehospital care workplace (Larmon & Snyder, 2007; 2008; Sanders, 2007; Bledsoe et al., 2003; Paul & Elder, 2006).

The researcher for this study developed questions that explored participants' responses and unveiled the true meaning of those responses. These responses were based upon participants' lived experiences and perceptions (Creswell, 1998; Patton, 2002).

The overarching question for this research study was:

What perceptions do paramedics and paramedic employers have about critical thinking?

To better understand this phenomenon and to answer the overarching question, this study asked paramedics and paramedic employers a set of open-ended questions designed to elicit descriptive responses (Creswell, 2003; Patton, 2002). These questions addressed:

1. How do participants define critical thinking?
2. How important is critical thinking to the paramedic profession?
3. What type of paramedic program did participants attend and complete (private company, hospital-based program, community college, vocational technical institution)?
4. Was the paramedic program attended and completed, a paramedic certificate or associate degree program?
5. Did the paramedic education and training program provide critical thinking education in the curriculum?

The findings of this study offer paramedics' and paramedic employers' perceptions of critical thinking to paramedic education programs and provide vital information to guide paramedic critical thinking education. The literature indicates that critical thinking education is essential for paramedics to effectively navigate the complex nature of medical and trauma patients in the prehospital patient care setting today (Bledsoe et al., 2003; Dalton, Limmer, Mistovich, & Werman, 2003; IOM, 2007).

### Methods

The methods section of chapter three provides a rationale for the design selected for this study. This includes role of the researcher, sampling, instrument, data collection procedures, and data analysis procedures.

## Role of the Researcher

The researcher of this qualitative study was a collector and evaluator of data. Because this was a qualitative phenomenological study, the researcher became part of the research as an instrument that engaged participants in their natural setting (Creswell, 1998; Patton, 2002). Researchers in phenomenological studies that observe and collect participant data also have naturally occurring biases and predetermined perceptions (Patton). It is essential that researchers acknowledge and address those biases in order to maintain rigor and credibility within the study, as biases can influence the study's sample selection, data collection procedures, as well as interpretation and reporting of findings (Patton).

## Researcher Biases

The researcher for this study does have biases related to perceptions of critical thinking and has personal interest in exploring this phenomenon (Creswell, 1998; 2003; Patton, 2002). The researcher has held several positions within the paramedic profession including field paramedic, training officer, supervisor, educator, and administrator for EMS continuing education. These positions have exposed the researcher to both positive and negative experiences with critical thinking abilities of paramedics within the prehospital patient care setting.

The researcher did have a predetermined perception that participants within this study would present some discontent with the quality and quantity of critical thinking education received from paramedic programs. Because the researcher had biases and preconceived perceptions about paramedic critical thinking, the researcher continued to evaluate the data and noted biases as they emerged throughout the data collection and

analysis processes (Creswell, 2003; Creswell & Plano-Clark, 2007). These biases were effectively addressed by remaining reflexive and open-minded to participant responses (Patton, 2002). Being reflexive allows the researcher to remain interactive with biases, perceptions and opinions about the phenomenon being studied (Patton).

### Sample for Study

The sample for this qualitative study was selected from a group of newly-hired, paramedics working for one of nineteen fire department and EMS agencies within a single, urban, high-performance EMS system. All paramedics within this system are required to attend an orientation course that encompasses local protocols, policies, and equipment specific to their EMS system. Paramedic participants for this study were selected from this paramedic orientation group during a two-month period. There is an orientation scheduled for each calendar month and the participant sample was achieved by selecting the first eight paramedics and first eight employers to complete the questionnaires.

The total participant group included eight paramedic participants and eight paramedic employer participants. Those who agreed to participate in the study were provided a questionnaire to complete. Paramedic and paramedic employers were summoned by participant recruitment flyers via a non-partial gatekeeper. All paramedic participant respondents in the study were labeled by a researcher assigned designator (e.g., PAR-1, PAR-2) and paramedic employers were labeled accordingly (e.g., EMP-1, EMP-2). All paramedic and paramedic employer participants remained anonymous throughout the study and were labeled only by their assigned designators (Creswell, 2003; Patton, 2002).



## Instruments for Study

This study utilized two questionnaires on SurveyMonkey™ to elicit participant responses to the overarching question of the study and to collect all data for this qualitative study. Paramedic participants received paramedic participant access and paramedic employers received employer participant access. The online SurveyMonkey™ environment was chosen for this study because it accurately collects participant responses and protects the identity of study participants.

Creswell and Plano-Clark (2007) identify technology as an ever-growing reality in research today and that online access and data collection is becoming a valid method of collecting qualitative study responses. The questionnaires provided for this study were researcher-developed with open-ended questions to summon participants' responses about critical thinking. Questionnaires are a viable, appropriate method of data and response collection because of the sensitive nature in responses participants may wish to offer and allows participants to elaborate on their perceptions or responses (Patton, 2002).

### Data Collection and Processing Procedures

The data collected from self-made, open-ended questionnaires via SurveyMonkey™ was used to summon paramedics' and paramedic employers' perceptions of critical thinking. A non-partial gatekeeper introduced paramedic and paramedic employer participants to the study by providing participant recruitment flyers to each potential participant.

Prior to gaining access to questionnaire questions on SurveyMonkey™, participants were informed of the voluntary nature of the study and provided with an Informed Consent Form (ICF) to accept or decline participation. Once participants agreed

to participate in the study, they were given access to the critical thinking questionnaire questions. The ICF included: an overview of the study that included the researcher's name with study topic; the purpose of the questionnaire; the duration of time required to complete the questionnaire; the anonymous nature of the study; safety measures in place to protect participants; who to contact if there were any questions or concerns; and how participants would be selected for the study.

If potential participants opted to decline and not accept the terms of the study, they were given a, "You have chosen not to participate in this study. Thank you for your time" message and were denied access to the questionnaire. If eight paramedic and eight paramedic employer participants had not been attained during the two-month orientation period, the researcher was prepared to ask the non-partial gatekeeper to deliver additional flyers to paramedics and paramedic employers until the participant quota of eight (8) paramedic and eight (8) paramedic employer participants was met for the study.

The Barry University Institutional Review Board (IRB) reviewed the procedures used in this study and granted permission for this study to proceed only if the researcher followed strict guidelines set forth by protocol. The researcher was (is) required to keep data collected from this study for five years. The questionnaire data will remain locked in a safe deposit box in custody of the researcher, will be available to the IRB upon request, and be destroyed five years after the study's completion.

#### Timeline of Study

Upon approval of the Barry University IRB, the researcher began to collect responses from paramedic and paramedic employer participants. The total amount of time designated for this study was a maximum of one year. Once data and responses were

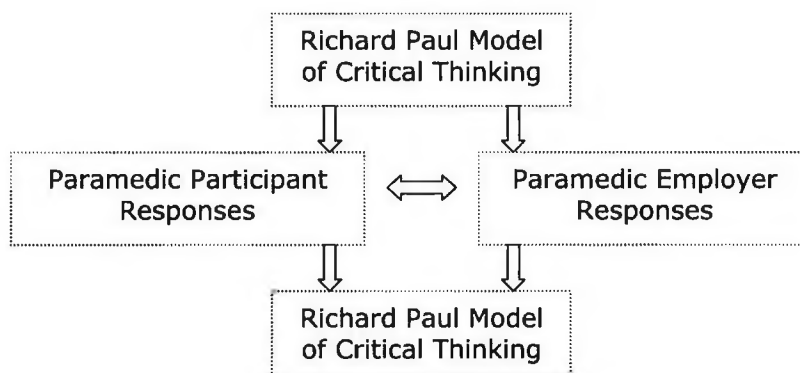
collected, sorted and coded appropriately (Creswell, 2007; Patton, 2002), the researcher began implementation of the data into a final written research document.

### Data Analysis Procedures

The data collected from this study was sorted using common themes and similar responses (Patton, 2002) from paramedic and employer participants. The researcher continued to sort similar responses into categories and continued dissection of responses until all possible variations of response interpretation could be achieved (Maxwell, 1992; Moustakas, 1994; Patton, 2002). Analysis of data for phenomenological, qualitative research seeks to delve into the understanding of participant responses and find true meaning of their lived experiences (Edie, 1962; Rubin & Rubin, 2005).

The participant responses were analyzed so the researcher could effectively interpret the thick, rich, descriptive responses from participants and code them into appropriate themes to answer the overarching question of the study (Creswell, 2003; Patton, 2002).

Figure 2. Application of Richard Paul Model to Explore Paramedic Critical Thinking



It was expected that there would be similar viewpoints from paramedic and employer participants on some aspects of critical thinking as well as different viewpoints and perceptions of others. The researcher identified similar responses from participants and then aligned them with the attributes of the Richard Paul Model (RPM) of Critical Thinking (see Figure 2). This collection and analysis process brought validity and integrity to the study (Fraenkel & Wallen, 2003; Maxwell, 1992). The RPM of Critical Thinking (Paul & Elder, 2002; 2006) provided a theoretical framework that built a valid and reliable foundation to explore the relevance of the paramedic and employer responses to the research questions of this study.

