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Law Enforcement Officers' Perceptions of their Skill Development and Transfer of Learning Post-Training

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LAW ENFORCEMENT OFFICERS' PERCEPTIONS OF THEIR
SKILL DEVELOPMENT AND TRANSFER OF LEARNING POST TRAINING

BY

JANE B. NORTHUP

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE

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Abstract

This research examined how law enforcement officers who took a course in criminal investigative techniques developed their skill and transferred what was learned post-training. The data was collected using document reviews and interviews. The participants were ten law enforcement officers who expected to use their newly acquired skill after leaving a course in criminal investigations. As a result of the qualitative multiple case study data analysis, four constructs were revealed as aids to the participants in transferring what was learned in the course and further improving their skills. The constructs were supports, experience, reflection, and motivation. The constructs can serve as tools that help law enforcement agency leaders examine their existing practices and develop new ones.

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Dedication

I want to dedicate this work and give special thanks to my father, Richard and my late mother, Audrey Bourbonnais. Their words of encouragement supported me during the process. My mother was particularly encouraging throughout my academic career. I am heartbroken she is unable to see me accomplish my recent achievements. However, I know she is always with me and will be alongside me as I accept my diploma.

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Chapter One: Introduction

U.S. organizations spend \$135 billion annually on workforce development programs to maintain a competitive edge in their respective industries (Boudreau & Ramstad, 2005; Patel, 2010). Investments in workforce development, such as training, result in positive economic effects (Riley, Michael, & Mahoney, 2017). Additionally, a worker's job performance is improved when their knowledge, skills, and abilities are enhanced (Quinones & Ehrenstein, 1999). In particular, professions which require a high level of skilled performance, (i.e., healthcare, aviation, education, and law enforcement), have a need to develop skill with on-going training in the workplace (Benner, 1982; Berliner, 2004; Dreyfus & Dreyfus, 1986; Gardner, 2012). As an example, law enforcement officers (LEOs) who are crime scene investigators (CSI), require a high level of skill since the significance of the outcomes of a criminal investigation affect community members (Gardner, 2012). Additionally, CSI must defend their actions in court and be able to articulate the reasons why one action was completed over another, however, there is a little research on effective ways to train LEOs once on-the-job (Birzer, 2003; Birzer & Tannehill, 2001; Gardner, 2012).

Statement of the Problem

Advancing technologies since the 1980s have made it increasingly clear the types of crime scene evidence presented in court, and found admissible, have changed dramatically (National Research Council, 2009). The advent of DNA alone has changed how LEOs view and process crime scenes. The CSI effect, where crime scenes are examined and solved with unrealistic speed on crime television shows, have made ordinary citizens, including jurors and courtroom personnel, believe that crimes are only

solved using highly specialized scientific equipment (Schweitzer & Saks, 2007). For the most part, cases are first solved with deductive and problem-solving skills, and second, by hard work and good luck (Lee & Pagliaro, 2013; Rubtcova, Pavenkov, & Pavenkov, 2017)

There have been cases where new technologies, such as DNA, changed the outcome of a case. One such case is the 1979 rape conviction of Gary Dotson using blood type and hair analysis. Newly recognized DNA tests were used to overturn his conviction during an appeal in 1988, making him the first individual exonerated for a crime through DNA evidence (Bopst, 1998). Conversely, in 1995, there was ample DNA evidence found at the scene of the homicide of two people that were genetically matched to O. J. Simpson and presented during his trial. However, the constant insistence by the defense that the police and laboratory personnel tainted the samples helped to lead to Simpson's exoneration of the crime (Mueller, 1996; Park, 1996).

Cases such as Dotson and Simpson have resulted in a National Academy of Science report to identify deficiencies and suggest recommendations for improvement in the field of forensic science (National Research Council, 2009). One goal of the report was to identify scientific advances to assist LEOs in the use of forensic technologies and techniques during crime scene investigations (National Research Council, 2009). The report led to the recommendation that it is necessary to improve the LEOs use of forensic science to solve crimes (National Research Council, 2009). Improving LEOs use of forensic science technology may be accomplished through required training in specialized techniques such as latent print collection, photography of crime scenes, and other enhancements of physical evidence found at crime scenes (Horvath & Meesig,

1996; Koper et al., 2009). However, Ludwig and Fraser (2014) found LEOs continue to receive infrequent and disorganized training. Currently, one-way New England LEOs develop their skill in crime scene investigation is through participation in a course sponsored by a New England state crime laboratory (hereinafter referred to as NESCL) in criminal investigation using scientific methods. The course covers the theory and practice in crime scene management, including topics such as documentation, the collection of physical evidence, crime scene evidence processing, evidence pattern interpretation, and crime scene reconstruction.

Forensic evidence includes information and objects collected at crime scenes (National Institute of Justice, 2018). For this study, forensic evidence is further defined as physical evidence, the objects collected and processed at crime scenes (Miller & Massey, 2016). Examples of physical evidence collected at crime scenes ranges from biologic evidence, such as DNA from surfaces and body fluids, pattern evidence such as fingerprints, shoe or tire impressions, chemical evidence such as accelerants found at a crime scene, and trace evidence such as hairs and fibers (Johnson, Peterson, Sommers, & Baskin, 2012; Miller & Massey, 2016; Robinson, 2016).

The complexity of the law enforcement industry is widely acknowledged (Greene, 2004; Herrington & Colvin, 2015; Wilson & Kelling, 2015). For example, law enforcement organizations continually attempt to maintain their legitimacy, define their role in society, create relationships in their community, define their operational successes and failures, manage the demand for their services, and improve training opportunities while continuing to fulfill their mission (Alpert, Dunham, & Stroshine, 2014; Chan, Devery, & Doran, 2003; Dunham & Alpert, 2015; Kelling & Moore, 1989). Research

studying effective ways to train LE recruits, primarily as it relates to new strategies in problem-solving, have recently surged (Antrobus, Thompson, & Ariel, 2018; Strang, Platz, & Sargeant, 2018; Sargeant, Antrobus, & Platz, 2017; Shusko et al., 2017).