#### Standards of Quality and Verification

To provide evidence of rigor within a qualitative study, a researcher must maintain validity and reliability (Creswell, 2005; Fraenkel & Wallen, 2003). For qualitative studies to be valid and reliable, research must be able to generate an understanding of the phenomenon being studied (Maxwell, 1992; Moustakas, 1994; Stenbacka, 2001). The study must also be conducted in a manner that portrays reasonable care to provide accurate details while providing evaluation for the value of findings in the study (Maxwell, 1992). While validity and reliability help to establish a quality qualitative study, trustworthiness is deemed a more appropriate term to validate the quality of qualitative studies (Creswell; Patton, 2002; Seale, 1999), as trustworthiness provides a holistic quality approach to studies by establishing credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

### *Credibility and Transferability*

Credibility is important to qualitative research because it ensures the researcher has addressed the research question(s) and that the study is seeking answers from participants to answer those questions (Creswell, 2003; Patton, 2002). Credibility can be achieved through transparency with description of responses while providing a detailed, systematic research process for the reader to establish their own interpretation of the data and how the researcher established interpretation of the findings (Creswell, 2005; Rubin & Rubin, 2005). The researcher of this study established credibility of the study by providing detailed data collection and analyzing processes as well as thick, rich, descriptive responses from participants (Creswell; Patton) that can be transferable to future research beyond the scope of this study.

### *Dependability*

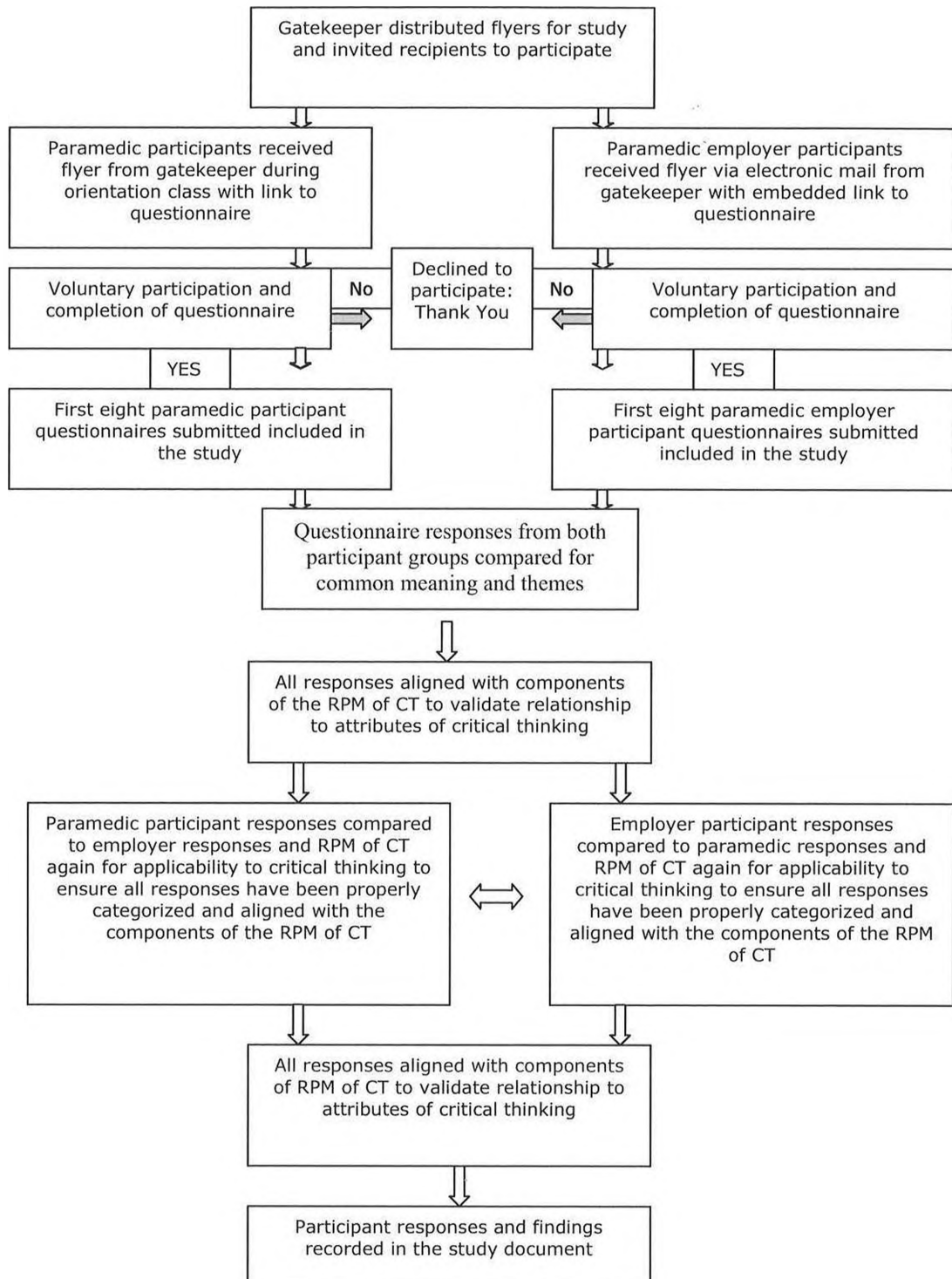
Dependability is important for a qualitative study because it establishes a reasonable, verifiable, and documented support for the research being conducted (Creswell, 2005; Lincoln & Guba, 1985). Dependability is a quality in qualitative research that allows the researcher to provide a detailed description and systematic process that reveals data, findings and interpretation or “audit trail” of a given study (Lincoln & Guba). The researcher for this study addressed dependability by presenting the data and findings in an objective manner that will allow the reader to develop their own opinions and perceptions of the results. Dependability was also addressed by identifying common themes and by supporting the findings and recommendations of the study (Creswell, 1998; Patton, 2002).

### *Confirmability*

Confirmability is important for qualitative studies because it establishes a sound, credible foundation with factual data and interpretation of results that clearly delineates and correlates the interpretations and findings of the research data (Creswell, 2005). The RPM of Critical Thinking (See figure 1) established the framework to validate participant responses and common themes found within the study. The RPM of Critical Thinking has multiple characteristics embedded within the standards of thinking, elements of reasoning, and intellectual traits sections that specify what critical thinking is and how a person becomes a critical thinker (Paul & Elder, 2002; 2006). Researchers conducting qualitative studies effectively infuse the attributes of credibility, transferability, dependability, and confirmability throughout their study and do so within moral and ethical guidelines (Lincoln & Guba, 1985).

During the qualitative research process, researchers must remain diligent in the respect for their participants (Creswell, 2003). Researchers develop ethical behaviors and build a trusting relationship with their participants while conducting research because of the open and honest answers being summoned for research (Creswell, 2005). The researcher for this study respected the dignity of participants and ensured that each clearly understood the voluntary participatory nature of the study (Patton, 2002). The researcher also ensured that participants were fully informed about the study while allowing them to determine their own voluntarily participation. Participants were informed of their right to decline participation or leave the study at any point without negative consequences (Creswell, 2003; Rubin & Rubin, 2005).

Figure 3. Data Collection and Processing Overview for Study



## Ethical Considerations

The researcher respected the participants' rights to privacy, dignity and remained compliant with the strict research guidelines set forth by The National Research Act of 1974 and the researcher's educational institution's Institutional Review Board (IRB). The researcher provided an Informed Consent Form (ICF) to each participant prior to administering the questionnaire. The National Research Act of 1974 (Jacobs & Zonnenberg, 2004) established requirements that all research with human participants, be examined and approved by an Institutional Review Board [IRB]. The IRB examines and approves all research and protects study participants from unsafe research practices or harm (Creswell, 2005; Patton, 2002).

An Informed Consent Form (ICF) for this study was accessed on SurveyMonkey™ and was accepted by participants agreeing to voluntary participation in the study or declining to participate. Declining excused them from the study and prevented them from participating without consequence. Due to the online, anonymous nature of participant questionnaires on Survey Monkey™, the researcher was unable to identify individual (Creswell, 2005; Patton, 2002) paramedic or paramedic employer participants and assigned researcher developed designators (e.g., PAR-1, PAR-2, EMP-1, EMP-2).

In addition to adherence to IRB policies, the researcher has also completed the National Institute of Health: Protecting Human Research Participants online course (Appendix H) as required by doctoral program requirements to ensure the researcher understands participant protection. This coursework highlights the ethical and legal



considerations researchers must strictly adhere to while protecting participants from harm or negative consequences resulting during or after research.

The raw data responses retrieved from participants in this study will remain protected to the fullest extent of the law. The researcher is required to secure this information in a locked safe deposit box; accessible only by the researcher. The participant response data for this study will be locked in a safe deposit box at the researcher's home residence in both paper and electronic form and will be destroyed after five years.

### Chapter Summary

As paramedic education programs continue to educate and release paramedic students into the workforce, the quality of care they provide relies upon graduates being able to think critically about patient care situations with appropriate, timely treatment (IOM, 2007). Prehospital and in-hospital healthcare employers continue to face shortages of competent, entry-level providers entering the workforce (FHA, 2005), so diligence in teaching paramedics how to think critically will be imperative to paramedic success. As patient care needs continue to become more complex, it becomes even more essential that paramedic education programs continue (or begin) to provide critical thinking education in the paramedic curriculum by establishing and implementing critical thinking processes and applications to their training (Bledsoe et al., 2003; Paul & Elder, 2002; 2006; IOM).

To address the importance of critical thinking in the paramedic profession, this study collected responses from paramedics and paramedic employer participants about critical thinking perceptions. The responses from participants on critical thinking applied in the prehospital patient care setting were evaluated based upon paramedic perception of

what critical thinking is, the value of critical thinking in the prehospital care setting, the employer's perception of what critical thinking is, and how effectively paramedics apply critical thinking in the prehospital care setting. The results of this study may be useful for paramedic education programs, paramedic employers, and paramedics who seek to understand the phenomenon of paramedic thinking.

## CHAPTER IV

### FINDINGS OF THE STUDY

#### Introduction

The aim of this qualitative study was to summon paramedics' and employers' perceptions of critical thinking in the prehospital patient care environment. A literature review revealed the inability of some paramedics to effectively apply critical thinking skills to patient care situations (Hauswald, 2002; Hubble et al., 2000; Maggiore, 2008; Nguyen, 2008; Pointer et al., 2001; Silvestri et al., 2002; Vilke et al., 2007). The deficiencies noted shed light upon concerns for both initial and continuing medical education for prehospital patient care providers and paramedics (IOM, 2000). The deficiencies noted include: (1) the inability of paramedics to triage patients for necessity of ambulance transport to local emergency departments; (2) inability to properly calculate and deliver medication infusions; and (3) inability to consistently place and secure (with a high rate of success) advanced airways (e.g., endotracheal intubation).

This study used a phenomenological perspective to summon and interpret participant opinions and perceptions about critical thinking by using open-ended questions. The results from this qualitative study provided in this chapter include: (1) demographic information of participants; (2) findings from the study; (3) summary of findings; (4) common themes; and (5) chapter summary.

#### Demographics of Participants

To summon participants for this study, invitational flyers were delivered to a purposive, convenient group of potential participants with access information to an anonymous, online, open-ended questionnaire about critical thinking. Only the first eight

paramedics and first eight paramedic employers to access and complete the questionnaire were included in this study. Each paramedic and paramedic employer participant was assigned a researcher-developed designator (e.g., PAR-1, PAR-2, EMP-1, EMP-2).

Paramedic participants were asked: (1) how they defined critical thinking; (2) type of paramedic program they attended; (3) if there was a difference between paramedic degree and certificate programs; (4) if paramedic education programs provided adequate critical thinking education in the paramedic curriculum; (5) the importance of critical thinking to the paramedic profession; (6) recommendation for improvement or additions to paramedic critical thinking education; and (7) to provide anything else they believed to be beneficial to the study.

Paramedic employer participants were asked: (1) how they defined critical thinking; (2) type of paramedic program they prefer their paramedics attend; (3) if there was a difference between paramedic degree and certificate programs; (4) if paramedic education programs provide adequate critical thinking education in the paramedic curriculum; (5) the importance of critical thinking to the paramedic profession; (6) recommendation for improvement or additions to paramedic critical thinking education; and (7) to provide anything else they believed to be beneficial to the study.

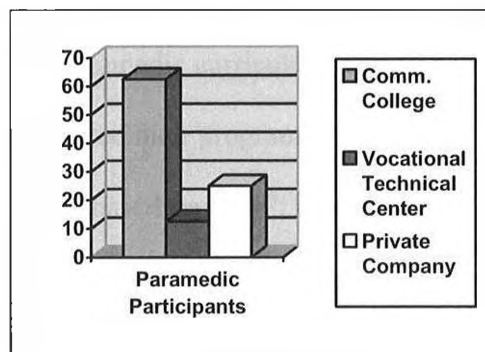
### Findings of the Study

To conduct this study, the researcher collected questionnaire responses from the first eight-paramedic participants and from the first eight-paramedic-employer participants. The questionnaires for this qualitative study yielded the thick, rich, descriptive responses sought from participants to answer the research questions about critical thinking (Creswell, 1998; Patton, 2002).

### *Paramedic Participant Responses*

Of the eight-paramedic participants responding to the questions, all (100%) provided descriptions of critical thinking as an ongoing process to gather and work through information, explore possibilities, and use rational thinking. In addition, many common descriptive themes emerged in these responses that included gathering, processing, considering all possibilities, rational decision-making, learned knowledge, and exploration of information. Five (PAR-2, PAR-5, PAR-6, PAR-7, and PAR-8) paramedic participants (62.5%) attended a community college paramedic program; one (PAR-1) attended (12.5%) a vocational technical center, and two (PAR-3 and PAR-4) attended (25%) a private company paramedic program (see Figure 4.1).

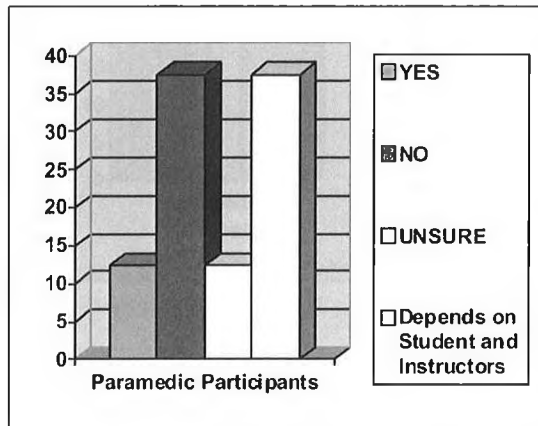
Figure 4.1. Type of Paramedic Program Attended by Paramedic Participants



When responding to whether there was a difference between associate degree and certificate paramedic programs or not; one (PAR-2) paramedic participant (12.5%) believed there was a difference, stating that associate degree programs offer “better coping and writing skills”; one (PAR-5) was unsure (12.5%) of any difference; three (PAR-3, PAR-4, and PAR-7) believed (37.5%) there was no difference; and three (PAR-1, PAR-6, and PAR-8) believed that it depends (37.5%) stating that “it depends on

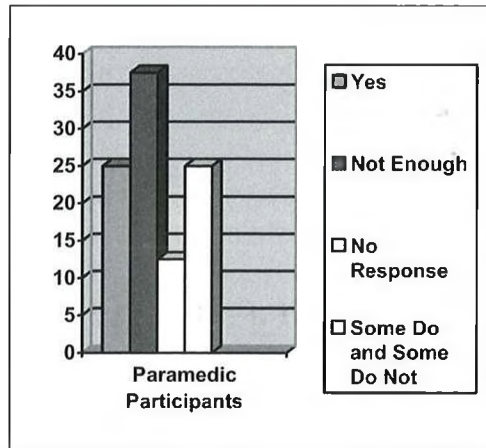
paramedic student and program” with “associate degree programs willing to go the extra mile” and “bridging the gap between curriculum” is important (see Figure 4.2).

Figure 4.2. Is there a difference between associate degree and certificate paramedic programs?



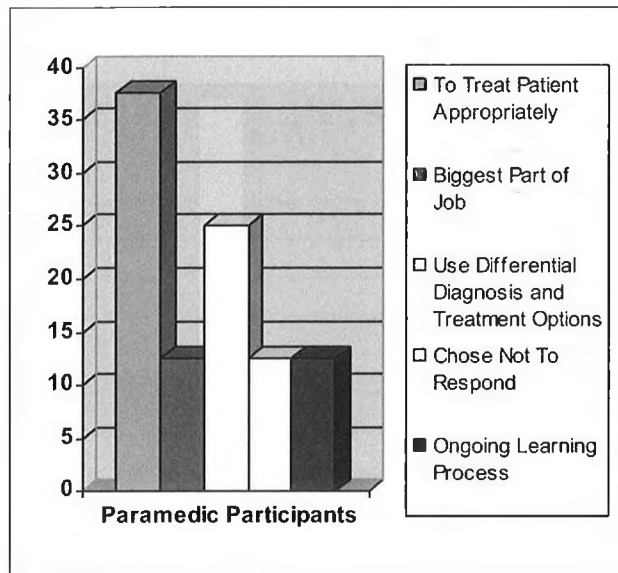
When questioned whether paramedic education programs provided adequate critical thinking education in the paramedic curriculum; two (PAR-1 and PAR-8) paramedic participants (25%) believed their program did provide enough, stating their program “provided lots of scenario-based training”; three (PAR-2, PAR-5, and PAR-6) believed (37.5%) not enough was provided; one (PAR-3) did not respond (12.5%) to the question; and two (PAR-4 and PAR-7) believed (25%) that some do and some do not provide enough critical thinking education. PAR-7 stated that their program “ran us through complex scenarios with curve-balls and odd circumstances” (see Figure 4.3).