However, while there is research on ways to improve law enforcement (LE) recruit training programs, there is a limited amount of research on effective ways to train LEOs on-the-job, in duties not covered in trainee programs (Birzer, 2003; Birzer & Tannehill, 2001).

The LE community has seen many advancements in the last 100 years. Many are taken for granted, such as video surveillance and the simple advent of the latex glove. Koper, Taylor, and Kabu (2009) completed a study on the effectiveness and prioritization of technologies, and the barriers LE communities face when implementing advanced technologies. They found a critical need for proper training in the use of technology. In another study, Byrne and Max (2011) discovered one of the most significant challenges in LE was keeping up with ever-changing technology and science. Emerging technologies have significantly impacted how LEOs, who are crime scene investigators, collect, document, and analyze evidence (Miller & Massey, 2016). For example, low-cost technology, such as laptops and tablets, have made access and information-gathering easier and the rapid advancement of quality photography equipment has improved how crime scene evidence is collected and recorded (Miller & Massey, 2016). Moreover, new technologies such as Rapid DNA have decreased the turn-around time from 90 days to 90 minutes for sample collection to victim or suspect identification (Miller & Massey, 2016; Robinson, 2016).

However, even with the advent of DNA, the total number of physical evidence collected and processed from crime scenes has changed little in the last decade. Even though a large number of biologic forensic samples, usually from homicides and rapes, have been added to U.S. DNA databases from 2002-2014, the *total* number of crime scene evidence collected has remained stationary (Murphy, 2015). This may be due to the absence of training and support in overall crime scene evidence collection, which in turn leads to less evidence collected from routine crime scenes which are not related to homicides or rape (Martin, 2002; Murphy, 2015; National Research Council, 2009). Furthermore, less evidence collected may negatively impact how crimes are solved (Miller & Massey, 2016). Therefore, it is crucial to LEOs and the communities they serve to add to the limited body of research on ways to assist LEOs in developing skill and transferring their training to their practice.

Transferring training to the workplace is particularly troubling for law enforcement officers (LEOs) who act as CSI and collect and process forensic evidence from crime scenes; the workforce examined in this study. CSIs come from a variety of law enforcement (LE) professions and agencies. For example, LEO's who conduct CSI duties, hail from a variety of agencies with enforcement duties which include arresting powers, i.e., town, city, state, and federal law enforcement agencies, environmental management enforcement officers, and fire marshal agencies.

U.S. federal statistical data collected on LE employment partially explains why LEOs are not adequately trained. In the most recent data collected and reported by the U.S. Department of Justice using Uniform Crime Reporting data, there are over 760,000 full-time sworn police officers (officers who carry a firearm and have arresting powers)

employed by over 17,000 agencies in the U.S (Banks, Hendrix, Hickman, & Kyckelhahn, 2016). However, of the more than 17,000 agencies, nearly 13,000 (more than 71%) of the agencies are categorized as small and serve fewer than 25,000 people with a workforce of under 25 sworn-officers (Banks, Hendrix, Hickman, & Kyckelhahn, 2016). Moreover, small agencies may have small budgets, which may inhibit their ability to provide training (King, 2014). Large departments with larger budgets, usually in urban communities, are associated with higher crime rates (Glaeser & Sacerdote, 1999). However, small communities surrounding large urban cities have higher rates of crime than similar sized suburban or rural communities, but without the big city budget which affects the processes and tools officers have available in the field (Friedman et al., 1989; Koper et al., 2009).

Larger LE agencies with larger budgets have the ability to form specialized divisions such as bureau of criminals investigation (BCI) units who specialize in crime scene examination, seek and attain accreditation, and have the capacity to use state of the art technology such as in-field computers, digital imaging GPS, and body cameras (Cordner & Gordon, 2011; Koper, Maguire, Moore, & Huffer, 2001). Whereas, smaller agencies (over 71% of the agencies in the U.S.), primarily use responding patrol officers, rather than specially trained CSIs to routinely collect evidence from crime scenes (Eck, 1983; Koper, 2004; National Research Council, 2009). Subsequently, regardless if the LEO works in a dedicated BCI unit, collecting and processing crime scene evidence requires specialized training to improve their skills (Kerr, 2005).

Federal policymakers, including law enforcement industry leaders, have promoted the need to develop and improve LEO crime scene evidence skills in the current ever-

changing technological culture of forensic science (Murphy, 2015; National Research Council, 2009; Skogan & Frydl, 2004). Additionally, as previously stated, positively transferring training to the workplace will improve knowledge, skills, and abilities; the goal of most organizations (Quinones & Ehrenstein, 1999). Therefore, this study sought to understand the processes and practices LEOs use to develop and positively transfer CSI skills acquired in a training program to their workplace. The study aims to assist policymakers and LE leaders by addressing strategies and tools for better quality policing as they pertain to criminal investigations where evidence is collected at crime scenes.

Background

Skill Development

The Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition (1980, 1986), (hereinafter referred to as The Model), developed by brothers Hubert and Stuart Dreyfus, informs this study. The Model illustrates possible skill growth throughout a person's career in a particular domain. For this study, the domain is crime scene investigation. For the purposes of this document, the word stage and level are used interchangeably when referring to The Model.

The Model explicates a learner's ability in each of the five stages of skill development: novice, advanced beginner, competent, proficient, and expert. Originally developed for the Air Force, the Dreyfus brothers have used The Model to examine the development of chess players' skills, second language learners, and those learning to drive (Dreyfus & Dreyfus, 1986). The Model is described further in Appendix A.

The Model suggests what learners might accomplish at each stage through experience but stops at suggesting how to encourage or assist the movement of learners

through the stages. Benner (2004) used The Model to explicate skill development in nursing, while Berliner (2004) applied it to his work with teachers. Some researchers have suggested the conduit for moving through stages in The Model is a result of inter-professional education using socialization, collaboration, and mentorship (Benner, 1982; Peno & Silva Mangiante, 2012).

Peno and Silva Mangiante (2012) developed the Purposeful Ongoing Mentoring Model (P.O.M.M) which operationalizes movement through the stages of The Model via a process of mentoring, using scaffolding (Vygotsky, 1974) and reflection (Schön, 1987). The P.O.M.M. builds on the characteristics of The Model by providing mentors and their mentees goals to when working together, with purposeful actions to help a mentee advance to higher skill levels (Peno & Silva Mangiante, 2012). The P.O.M.M. was developed to be used in a variety of domains including teaching and spine surgery (Peno & Silva Mangiante, 2012, 2013).

Newly developed skills may be acquired through imitation followed by trial and error and or with the aid of an instructor (Dreyfus & Dreyfus, 1980). Imitation and trial and error have some limits, possibly life-altering when it involves individuals who are in settings and professions which require a high level of performance (Doyle, 2012). For instance, a low risk setting would be a worker learning to use a computer word processor. Successes and failures when learning computer processing is an acceptable way to develop skill in a low-risk setting. However, an LEO may learn to collect evidence in a course using trial and error, but once at a crime scene where a homicide has been committed, properly collecting and processing evidence for the development of a suspect and conviction of a criminal leaves little room for error. Likewise, an unjustly accused

individual may be wrongfully convicted during the judiciary process because an inadequately trained LEO contaminated the evidence. These are two examples where skill development using trial and error alone are not effective when outcomes result in negative consequences (Doyle, 2012; Yule, Flin, Paterson-Brown, Maran, & Rowley, 2006). Therefore, a more effective method of skill development for adults in professions which require a high rate of accuracy and performance is instructor-led training where students have the opportunity to make mistakes and learn in an environment which is low-risk (Dreyfus & Dreyfus, 1980).

Dreyfus and Dreyfus (1980, 1986) found that everyday problem-solving experiences rely on previous experiences in skill acquisition. In order for BCI officers to develop their skill on the job, it is important that their pre-service training is authentic and similar in context to what they will experience in the field (Doyle, 2012; Dreyfus & Dreyfus, 1980). For instance, an LEO, newly trained in evidence collection, may use instructor-led experiences from the classroom to build on their skill when arriving at a crime scene, to collect and process evidence.

Transfer of Training

Training, as defined by Campbell, Dunnette, Lawler, and Weick, (1970), is a process where a permanent change is made in an employee's specific workplace knowledge, skills, and attitudes. Transfer of training occurs when learning in one context influences performance in another context (Blume, Ford, Baldwin, & Huang, 2010; Perkins & Salomon, 1992). For example, learning to drive a car may assist the learner in the future when driving a tractor-trailer. Additionally, since research has reported that only 10-15% of training is transferred to the workplace after one year (Broad &

Newstrom, 1992; Hoffman, 1983; Holton, III & Baldwin, 2000), training programs which do not support skill development and positive training transfer in the workplace yield little value and are ineffective (Yamhill & McLean, 2001).

After a review of transfer of training studies, Baldwin and Ford (1988) developed a model that includes training inputs, training outputs, and conditions for transfer.

Baldwin and Ford's model is further examined in chapter two. Baldwin and Ford's (1988) model explicates training inputs, which aid in training transfer, through trainee characteristics (i.e., motivation), training design (i.e., learning principles), and work environment (i.e., organizational support). Additionally, Broad and Newstrom expanded on the roles of individuals in the transfer partnership: trainees, trainers, and managers (1992). Successful training includes ongoing activities and factors before training (i.e., intentional groupings for the trainee), during training (i.e., the trainer including authentic tasks), and after training (i.e., the manager giving trainees opportunities to practice new skills) (Broad & Newstrom, 1992; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). Factors that assist successful training are further discussed in the Chapter two.

After a comprehensive review of training research, Salas et al. (2012) reported that although training works, the design, delivery, and implementation matters. Other researchers reported factors which influence the trainee's opportunity to use their skills are domain dependent, (i.e., the trainee's characteristics, the work context, and the organizational domain) and all play a role in transfer of training (Ford, Quinones, Sego, & Sorra, 1995). After reviewing other models, the Baldwin and Ford (1988) training transfer model was found to be most closely related to the researcher's study, therefore, it was the model chosen as a foundation for this research.

Nevertheless, the organizational context is an important consideration. As an example, before assignment to a department, new LEOs frequently attend training (Baldwin & Ford, 1988). However, a division within a department (i.e. the BCI unit of a police department), has specific cultures, goals, and values, which may impact a new hire's opportunity to use their training (Bell, Tannenbaum, Ford, Noe, & Kraiger, 2017; Ford et al., 1995). For example, the culture of a police department may not allow a newly transferred detective to use their trained BCI skills until they have a certain amount of time on the job.

The participants in this study attended a two-semester course in criminal investigations using scientific methods for current law enforcement officers, facilitated through a New England State Crime Laboratory. The training program uses principles of Andragogy (the art and science of teaching adults) through strategies like providing time for LEOs to share their experiences at authentic crime scenes in class. Additionally, there are few barriers for the trainees when they attend the course. For instance, the participants attend the course during paid working hours rather than on personal time. Attendance in the course is usually a result of the officer attaining status as a detective, a promotion they applied for. Consequently, they are oriented and motivated to learn (Knowles, Holton, III, & Swanson, 2005).