Figure 4.3. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum?



When asked about the importance of critical thinking to the paramedic profession, three (PAR-2, PAR-6 and PAR-8) paramedic participants believed (37.5%) critical thinking was important to find the right answers and treat patients appropriately with PAR-6 stating “we only have minutes to make decisions while relying on training, protocols, and COMMON SENSE” ; one (PAR-1) believed (12.5%) critical thinking was the “biggest part of being a paramedic that improves patient survival and quality of life potential”; two (PAR-4 and PAR-5) believed (25%) being able to work through a “differential diagnosis” process and “considering various treatment options” makes critical thinking important to the paramedic profession; one (PAR-7) believed (12.5%) that paramedics “should be thorough and strengthen skills through an ongoing learning process”; and one (PAR-3) chose (12.5%) not to respond (see Figure 4.4).

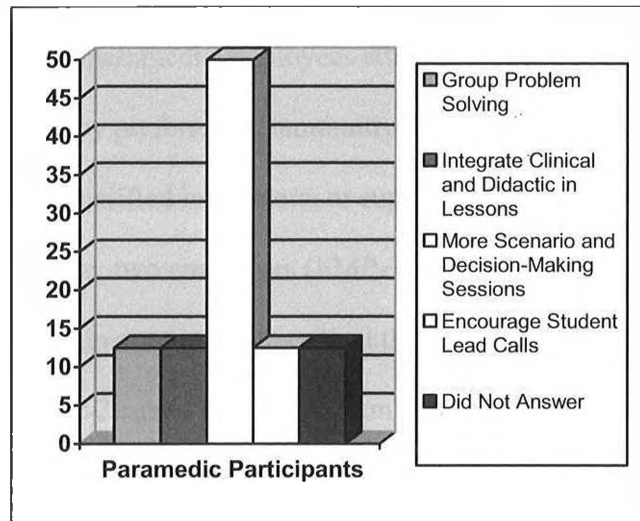
Figure 4.4. What is the importance of critical thinking to the paramedic profession?



When asked about recommendations to improve or add to paramedic critical thinking education, one (PAR-2) paramedic participant (12.5%) suggested small group projects with teams (of 3 to 4) working together to find solutions and answers to problems; one (PAR-1) recommended (12.5%) more integration of clinical (patient contact) experience into didactic (lecture) sessions to strengthen understanding of material being taught; four paramedics (PAR-4, PAR-5, PAR-7 and PAR-8) suggested (50%) more scenario and decision-making processes implemented into the curriculum with PAR-4 relating to critical thinking as “critical skill to make a differential diagnosis” and “applying multiple treatment modalities with consideration for risks and benefits”; one (PAR-6) suggested (12.5%) that preceptors should “encourage more student-lead patient care and leadership practice to build student confidence”; and one (PAR-3) chose (12.5%) not to respond (see Figure 4.5).



Figure 4.5. What recommendations would you make for paramedic critical thinking education?



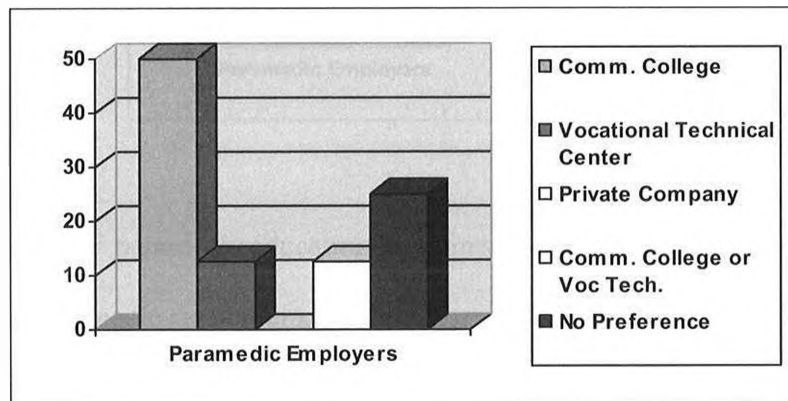
And finally, when asked if there was anything else they wanted to offer for the benefit of this study, three (PAR-4, PAR-5, and PAR-8) paramedic participants (37.5%) had nothing to add; one (PAR-3) chose (12.5%) not to respond; two (PAR-1 and PAR-7) wanted (25%) to ensure that paramedics were “in the profession for the benefit of patient care” and “not just occupy a position”; one (PAR-2) suggested (12.5%) that “critical thinking continuing education materials be included in the recertification process”; and one (PAR-6) offered (12.5%) encouragement for this research.

*Paramedic Employer Participant Responses*

Of the eight-paramedic employers responding to the study, seven (EMP-1, EMP-2, EMP-3, EMP-4, EMP-6, EMP-7 and EMP-8) paramedic employers (87.5%) agreed that critical thinking was a process of thinking and evaluating what is learned, to find a well thought-out solution to a problem. EMP-6 stated that “most paramedics do NOT use critical thinking skills due to protocol-based teaching rather than critical decision

making” education; one employer (EMP-5) referred (12.5%) to critical thinking as a “step-by-step, decision-making process”. When questioned about the type of paramedic program they preferred their paramedic employees attend, four (EMP-2, EMP-5, EMP-6 and EMP-8) stated (50%) they preferred a community college program because of accreditation, consistency, qualified instructors, or supporting health courses that strengthen student knowledge; two employers (EMP-3 and EMP-7) preferred (25%) any program that offered quality instruction with critical thinking, use of knowledge, and decision-making skills. EMP-3 stated that “a program that uses critical thinking would be preferable because students would know why they are doing procedures” instead of just learning how-to do procedures; and two (EMP-1 and EMP-4) preferred (25%) either a community college or vocational-technical center with cost-effectiveness and accreditation standards being primary factors (see Figure 4.6).

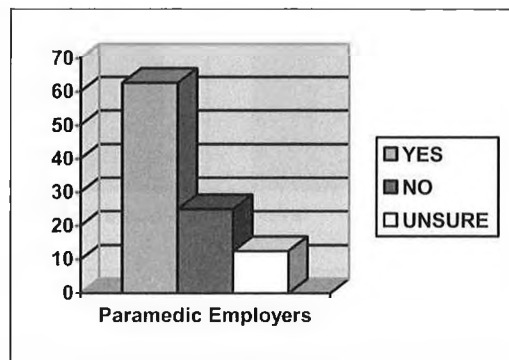
Figure 4.6. Type of Paramedic Program Preferred by Paramedic Employers



When asked if there was a difference between paramedics who complete associate degree and certificate programs, five paramedic employers (EMP-2, EMP-4, EMP-6, EMP-7 and EMP-8) believed (62.5%) that associate degree programs prepare students to

be more successful with reading, writing, and articulation skills with EMP-2 stating that “college [associate degree] programs teach more than how-to” and “certificate programs are geared towards turning students out at a faster pace and rely on employers to complete the student’s education with on-the-job training”; two employers (EMP-1 and EMP-3) believed (25%) there was no difference between programs with EMP-3 adding that “associate degree programs prepare them for supervisor positions”; and one employer (EMP-5) was not sure (12.5%) of any difference, but did state that any level of college education is beneficial (see Figure 4.7).

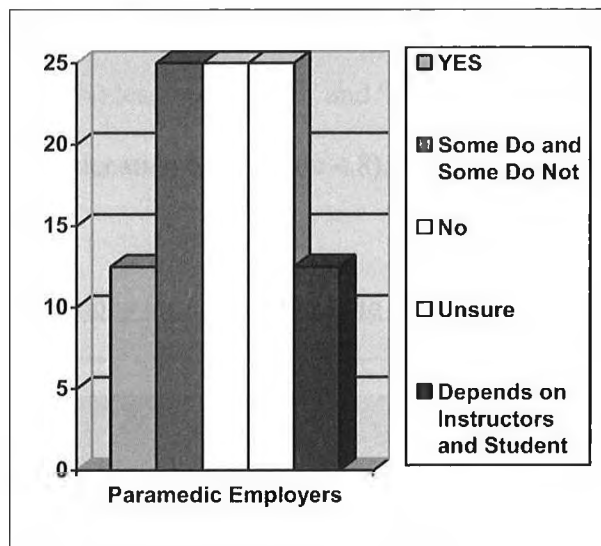
Figure 4.7. Is there a difference between paramedics who complete associate degree and certificate paramedic programs?