Moreover, the course content evolves as frequently as the needs of the BCI community require. For example, when there are new technologies in BCI (i.e., new procedures in evidence collection) or a growing health crisis (i.e., fentanyl misuse as a national emergency), the program coordinator changes the training curriculum accordingly. Additionally, the course instructors are experts in their field of instruction

and include current and former law enforcement officers. This helps to make the program authentic because participants are instructed by those with the same lived experiences.

The program utilizes a variety of teaching methods such as lectures, workshops, guest speakers, and collaborative group work in and outside of the classroom. Crime scene simulations are a significant mode of instruction and assist in the generalization of the learning content. Generalization, a condition of transfer, is when near and far transfer help facilitate learning by teaching knowledge and skills in a setting that has elements identical to activities encountered in the transfer context (Baldwin & Ford, 1988).

The course also uses modeling, coaching, scaffolding, fading, and reflection to support learning and retention (Vygotsky, 1978). As an example, an instructor will lecture to the class on crime scene guidelines using real-life crime scenes as examples. The positive and negative conditions of the scene will be discussed using the instructor's and learners' past experiences. Following the classroom instruction, the learners will break up into groups of four to process a mock crime scene. Each learner will fill a different role each week, such as primary investigator, secondary investigator, photographer, and sketch artist, so that each has an experience with all the roles required in crime scene investigations. The mock crime scenes are usually replications of a crime scene the instructor has attended.

Assisted by instructors, the group will process the items collected at the mock crime scene. The learner will discuss with a chemical processing instructor proper processing and enhancement techniques used on the evidence obtained. Enhancement of latent fingerprints (fingerprints not seen with the naked eye) is an example of what types

of evidence is processed. Enhancement includes the use of fingerprint powders or placing an object in a specially designed chamber that uses a chemical process for the development of fingerprints.

The following week the group presents their findings to their classmates and instructors as if in a mock grand jury trial. This allows the instructors to assist the group with their expectations of what should have been collected and processed from the scene. This will continue throughout each semester until the end of the course when the learner is responsible for all the tasks at a crime scene and they testify as an expert witness in a mock courtroom setting.

Purpose of the Study

The purpose of this study is to examine which practices, outside of the classroom, helped crime scene investigators improve their investigative skills and transfer what they learned to the field. This study sought to understand: How do LEOs, who participated in the BCI course offered by the NESCL, perceive how they transferred and further developed their skills during the six months after leaving the course?

Research Questions

The overarching question of the study is how law enforcement officers improve and transfer their skills once they have left a course in CSI. To understand LEO's perceptions of their transfer and further development of skills (learned in the BCI course) during the six months following the course, the research questions that guided this study were:

- 1) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition immediately after the completion of the BCI course?
- 2) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition months after the completion of the BCI course?
- 3) What do officers attribute any change in their skill development to during the six months after completion of the BCI course?
- 4) How do LEOs describe their use of crime scene investigation skills six months after the completion of the BCI course?
- 5) What do LEOs attribute their ability to use their crime scene investigation skills to six months after the completion of the BCI course?

Significance of the Study

There are several training transfer studies regarding pre-service LEOs and a limited number of studies which explore post-service transfer training in the workplace. However, there are very few studies on how LEOs develop their skill when working with physical evidence at a crime scene. Studies reported how crime clearance (a case resolved) and conviction rates improve when LEOs collect and present physical evidence in the case to court (Horvath & Meesig, 1996). Understanding the positive influences on LEO skill acquisition, and which tools and processes positively affect transfer of training for LEOs who conduct forensic science tasks, is beneficial to LE and the communities they serve.

Though not necessarily a generalizable study, the findings can aid LE and other high-performance settings where a lack of training transfer by its workforce results in negative consequences. Examples of negative consequences due to a lack of training transfer in the workplace are LEOs mishandling evidence collected at crime scenes resulting in acquittals of possibly guilty individuals (Mueller, 1996; Park, 1996). Judges who have allowed low-quality evidence to be presented in court which lead to erroneous convictions of innocent victims (Schweitzer & Saks, 2009). Crew procedural errors are the largest type of errors in airline accidents that lead to aircraft crashes (Dismukes, Berman, & Loukopoulos, 2016). And, nurses who have made fatal errors when administering wrong drugs to patients due to a lack of training transfer (Saintsing, Gibson, & Pennington, 2011). These are all workplace settings which have found the importance of positive training transfer to improve the development of skills and decrease or eliminate dire consequences.

Definition of Key Terms

To aid the reader, this section includes definitions of common terms that are used throughout the study.

Accreditation. A credential issued to a department after undergoing a process which an outside auditor determines the agency meet a specified set of criteria (Murphy, 2015).

Barriers to transfer. A set of actual or perceived factors that inhibit the success of training and acts as an impediment to transfer of training (Broad & Newstrom, 1992).

Bureau of Criminal Investigation (BCI). A division within an agency or person who conducts investigations related to suspected violations of Federal, State, or local laws to prevent or solve crimes (Bureau of Labor Statistics, 2018a).

Crime Scene Investigator (CSI) A person who conducts investigations related to suspected violations of Federal, State, or local laws to prevent or solve crimes. Depending on the context, CSI may also be defined as a crime scene investigation (Bureau of Labor Statistics, 2018a).

Detective. A uniformed or plainclothes investigator who gathers facts and collects evidence for criminal cases (Bureau of Labor Statistics, 2018).

DNA. DNA, or deoxyribonucleic acid, is the fundamental building block for an individual's entire genetic makeup. It is a component of virtually every cell in the human body (Saferstein, 2004).

Error rate. The rate which mistakes are made (Murphy, 2015).

Evidence. *See Physical Evidence.*

Far transfer. The extent to which trainees apply training received to new or different situations from the ones in which they were trained (Broad & Newstrom, 1992).

Feedback. Information provided by a participant regarding aspects of their performance or understanding (Hattie & Timperley, 2007).

Forensic Evidence. Refers to information or objects (*see Physical Evidence*), usually found at a crime scene, which may be admitted into court for judges and juries to consider when hearing a case (National Institute of Justice, 2018).

Law Enforcement Officer (LEO). The individuals within an agency responsible for enforcing laws and maintaining public order and public safety (Bureau of Justice Statistics, 2018).

Law Enforcement Agency (LEA). The agencies who are responsible for enforcing laws and maintaining public order and public safety (Bureau of Justice Statistics, 2018).

Manager. An individual in an agency with the authority and responsibility to accomplish objectives with the help of others (Broad & Newstrom, 1992).

Motivation. The psychological factors, other than ability, that determines how the individual acquires and uses skills (Dweck, 1986). The motivation to transfer is an intended effort by a trainee to incorporate the knowledge learned in the training environment to the work environment (Noe, 1986).

Near transfer. The extent to which trainees apply what was acquired in training to situations very similar to those in which they were trained (Broad & Newstrom, 1992).

Patrol Officer. The person responsible for enforcing the rule of law and civil order in a specific area which protects lives and property (Bureau of Labor Statistics, 2018b).

Physical Evidence. Evidence found at a crime scene that falls into the following categories: biologic (samples from a living item such as body fluids), chemical (identifiable chemicals such as an accelerant), patterned (predictable patterns such as fingerprint impressions or tool marks), and trace (small in size and easily overlooked evidence such as hairs and fibers) (Miller & Massey, 2016).

Probative. Evidence with evidentiary value (Wells, Memon, & Penrod, 2006).

Reflection. Critique of the presuppositions on which our beliefs have been built (Mezirow, 1990).

Sworn Officer. Officers who have full arrest powers as compared to civilian employees whose position is usually administrative (Banks et al., 2016).

Trainee. An employee whose training, education, and development is sponsored by their agency to improve their practice (Broad & Newstrom, 1992).

Transfer Climate. Attributes in an agency (or unit) which projects to the trainee varying degrees of support to assist in the application of new skills (Broad & Newstrom, 1992).

Trainer. An internal or external professional who analyzes performance, designs, delivers, and manages training programs (Broad & Newstrom, 1992).

Transfer of Training. The effective and continuing application by trainees to their job the skills gained in training (Broad & Newstrom, 1992).

Chapter Summary

This study contributes to skill development and transfer of training literature by offering a qualitative understanding of participants who have duties in crime scene evidence collection and processing. The research questions are directed toward an understanding of the practices, outside the classroom, that helps officers improve their crime scene investigative skills and transfer what they learned to the field. Furthermore, the questions aim to illuminate which contextual influences affect participant skill development, including the systems they used to assist in their training transfer when managing a crime scene.

Organization of Study

This study is organized into five chapters. Chapter one introduced the reader to the concepts studied. The chapter included the introduction to the study, an overview of the background, which introduced the theoretical framework, the statement of the problem, the purpose of the study including the research questions, the significance of the study, the definition of terms, and the organization of the study.

The focus of chapter two is a literature review of the studies relevant to the theoretical framework. The chapter is divided into five sections. The first section reviews the relevant literature and the importance of moving from the training context to a practice context in law enforcement and reviews the benefits of transferring training to the job. The second section provides an overview of skill development literature. The third section provides an overview of the transfer of training literature. The fourth section provides a review of related constructs embedded within skill development and training transfer: adult learning principles, mentorship, situated learning, scaffolding, and reflection. The fifth section provides a conceptual framework formed from the literature review.

Chapter three describes the research, sampling design, and a description of the participants of the study. The chapter also includes the study setting and the methods used for data collection, analysis, and issues of trustworthiness.

Chapter four provides participant vignettes and a cross-case analysis for ascertaining the findings from the study. The findings reveal supports, experience, reflection, and motivation aid in skill development and transfer of training, post-training, for the participants in this study.

Finally, chapter five includes a summary, conclusions, interpretations of the findings, recommendations, limitations to the study, issues of trustworthiness in the study, and suggestions for future research.

Chapter Two: Literature Review

Introduction

This study focuses on how law enforcement officers who collect and process crime scene evidence perceive how their skill further developed after leaving a course in crime scene techniques. This chapter is divided into five sections. The first section reviews the relevant literature and the importance of moving from a training context to a practice context in law enforcement and reviews the benefits of transferring training to the job. Literature was only found on traditional sworn police officers rather than the previously stated broad LE definition as any sworn law enforcement officer who conducts investigations at crime scenes and has arresting powers.

The second section provides an overview of skill development literature by defining skill development and discussing supporting theories and models in skill development. The third section provides an overview of training transfer literature by defining transfer of training and discussing the theories, models, research, and concepts related to transfer of training. The fourth section defines, describes, and discusses related constructs that the literature review found to be useful in developing skill and assisting in training transfer. The fifth section provides the conceptual framework from the literature reviewed.

Training Law Enforcement for Practice

Training in law enforcement is discussed in two categories, before hire (pre-service) training such as recruit academy training and after hire (in-service) such as professional development training. Many researchers believe that pre-service and in-service training are two separate and independent ways to train officers (Martin, 2014).