When asked if paramedic education programs provide adequate critical thinking education in the paramedic curriculum, one employer (EMP-7) believed (12.5%) that programs provide adequate training, but stated that “training such as Advanced Cardiac Life Support can teach them [paramedics] to respond automatically” instead of “thinking critically, so improving their critical thinking abilities would make better paramedics”; two (EMP-5 and EMP-8) believe (25%) that some programs effectively address critical thinking education and some do not; two (EMP-2 and EMP-6) believed (25%) that

programs do not; two employers (EMP-1 and EMP-4) do not know (25%) if paramedic programs adequately address critical thinking education; and one (EMP-3) believed (12.5%) that some programs provide mixed-results with instructors having the greatest influence on student’s ability to learn critical thinking (see Figure 4.8).

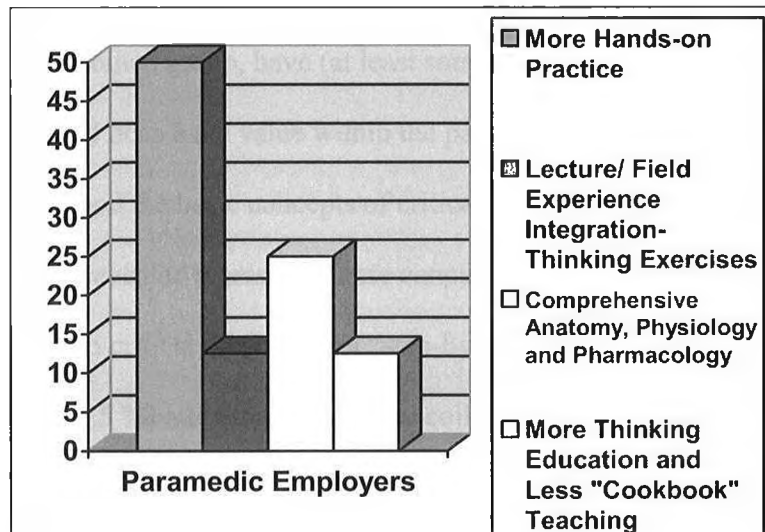
Figure 4.8. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum?



When asked about the importance of critical thinking to the paramedic profession, all eight (100%) paramedic employers identified critical thinking as an essential skill for paramedics to help them assess, evaluate, and address patient conditions properly. EMP-4 stated that critical thinking is important so paramedics “can evaluate patients, develop a treatment plan, and engage in substantial dialogue with Emergency Department doctors and nurses about patient care”. When asked about recommendations for improvements or additions to paramedic critical thinking education, four employers (EMP-1, EMP-5, EMP-7 and EMP-8) recommended (50%) more “hands-on” scenarios that make students

think through various situations with EMP-5 stating “hands-on scenarios with quality mentors/ instructors that encourage student thought processes” are ideal; one employer (EMP-4) recommended (12.5%) more thinking exercises with a building of strong foundations between knowledge and field experience that challenge, build, and strengthen critical thinking skills; two employers (EMP-3 and EMP-6) recommended (25%) more comprehensive anatomy, physiology, and pharmacology education so paramedics understand “how and why their treatment is working”; and one employer (EMP-2) demanded (12.5%) less “cookbook” and “step-by-step” teaching and more comprehensive thinking education (see Figure 4.8).

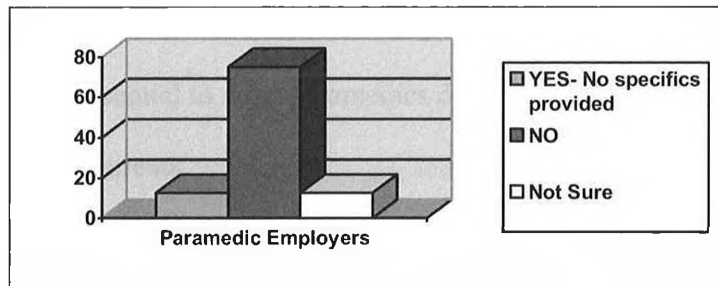
Figure 4.8. Recommendations for critical thinking education in the paramedic programs



When asked if there were any recommendations or additions to this study, one employer (EMP-2) stated (12.5%) there were recommendations, but did not know where to begin; six employers (EMP-3, EMP-4, EMP-5, EMP-6, EMP-7 and EMP-8) stated

(75%) there was nothing to add or recommend; and one employer (EMP-1) was not sure (12.5%) if there was anything else to add (see Figure 4.9).

Figure 4.9. Are there any recommendations or additions for this study?



#### Summary of Findings

The findings of this study revealed that both paramedics and paramedic employers, as a combined group, have (at least some) understanding of what critical thinking is and that it does have value within the paramedic curriculum. All (100%) paramedics understood the basic concepts of critical thinking and most paramedic employers (87.5%) revealed a grasp on these concepts as well, with one (12.5%) employer referring to critical thinking as a “step-by-step” and “problem-solving” process. Five paramedics (62.5 %) attended community college programs for their initial paramedic education and half (50%) of the employers preferred that their paramedics attend a community college program. When asked about the difference between associate degree and certificate paramedic programs, five (62.5%) employers believe that associate degrees were favorable and three (37.5%) paramedics believed there was no difference between paramedic degree and certificate programs.

One common agreement between paramedics and employers was both requesting (50%) more “decision-making” and thinking scenarios in the paramedic curriculum. Another common finding revealed that a minority of paramedics (25%) and employers (12.5%) believed that paramedic programs offered adequate critical thinking education. Both paramedics and employers revealed that they valued critical thinking ability and that critical thinking was essential to what paramedics do in the prehospital patient care setting -- take care of patients.

One other finding that emerged from this study was that most of paramedics and employers recommended changes to the critical thinking education being offered in paramedic programs. These recommendations included offering: (1) more hands-on scenarios using a thought process to work through problems; (2) more hands-on scenarios with repetition and variations; (3) comprehensive anatomy, physiology, and pharmacology classes to strengthen understanding of body systems; (4) student-centered dialogue and interaction to engage student groups; (5) more integration of clinical, field, and lecture material into presentations; so students can put it all together in the learning environment; (6) group projects with team-based learning; (7) use of critical thinking processes throughout the program that allows students to evolve from “step-by-step” processes that limit thinking and learning experiences; and (8) a stronger learning foundation by integrating field, clinical, and lecture to strengthen student’s understanding of the paramedic curriculum.

#### Chapter Summary

This qualitative, phenomenological study summoned paramedic and paramedic employer perceptions of critical thinking via online, open-ended questionnaires. The

questions posed to participants asked how they defined critical thinking, type of paramedic program preferred or attended, if there was any difference between paramedic degree and certificate programs, if paramedic education programs provided adequate critical thinking education, the importance of critical thinking to the paramedic profession, recommendation for improvement or additions to paramedic critical thinking education, and if they had anything else they felt would be beneficial to the study.

The results of the study revealed that paramedics and paramedic employers have some understanding of what critical thinking is and being a valuable attribute to the paramedic profession. In addition, participants revealed their desire to have more comprehensive training with opportunity to learn and practice critical thinking skills.



## CHAPTER V

### DISCUSSION OF THE FINDINGS

#### Introduction

With a vast number of both public and private paramedic training and education programs providing paramedics to our communities, there remains a variance in the quality and quantity of skills practice, hospital and field internship hours, and patient contact requirements for each program (Institute of Medicine [IOM], 2007; National Registry of Emergency Medical Technicians [NREMT], 2006). Prehospital employers continue to face shortages of competent, entry-level paramedics entering the workforce and it is because of these shortages that paramedic training and education programs continue to receive pressure from employers to increase the number of paramedic graduates each year (IOM).

As patient medical conditions become more complex, the nation's healthcare system faces increased fiscal and resource constraints (IOM, 2004; 2007), our national geriatric population increases (American Geriatric Society, 2004), the number of premature patient releases from hospitals and healthcare facilities continues (IOM, 2007), an increased demand for competent and well-trained prehospital care providers exists (IOM). To address this demand, paramedic training and education institutions will continue being tasked with delivering ample numbers of competent, critically thinking paramedics to navigate these complex patient care conditions (IOM).

## Summary of the Study

This study focused on how paramedics and paramedic employers perceive critical thinking in the prehospital patient care setting. Because paramedic programs have access to educational products that allow for infusion of critical thinking into their education arsenal (Bledsoe et al., 2003; Dalton et al., 2003; Larmon & Snyder, 2007; 2008; 24-7 EMS, 2007), students are able to learn critical thinking concepts and applications. A review of the literature revealed that some (and not all) paramedic programs infuse critical thinking education into their curriculum. The exposure to critical thinking concepts and ideology in the student learning culture (Paul, 1993; Larmon & Snyder) yields a stronger and more comprehensive learning of concepts and skills applications.