However, in-service training is more accurately an extension rather than a departure from pre-service training (Martin, 2014). To aid in understanding law enforcement officer training, pre-service recruit (academy) training, formalized in the 1960s, has remained relatively constant, yet, in-service training has been sporadic at best (McNeill, 1982; White & Escobar, 2008). Skogan, Van Craen, & Hennessy (2015) reviewed police officer training research and concluded that we know virtually nothing about short- or long-term effects associated with any form of police training since practitioners and external researchers have conducted little research. The conclusion was that, overall, an evaluation of police training had not produced volume, quality, or generality of studies (Skogan et al., 2015).

In addition to Skogan et al.'s (2015) review of police training literature, a comprehensive review of published articles from 1987-2011 using keywords such as police in combination with training, teaching, and learning was conducted (Aguilar-Moya, Melero-Fuentes, Aleixandre-Benavent, & Valderrama-Zurián, 2013). Researchers found 1,469 articles from which only 155 articles from around the world were directly related to police training and found to include reliable data (Aguilar-Moya et al., 2013). From this sample, there were only six research groups identified where authors had more than one article published (Aguilar-Moya et al., 2013). When comparing this data to another industry, i.e. teaching, the scarcity of policing research is illustrated. For example, in a study reviewing published qualitative studies which focused on strategies used to prepare pre-service teachers to integrate technology in their practice, 144 relevant studies were found (Tondeur et al., 2012). Comparing the raw numbers of the two studies, 155 journal articles from possibly all articles on police officer training, pre-

service and in-service, as compared to 144 journal articles on one area of teacher training, qualitative studies for pre-service teachers to integrate technology in their curriculum, helps to conceptualize the scarcity of police training literature. Therefore, it is easy to understand how research on LEO training effectiveness is from inadequate samples including the inability to control for theoretically relevant variables (Rydberg & Terrill, 2010).

Recent high-profile cases of misconduct by LEOs intensifies the issue; there is a lack of research on the effectiveness of police officer training including the view that LEO in-service training is sporadic (McNeill, 1982; White & Escobar, 2008). President Obama's Task Force on 21st Century Policing (2015) aimed to strengthened the efforts to strengthen community policing and improve trust among law enforcement officers and the communities they serve after highly publicized cases of police misconduct (President's Task Force on 21st Century Policing, 2015). The Task Force's (2015) sixth recommendation included the need for additional training and education programs. As the scope of law enforcement expands to maintain and define their role in society, there is a critical need for effective training. Effective training should address the challenges which include an increase in international terrorism, evolving technologies, new cultural mores, and a growing mental health crisis (Alpert et al., 2014; Chan et al., 2003; President's Task Force on 21st Century Policing, 2015).

In addition to the expansion of scope from forces *not* in their control, LEAs are subject to increased censure from community members for their actions, which are under their control (President's Task Force on 21st Century Policing, 2015). As an example, the majority of civil rights lawsuits against police departments for police misconduct list

administrators inadequately training officers as problematic (Barrineau & Dillingham, 1984; Fishel, Gabbidon, & Hummer, 2007). In addition to the cost to the victim, there is a high cost to municipalities. Because of police officer actions, the city of New York paid out \$308.2 million in FY 2017 due to a lack of training considerations (Stringer, 2018). Even with recent advances in pre-service police training including the number of hours of in-service training for veteran officers increasing (Antrobus et al., 2018; Stickle, 2016; Strang et al., 2018), failure-to-train assertions still pose a pertinent concern for police agency administrators and the communities they serve.

Pre-service Training

Pre-service or academy training is a condition of employment in nearly all U.S. police departments (Reaves, 2013). Academy training consists of training in the basic skills necessary to perform law enforcement tasks (Reaves, 2009). While the topics, format, and hours required vary from state to state, the average number of classroom hours for academy training in 2007 was 761 (Reaves, 2012). On average, academies are approximately 19 weeks long for general service police officers (Reaves, 2012). Regarding curriculum, there are some commonalities, i.e., report writing, patrol operations, investigation, CPR/first aid, constitutional law and criminal law (Reaves, 2009).

There have been a limited number of studies conducted, which review the socialization process in police officer training. In one examination, Chan, Devery, and Doran (2003) studied ways police recruits learn and transfer their knowledge to their practice. Chan et al.'s (2003) recruit training study focused on how recruits become competent in their work, one measure of professionalism for this study, and their learning

processes by following a police recruit cohort for two years. The researchers followed 150 police recruits from a New South Wales, Australia, police organization. Using surveys, interviews, observations, and artifacts such as reports and course materials, Chan et al. (2003) concluded recruits were given the knowledge, ability, and motivation to improve and define their role in their organization through socialization (Chan et al., 2003; Christie, Petrie, & Timmins, 1996).

Another finding of the study was that officers perceived the public as not supportive. Therefore they relied on their relationships with their colleagues for supports (Chan et al., 2003). The recruits further developed their relationships with their colleagues by reflecting, observing, and appreciating their colleague's practical skills, communication skills, how they handled high-stress circumstances, and their ability to take control during difficult situations (Chan et al., 2003). The researchers concluded that reform in policing is possible through training, especially when the concepts of socialization and reflection are embraced, which helps set the stage as a new model of policing to advance overall police professionalism (Chan et al., 2003).

Adding to the research on the importance of socialization in pre-service police officer training, a second comprehensive study by Paes-Machado and de Albuquerque (2006) followed 70 students each year for three years at the Military Police Academy of Bahia in Brazil. Researchers were studying how socialization affects the processes recruits pass through from civilian to sworn police officer. The research concluded that family members assist and adapt to the recruits new roles in policing which helps to offset negative aspects of the academy and the learning process (Paes-Machado & de Albuquerque, 2006). Moreover, the familial relationship added to the emerging bond

between the instructors and recruits in supporting them as they proceeded through the academy (Paes-Machado & de Albuquerque, 2006).