This study found that paramedic and employer participants support continuous infusion of critical thinking concepts and practice into the paramedic curriculum. This infusion enhances paramedic education (Bledsoe et al., 2003) and yields positive employer satisfaction outcomes with paramedic graduates entering the workforce.

## Purpose of the Study

The purpose of this study was to summon paramedics' and paramedic employers' perceptions of critical thinking skills in the prehospital care setting. To explore this phenomenon, the researcher summoned and collected answers to an overarching question by using a researcher developed questionnaire with critical thinking questions (Creswell, 2005; Patton, 2002). The overarching question for this research study was:

What are paramedics' and paramedic employers' perceptions of critical thinking?

To address the overarching question, this study asked paramedics and paramedic employers a set of open-ended questions designed to elicit descriptive responses. These questions addressed:

1. How do participants define critical thinking?
2. How important is critical thinking to the paramedic profession?
3. What type of paramedic program did participants attend and complete (e.g., private company, hospital-based program, community college, vocational technical institution)?
4. Was the paramedic program attended and completed, a paramedic certificate or associate degree program?
5. Did the paramedic education and training program provide critical thinking education in the curriculum?

The participants' responses to these questions will offer paramedic and paramedic employer perceptions of critical thinking to paramedic education programs and provide vital information to potentially guide future paramedic critical thinking education.

#### Significance of Study

Paramedics, as emergency care providers, are a critical link to the patient care continuum by providing life-saving emergency care in the prehospital patient care setting (Bledsoe et al., 2003; IOM, 2007; Mason, Knowles, Freeman, & Snooks, 2008; NREMT, 2006). To provide the level of care that is essential to patient safety and well-being, paramedics must apply critical thinking skills in the patient care setting.

This study is significant because patient medical conditions are becoming increasingly more complex during a time of fiscal and staffing challenges (IOM, 2004; 2007) and healthcare employers are searching for healthcare providers with the critical thinking skills necessary to provide care to diverse patient care populations. The findings

of this study revealed that not all paramedic programs address critical thinking in their curriculum.

### Methods

To summon paramedics' and employers' perceptions of critical thinking, this study selected a purposive, convenient sample population of paramedics and paramedic employers from an urban, high-performance EMS system that hires paramedics from (potentially) all over the U.S. Paramedic participants in this study were employed by one of nineteen employing agencies and attended a required orientation course. Paramedic participants originated from various types of paramedic programs and may have had various levels of skills, knowledge, competency and years of experience in the EMS field.

All paramedic employer participants in this study hire paramedics working within the county where the study took place. In total, this study included responses from 16 participants by selecting the first eight paramedic and first eight paramedic employer participants who responded to and completed online, anonymous questionnaires (Appendixes A and B) addressing paramedic critical thinking.

Responses collected were analyzed by discovering descriptive responses and sorting them for common themes and differences (Creswell, 2003). Once all common themes were identified and sorted, the data was aligned with components of the Richard Paul Model of Critical Thinking (Figure 1) to identify attributes of critical thinking.

## Limitations

Because this study limited participation to paramedics and employers within a single county, a list of associated limitations was addressed. The following were recognized as potential limitations of this study:

1. The sample for this qualitative study was newly hired paramedics working for one of nineteen fire department and EMS agencies within a single, urban high-performance EMS system and the first eight (8) out of nineteen paramedic employment agencies potentially participating in this study.
2. Many of the participants know the researcher as a paramedic and educator. This may have created some level of intimidation or apprehension in participants' willingness to participate or in providing complete and honest responses to the questions posed to them.

As these limitation potentials were recognized and acknowledged, the researcher made every effort to be open and honest (Creswell, 2003; Patton, 2002) with participants in the study. As the researcher collected data and responses from secured, online anonymous questionnaires, the researcher had no way of knowing individual identities of participants. Even with the limitations of this study, results yielded a common theme of support for critical thinking education.

## Discussion of the Findings

Paramedic and employer participants in this study presented an overall desire to have critical thinking education infused into the paramedic curriculum. While the definition and perceptions of what critical thinking is and its importance to the paramedic profession varied, most paramedic and employer participants generally perceived critical thinking as a process of thinking to accomplish the best possible patient care outcomes. There are various types of paramedic programs within the U.S. (i.e., private company, hospital-based program, community college, vocational-technical institution) and this

study found that paramedic participants attended various types of paramedic training programs resulting in diverse perceptions on degree and certificate paramedic programs.

Overall, employer participants perceived critical thinking as the ability for paramedics to work through a process of thinking to address patient care needs. Employer participants had varied opinions about what type of paramedic program they preferred their employees attend with cost, flexibility, comprehensive pharmacology, anatomy and physiology, with communication and writing skills being emphasized as very desirable.

### Recommendations

Paramedic and employer responses to this study revealed a common desire to have paramedic programs review their curriculum and address the amount of (if any) critical thinking education and opportunities provided. Paramedic education involves a significant amount of resources and time to adequately train and educate future paramedics. This study discovered recommendations that will be provided for paramedic programs. First, paramedic programs that use critical thinking as a foundation for their student learning should continue dialogue with their students and community employers to ensure satisfaction with the critical thinking education being provided. For paramedic programs that have not yet embraced the concept or application of critical thinking education in their program, a review of the paramedic national education standards, paramedic curriculum using a critical thinking foundation, and dialogue with community employers that hire their graduates is essential.

Second, paramedic education programs should increase the amount of (or begin) group-based and scenario-based learning in their curriculum that allows students to “think outside of the box” and go beyond a “cookbook” approach in patient care

situations. Third, a collaborative effort is recommended to allow students to work together and think through patient care situations while applying learned knowledge and skills in a cohesive, “putting it all together” manner. According to Alexander (2006) and Bloom (1956), bringing all cognitive, psychomotor, and affective domain attributes together in the learning environment fosters a more comprehensive learning experience for (educators and) students.

#### Further Research

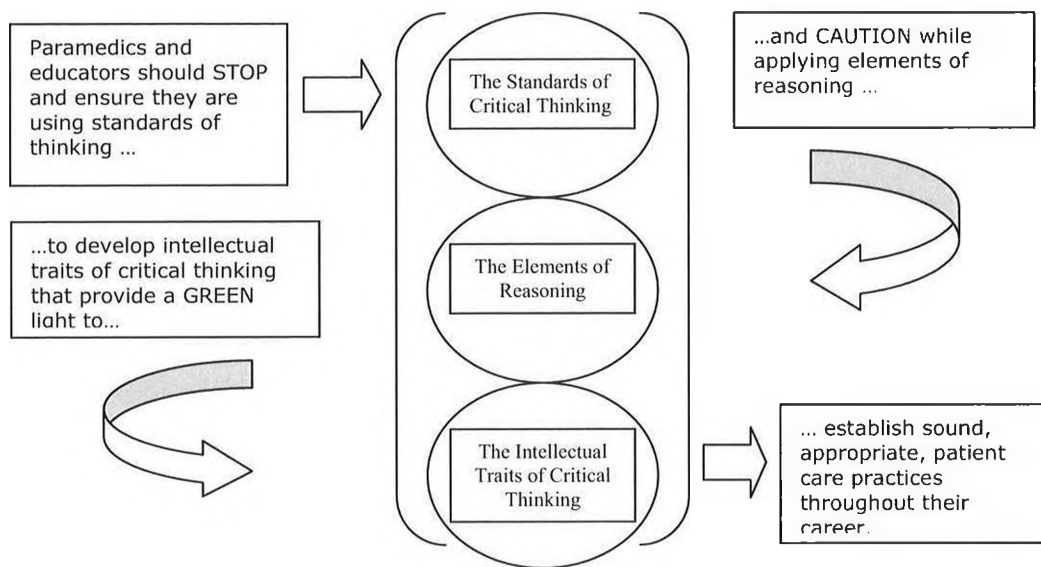
While there is ongoing research into paramedic performance and competencies, there has been little research to explore paramedic and employer perceptions of critical thinking. As this study summoned responses from a small group of participants, it yielded some interesting findings about paramedic critical thinking education. Further research in paramedic critical thinking would benefit paramedic programs by conducting regional or nationwide studies that include participant gender, total years of EMS experience, type of system working in, and years of post-secondary education. In addition, research addressing how various paramedic programs (i.e., local, regional, and national) define and deliver critical thinking to their student populations would prove very helpful in standardizing critical thinking education across the country.

#### Implications for Practice

The findings of this study revealed that not all paramedic programs offer or effectively address critical thinking education in the classroom. Participant responses from this study found that providing critical thinking practice is beneficial (and desirable) for optimal patient care outcomes. Paramedics can only apply critical thinking to patient care settings if they learn to do so in the early stages of education. It is therefore essential

that educators learn: (1) about critical thinking; (2) how to infuse critical thinking standards and elements of reasoning into the curriculum; and (3) how to engage students in an ongoing effort to encourage thoughtful and meaningful responses to situations and questions presented. A continuous and ongoing effort to encourage critical thinking will establish a life-long foundation of sound, appropriate, patient care practices (See figure 5) that will become an integral part of a life-long learning process.

Figure 5. STOP Light Approach to Paramedic Critical Thinking



Note: (Based upon the Richard Paul Model of Critical Thinking)

### Summary

This qualitative, phenomenological study summoned paramedics' and paramedic employers' perceptions of critical thinking and collected data that yielded answers to the overarching question of the study. As paramedics encounter increasingly complex patients in the prehospital patient care setting, there is a high-demand for competent and



educated prehospital care providers (Bledsoe et al., 2003; IOM, 2007) who can effectively apply critical thinking to patient care. To address this demand, paramedic education programs will face continuous pressure to deliver ample numbers of competent, critical thinking paramedics to navigate complex patient care conditions (IOM).

To address the challenge of providing competent entry-level paramedics, education programs are encouraged to infuse critical thinking concepts and practice into their curriculum as well as communicate with community employers who hire their students to ensure there is a level of satisfaction with paramedics entering the workforce.

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## APPENDIX A

### Paramedic Participant Recruitment Flyer

# Paramedic Critical Thinking: Is it important to the Paramedic Profession?

## Paramedics and Paramedic Employers Needed!

This is your chance to provide your opinion about paramedics and critical thinking. Is it important to you? If so, we need your help. We are looking for eight (8) paramedics and eight (8) paramedic employers within the Pinellas County, Florida EMS system to provide their perceptions about critical thinking in paramedic education and the paramedic profession.

If you decide to voluntarily participate in this study, you will be requested to do the following:

- Access a researcher developed questionnaire located online at: [http://www.surveymonkey.com/s.aspx?sm=Kc3CF5cfZGTisOWA0qU8zQ\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=Kc3CF5cfZGTisOWA0qU8zQ_3d_3d)
- If you agree to participate, you will select "I AGREE to participate" in the "Informed Consent Form" page provided within the questionnaire.
- If you choose not to participate, you will select "I DO NOT agree to participate" and will be asked to exit the questionnaire.
- If you agree to participate in the study on the questionnaire, you will then complete seven open-ended questions relating to critical thinking in the paramedic profession.
- You will only have one opportunity to answer the questions and once submitted, will not be able to go back and change/ alter any answers.
- All participants will remain anonymous and the researcher will be unable to access identifiable information.
- The study will use the first eight paramedic questionnaires submitted and designate each participant with a researcher-assigned designator (e.g., PAR-1, PAR-2).
- The study will also use the first eight (8) paramedic employer questionnaires; assign them researcher-assigned designators (e.g., EMP-1, EMP-2), and align responses from both groups using a critical thinking model.
- The anticipated time to complete this questionnaire is approximately 15-30 minutes.
- Your participation or non-participation in this study is completely voluntary and will have no effect on employment. You may withdraw or decline participation in this study at any time without any negative consequences.

## APPENDIX B

### Paramedic Employer Participant Recruitment Flyer

# Paramedic Critical Thinking: Is it important to the Paramedic Profession?

## Paramedics and Paramedic Employers Needed!

This is your chance to provide your opinion about paramedics and critical thinking. Is it important to you? If so, we need your help. We are looking for eight (8) paramedics and eight (8) paramedic employers within the Pinellas County, Florida EMS system to provide their perceptions about critical thinking in paramedic education and the paramedic profession.

If you decide to voluntarily participate in this study, you will be requested to do the following:

- Access a researcher developed questionnaire located online at: [http://www.surveymonkey.com/s.aspx?sm=8ZFBavWPetR1yhKbsMjWNQ\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=8ZFBavWPetR1yhKbsMjWNQ_3d_3d)
- If you agree to participate, you will select "I AGREE to participate" in the "Informed Consent Form" page provided within the questionnaire.
- If you choose not to participate, you will select "I DO NOT agree to participate" and will be asked to exit the questionnaire.
- If you agree to participate in the study on the questionnaire, you will then complete seven open-ended questions relating to critical thinking in the paramedic profession.
- You will only have one opportunity to answer the questions and once submitted, will not be able to go back and change/ alter any answers.
- All participants will remain anonymous and the researcher will be unable to access identifiable information.
- The study will use the first eight paramedic questionnaires submitted and designate each participant with a researcher-assigned designator (e.g., PAR-1, PAR-2).
- The study will also use the first eight (8) paramedic employer questionnaires; assign them researcher-assigned designators (e.g., EMP-1, EMP-2), and align responses from both (paramedic and employer) groups using a critical thinking model.
- The anticipated time to complete this questionnaire is approximately 15-30 minutes.
- Your participation or non-participation in this study is completely voluntary and will have no effect on employment. You may withdraw or decline participation in this study at any time without any negative consequences.

## APPENDIX C

### Online Informed Consent Form

Dear Research Participant:

Your participation in a research project is requested. The title of the study is Paramedics' and Employers' Perceptions of Critical Thinking. The research is being conducted by David L. Sullivan, a doctoral student in the Education and Leadership department at Barry University, and is seeking information that will be useful in the field of paramedic critical thinking. The aim of the research is to improve the quality of critical thinking skills applied to the prehospital, patient care setting. In accordance with these aims, the following procedures will be used:

Only paramedics hired by a Pinellas County fire department or EMS agency and attending a required medical director's orientation class will be permitted in the study as paramedic participants. In addition, only Pinellas County fire department and EMS agencies employing paramedics will be permitted as paramedic employer participants in the study. The study will use participants from two-months of orientation in a group to obtain an adequate sample of paramedics from various training institutions and years of experience. Each paramedic participant who voluntarily agrees to participate will be given a questionnaire via online access to SurveyMonkey™. Paramedic employer participants will be given access to an employer questionnaire. The paramedic and paramedic employer questionnaires will have seven (7) open-ended questions relating to paramedic critical thinking. These questionnaires will be completed anonymously and on a voluntary basis. The researcher will not have access to paramedic or paramedic employer identities.

We anticipate the number of paramedic participants to be eight (8) and the paramedic employer participants to be eight (8). If you decide to participate in this research, you will be asked to do the following:

- 1) Paramedic and paramedic employer participants will access the questionnaire using this SurveyMonkey(TM) link.
- 2) The estimated time to complete this questionnaire will be 15-30 minutes.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects for you or your employer.

There are no known risks to you for participating in this study. Although there are no direct benefits to you, your participation in this study may help our understanding of critical thinking in paramedics and provide valuable information to paramedic training and education institutions.

As a research participant, information you provide will be kept anonymous; that is, no names or other identifiers will be collected on any of the instruments used for this study. Data will be kept in a locked file in the researcher's office. The questionnaires will be completed on a secured, online platform that prevents the researcher from collecting any identifying information. By completing and returning this questionnaire, you have shown your agreement to participate in the study.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, David L. Sullivan, at (727) 341-3601, my supervisor, Dr. Joseph Maddox, Jr. at (321) 235-8422, or the Institutional Review Board point of contact, Mrs. Barbara Cook, at (305) 899-3020.

Thank you for your participation.  
Sincerely,

*David L. Sullivan*

**1. Please select one of the following options to participate or decline participation in this study.**

- I AGREE to participate
- I DO NOT agree to participate



APPENDIX D

Paramedic Critical Thinking Questionnaire

**Paramedic Participant - Critical Thinking Questionnaire**

**[Exit this survey](#)**

**Paramedic Participant - Critical Thinking Questionnaire**

**1. Paramedics' and Employers' Perceptions of Critical Thinking.**

Welcome and thank you for taking the time to participate in this study. The next page will explain the study and what is expected of participants. **\*\* (click next to continue) \*\***

	17
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Next

**[Exit this survey](#)**

**2. Barry University Informed Consent Form**

Dear Research Participant:

Your participation in a research project is requested. The title of the study is Paramedics' and Employers' Perceptions of Critical Thinking. The research is being conducted by David L. Sullivan, a doctoral student in the Education and Leadership department at Barry University, and is seeking information that will be useful in the field of paramedic critical thinking. The aim of the research is to improve the quality of critical thinking skills applied to the prehospital, patient care setting. In accordance with these aims, the following procedures will be used:

Only paramedics hired by a Pinellas County fire department or EMS agency and attending a required medical director's orientation class will be permitted in the study as paramedic participants. In addition, only Pinellas County fire department and EMS agencies employing paramedics will be permitted as paramedic employer participants in the study. The study will use participants from two-months of orientation in a group to obtain an adequate sample of paramedics from various training institutions and years of experience. Each paramedic participant who voluntarily agrees to participate will be given a questionnaire via online access to SurveyMonkey™. Paramedic employer participants will be given access to an employer questionnaire. The paramedic and paramedic employer questionnaires will have seven (7) open-ended questions relating to paramedic critical thinking. These questionnaires will be completed anonymously and on a voluntary basis. The researcher will not have access to paramedic or paramedic employer identities.