Both studies concluded that socialization was a means of support for effective training programs. They reported that the learner's socialization process within the organization aided the learner's abilities and motivation to learn. Consequently, socialization, paired with reflection, are related constructs which aid in learning for pre- and post-service police officer training which is further developed later in this chapter.

In-service Training

In-service training is usually presented as short bursts of training on one or two topics. Examples of in-service training topics are interviewing skills, mental health issues, diversity training, use of force, evolving technologies, and problem-oriented policing (Armstrong, Clare, & Plecas, 2014; Cederborg, Alm, Nises, & Lamb, 2013; Herrington & Pope, 2014; Israel, Harkness, Delucio, Ledbetter, & Avellar, 2014; President's Task Force on 21st Century Policing, 2015; Quinet, Nunn, & Kincaid, 2003). LEA leaders have not embraced training as fervently as expected. Reasons LEA leaders fail to improve or embrace recommendations to train LEOs may be due to the majority of agencies are small, therefore, lack budgets for training beyond basic pre-service training requirements (Hollowell, 2011). Likewise, police chiefs, in general, are not in agreement on whether or not training helps in time-pressure situations (Vinzant & Crothers, 1998). Bayley and Bittner (1984) reported that LEOs perceive their skill development in non-technical skills, such as actions during time-sensitive and problem-solving issues, are achieved through experience rather than training.

A lack of LE training literature recommendations for agencies to act upon and learn from have resulted in a small number of evidence-based practices in LEO training (Lum & Koper, 2014). However, research on training LEOs is usually focused on one specific aspect of police officer behavior rather than topics such as crime scene investigative skills, which require problem-solving and decision-making skills (Rydberg & Terrill, 2010). Therefore, reviewing studies that have shown training that includes training and experience as variables help provide a context for how learning occurs for LEOs.

Building upon experience on-the-job as a means to effecting change in police officer attitudes and skills including problem-solving, Correll, Hudson, Guillermo, and Ma (2007) further studied experience and training in LEO learning acquisition and report training *and* experience on the job helped mitigate catastrophic instances and therefore, should be included in LEA policies and procedures. Correll et al. (2007) completed three studies to test the participant's tendency (in a time-sensitive encounter) to shoot at a possible suspect using a video-game simulation with targeted suspects (white/black ratio of 1:1, armed and unarmed). The first study included three participant groups (recruited local police, police officers attending a national conference, and community members recruited through a Division of Motor Vehicle (DMV) database). First, through questionnaires scaled on demographic and psychological variables, the group's unconscious biases were compared (Correll et al., 2007). Racial stereotypes affected all three groups; the LEO group participants had similar bias tendencies as the community counterparts. However, when it came time to pull the trigger, the police officer's training

and expertise improved their response speed, increased their sensitivity to the situation, and reduced their tendency to shoot the target (Correll et al., 2007).

Researchers continued with study two, which included two groups, the local police officers and community members recruited from the DMV database. The second study forced the participants to respond quicker, therefore, forcing them to make quicker decisions (Correll et al., 2007). The error rate increased for both groups, but the conclusions were the same as study one, the police officers had greater restraint when pulling the trigger (Correll et al., 2007).

Study three looked at how experience alone affects decision making by utilizing untrained undergraduate college students. In this study, the students were tested on the video-game over two days, where each day consisted of two rounds. The students were tested on the same simulated video game over two days to evaluate how experience may change outcomes (Correll et al., 2007). Similar to the previous studies, after round one, each day, the participants had similar tendencies to shoot the suspect as did the community members who were pulled from the DMV database (Correll et al., 2007). However, after the second round on each day, where students gained experience from participating in the earlier round of the day, the study participants had skills similar to the trained police officers in the other two studies (Correll et al., 2007). This leads one to believe that experience is how the skill under study is developed, but interestingly, the study found that when the participants performed on day two, round one, all the “experience” gained the previous day was no longer present (Correll et al., 2007). The results revealed that the experience was short-lived and not retained by the study participants since they reverted to their novice status after each day (Correll et al., 2007).

Therefore, the police officers in the study, in addition to experience, had previous training which appeared to be the differing factor in their skill when determining how they performed in sensitive situations (Correll et al., 2007).

The research reviewed found that experience and training impact how LEOs react to sensitive issues with community members. Therefore, when analyzing how training impacts skill in the workplace for LEOs, reviewing what training practices are most effective in LEO training programs should be included. One way to address a more effective practice when training LEOs, researchers have recommended that police officer training, pre-service and in-service, move from the traditional (behavioral) model to an adult-based instructional model (Andragogy) (Birzer, 2003b; Hunter-Johnson & James, 2012; McCoy, 2006; Vodde, 2012; White & Escobar, 2008). Andragogy is defined as the art and science of helping adults learn (Knowles, 1970). Knowles presents characteristics of the adult learner whose implications could change of how we approach teaching adults. Andragogy is further reviewed in the Related Constructs section.

After a review of training in policing, it is apparent that continued research is necessary for a fuller picture. However, as stated previously, training is only as successful as the knowledge transferred to the workplace. To review the constructs of positive training transfer, framing what skill development looks like is important. For this study, the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition (1980, 1986), acts as an anchor to assist in the study of how LEOs further develop their skill on the job.

Skill Development

Skill development is defined as the process whereby learners acquire skills in a particular domain (Dreyfus & Dreyfus, 1980; 1986). Fischer and Ferrar (1987) describe

skill as a characteristic that is “neither person nor of a context but of a person-in-a-context” (p. 646). For example, if an LEO is the person, and the context is a crime scene, for skill development to be achieved, the LEO must be “in” the crime scene, rather than on the periphery.