We anticipate the number of paramedic participants to be eight (8) and the paramedic employer participants to be eight (8). If you decide to participate in this research, you will be asked to do the following:

- 1) Paramedic participants will access this SurveyMonkey(TM) questionnaire using this link.
- 2) The estimated time to complete this questionnaire will be 15-30 minutes.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects for you or your employer.

There are no known risks to you for participating in this study. Although there are no direct benefits to you, your participation in this study may help our understanding of critical thinking in paramedics and provide valuable information to paramedic training and education institutions.

As a research participant, information you provide will be kept anonymous; that is, no names or other identifiers will be collected on any of the instruments used. Data will be kept in a locked file in the researcher's office. The questionnaires will be completed on a secured, online platform that prevents the researcher from collecting any identifying information. By completing and returning this questionnaire, you have shown your agreement to participate in the study.)

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, David L. Sullivan, at (727) 341-3601, my supervisor, Dr. Joseph Maddox, Jr., at (321) 235-8422, or the Institutional Review Board point of contact, Mrs. Barbara Cook, at (305) 899-3020.

Thank you for your participation.

Sincerely,  
*David L. Sullivan*

**1. Please select one of the following options to participate or decline participation in this study.**

- I AGREE to participate
- I DO NOT agree to participate

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**Exit this survey**

Paramedic Participant - Critical Thinking Questionnaire

**5. Paramedic Critical Thinking Questionnaire**

**1. How do you as a paramedic define critical thinking?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

An empty rectangular text input box with a light gray background and a thin border. It features a vertical scrollbar on the right side and horizontal scrollbars at the bottom.

**2. What type of paramedic program did you attend (private company, hospital-based program, community college, vocational technical institution)?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

An empty rectangular text input box with a light gray background and a thin border. It features a vertical scrollbar on the right side and horizontal scrollbars at the bottom.

**3. Do you feel there is a difference between paramedics who complete associate degree and certificate programs? If so, please explain what those differences are.**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

An empty rectangular text input box with a light gray background and a thin border. It features a vertical scrollbar on the right side and horizontal scrollbars at the bottom.

**4. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum? If yes, can you provide specific examples?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

An empty rectangular text input box with a light gray background and a thin border. It features a vertical scrollbar on the right side and horizontal scrollbars at the bottom.

**5. What do you feel is the importance of critical thinking to the paramedic profession?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

An empty rectangular text input box with a light gray background and a thin border. It features a vertical scrollbar on the right side and horizontal scrollbars at the bottom.

**6. If you were to recommend improvements or additions to paramedic critical thinking education, what would this include?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

**7. As a final opportunity, is there anything else you would like to offer for this paramedic critical thinking study?**

(\*\*Note- you may use a word document to write the response and then copy/paste to this box)

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**Exit this survey**

Paramedic Participant - Critical Thinking Questionnaire

**6. Thank You**

Your participation in this study is greatly appreciated, as it will help us to explore how paramedics and employers view critical thinking in the paramedic profession.

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## APPENDIX E

### Paramedic Employer Critical Thinking Questionnaire

#### Employer - Paramedic Critical Thinking Questionnaire

#### Employer - Paramedic Critical Thinking Questionnaire

#### 2. Barry University Informed Consent Form

Dear Research Participant:

Your participation in a research project is requested. The title of the study is Paramedics' and Employers' Perceptions of Critical Thinking. The research is being conducted by David L. Sullivan, a doctoral student in the Education and Leadership Department at Barry University, and is seeking information that will be useful in the field of paramedic critical thinking. The aim of the research is to improve the quality of critical thinking skills applied to the prehospital, patient care setting. In accordance with these aims, the following procedures will be used:

Only paramedics hired by a Pinellas County fire department or EMS agency and attending a required medical director's orientation class will be permitted in the study as paramedic participants. In addition, only Pinellas County fire department and EMS agencies employing paramedics will be permitted as paramedic employer participants in the study. The study will use participants from two-months of orientation in a group to obtain an adequate sample of paramedics from various training institutions and years of experience. Each paramedic participant who voluntarily agrees to participate will be given a questionnaire via online access to SurveyMonkey™. Paramedic employer participants will be given access to an employer questionnaire. The paramedic and paramedic employer questionnaires will have seven (7) open-ended questions relating to paramedic critical thinking. These questionnaires will be completed anonymously and on a voluntary basis. The researcher will not have access to paramedic or paramedic employer identities.

We anticipate the number of paramedic participants to be eight (8) and the paramedic employer participants to be eight (8). If you decide to participate in this research, you will be asked to do the following:

- 1) Paramedic and paramedic employer participants will access the questionnaire using this SurveyMonkey(TM) link.
- 2) The estimated time to complete this questionnaire will be 15- 30 minutes.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects for you or your employer.

There are no known risks to you for participating in this study. Although there are no direct benefits to you, your participation in this study may help our understanding of critical thinking in paramedics and provide valuable information to paramedic training and education institutions.

As a research participant, information you provide will be kept anonymous, that is, no names or other identifiers will be collected on any of the instruments used. Data will be kept in a locked file in the researcher's office. The questionnaires will be completed in a secured, online environment that prevents the researcher from collecting any identifying information. By completing and returning this questionnaire, you have shown your agreement to participate in the study.

If you have any questions or concerns regarding the study or your participation in the study, you may

contact me, David L. Sullivan, at (727) 341-3601, my supervisor, Dr. Joseph Maddox, Jr. at (321) 235-8422, or the Institutional Review Board point of contact, Mrs. Barbara Cook, at (305) 899-3020.

Thank you for your participation.  
Sincerely,

*David L. Sullivan*

**1. Please select one of the following options to participate or decline participation in this study.**

- I AGREE to participate
- I DO NOT agree to participate

33%

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Next

## Employer - Paramedic Critical Thinking Questionnaire

### 5. Paramedic Critical Thinking Questionnaire

**1. How would you as an employer describe paramedic critical thinking?**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)

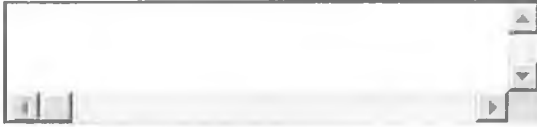
**2. What type of paramedic program would you prefer that your paramedic employees attend (e.g., private company, hospital-based program, community college, vocational-technical institution)? Please explain why.**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)

**3. Do you feel there is a difference between paramedics who complete associate degree and certificate programs? If so, please**

**explain what those differences are.**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)



**4. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum? If yes, can you provide specific examples?**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)



**5. What do you feel is the importance of critical thinking to the paramedic profession?**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)



**6. If you were to recommend improvements or additions to paramedic critical thinking education, what might this include?**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)



**7. Is there anything else you believe would be beneficial to this study?**

(\*\* Note - you may use a word document to write the response and then copy/paste to this box)



## **6. Thank You**

Your participation in this study is greatly appreciated as it will help us to explore how paramedics and employers view critical thinking in the paramedic profession.



## APPENDIX F

### **Paramedic Questionnaire Questions**

1. How do you as a paramedic define critical thinking?
2. What type of paramedic program did you attend (private company, hospital-based program, community college, vocational technical institution)?
3. Do you feel there is a difference between paramedics who complete associate degree and certificate programs? If so, please explain what those differences are.
4. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum? If yes, can you provide specific examples?
5. What do you feel is the importance of critical thinking to the paramedic profession?
6. If you were to recommend improvements or additions to paramedic critical thinking education, what would this include?
7. As a final opportunity, is there anything else you would like to offer for this paramedic critical thinking study?

## APPENDIX G

### **Paramedic Employer Questionnaire Questions**

1. How would you as an employer describe paramedic critical thinking?
2. What type of paramedic program would you prefer that your paramedic employees attend (e.g., private company, hospital-based program, community college, vocational-technical institution)? Please explain why.
3. Do you feel there is a difference between paramedics who complete associate degree and certificate programs? If so, please explain what those differences are.
4. Do paramedic education programs provide adequate critical thinking education in the paramedic curriculum? If yes, can you provide specific examples?
5. What do you feel is the importance of critical thinking to the paramedic profession?
6. If you were to recommend improvements or additions to paramedic critical thinking education, what might this include?
7. Is there anything else you believe would be beneficial to this study?

APPENDIX H

Certificates of Completion  
Protecting Human Research Participants  
The National Institute of Health  
Office of Human Subjects Research