Skill development is further defined as the human ability and capacity that helps to transform past experiences into a lasting view with varied significance and aids in the movement toward a greater reliance on intuition when carrying out complex job functions (Dreyfus & Dreyfus, 1986). In police training, academy recruits are novices in their decision-making practices as they try to master basic skills, i.e., properly handcuffing someone and directing traffic (Malmin, 2012). Once the novice is on the job, to develop higher-order skills in tasks, the novice officer accompanies a seasoned field training officer (FTO) until it is determined by the FTO the novice may work on their own (Malmin, 2012). For example, the novice officer will learn from the FTO the processes needed when stopping an impaired driver. The FTO will use observation, judgment, and field sobriety examinations to interpret the driver’s abilities to make an informed decision on whether chemical testing is required (Chan, 1996; Malmin, 2012).

Research has found that FTO training is primarily conducted from the car seat of the FTO’s vehicle; reflection-on-action rather than reflection in-action (Schön, 1987; Tyler & McKenzie, 2014). The experience is described as collaborative as the FTO gives support, guidance, and feedback to the novice on their performance (Tyler & McKenzie, 2014). The critical thinking and problem-solving skills needed to make a judgment call, i.e., a field sobriety test, require the novice to be guided by a more seasoned officer.

Similarly, when seasoned officers attend a class in a subject unfamiliar to them, i.e., crime scene investigations, they become novices in the new and unfamiliar domain.

The Dreyfus' skill development model has been used in studies involving teachers, strategic planning, and healthcare professionals such as nurses, physicians, and dentists as a well-established anchor for studies on skill development (Benner, 1982, 2004; Berliner, 2004; Campbell et al., 2015; Hall-Ellis & Greal, 2013; Peno & Silva Mangiante, 2013; Saintsing, Gibson, & Pennington, 2011). Moreover, Ericsson, Prietula, and Cokely (2007) found that it takes 10,000 hours of deliberate practice activities to gain expertise in a domain. Dreyfus and Dreyfus's (1980, 1986) model assumes an expert's knowledge has formed out of contextual experiences.

Embedded in the LEOs experiences, pre-, during, and post-training, are personal and professional biases, cultural norms, and organizational agendas, which may weaken the learner's pursuit of expertise (Broad & Newstrom, 1992). The unpredictable nature of some professions serve as barriers to critical thinking which leads learners, with experience in their domain of specialization, unable to achieve expertise in another domain (Cornell, Riordan, Townsend-Gervis, Mobley, 2011). As an example, LEOs who are developing skill in one domain (CSI skills) still need to keep or improve skill in another equally important task (use-of-force).

The Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition (1980, 1986), hereinafter referred to as The Model, illustrates possible skill growth throughout a person's career in a particular domain. It explicates a learner's ability in each of the five stages of skill development: novice, advanced beginner, competent, proficient, and expert. For illustrative purposes, a brief explanation of where the learner's ability resides

at each stage of The Model follows. The Model suggests what learners may accomplish at each stage through experience but stops at suggesting how to encourage or assist the movement of learners through the stages.

Novice

An instructor in a specific domain has given the learner the rules to a task. The learner has no experience in the domain and is inflexible when following the rules. The learner has no commitment to the outcomes and no understanding of when and how tasks are conducted or in decision-making processes. For example, if an LEO is attending to an outside crime scene and it appears rain is imminent, the LEO will rush to collect the evidence and compromise the quality of the evidence collected.

Advanced Beginner

The learner is now exposed to an increased number of experiences and situations in the domain. When new features arise, the learner understands and recognizes the feature as a new experience. However, when challenging situations arise, the learner is ill-prepared to negotiate change. The learner continues to have no commitment to the outcomes and no understanding of when and how tasks are conducted or in decision-making processes. For example, if an LEO is attending to an outside crime scene and it appears rain is imminent, rather than rush the evidence collection procedure, the LEO will attempt to properly collect as much evidence as he/she can before it rains.

Competent

The learner starts to be minimally invested emotionally in the task. The learner, through exposure to challenging situations, devises a plan though is unsure whether the plan is the appropriate course of action. The learner is not yet capable of understanding

when and how tasks are conducted or in decision-making processes but is now committed to the outcome of the task. The learner however, is capable of reflecting on practice that occurred in the past, and making changes to future practice if they felt the outcome needed to be altered. For example, a CSI may suffer embarrassment in court if they do not describe the process they used to collect evidence correctly, and may reflect on ways they could perform better in the future. Or, an LEO is attending to an outside crime scene and it appears rain is imminent, the LEO will call for assistance so that the evidence may be properly collected. However, many learners do not proceed past this stage.

Proficient

The learner has become increasingly invested emotionally, though continues to have difficulty detaching themselves from their previous rule-following stance. The learner does not have enough experiences with a wide variety of outcomes to automatically make appropriate decisions. The learner is still committed to the outcomes, is now actively involved in understanding when and how tasks are conducted but is detached from decision-making processes. Intuition is beginning to develop but the learner still deliberates when making decisions. For example, if an LEO is attending to an outside crime scene and it appears rain is imminent, while en route, the LEO will call for a tent to be brought to the scene.

Expert

The learner has had extensive experiences in tasks, all with the same perspective. This helps the learner make intuitive responses when encountering new and challenging experiences. The learner is unequivocally involved in the outcomes, understands when

and how tasks are conducted, and is capable of the decision-making process. For example, when rain is imminent, the LEO attending an outside crime scene will arrive at the crime scene with a tent to preserve the scene.

Benner (1982, 2004) and Berliner (2004) used The Model to explicate skill development with nurses and teachers, respectively. Patricia Benner (2004) conducted several studies in nursing expertise and reported on the use of the The Model. In one study, Benner (1982) interviewed newly graduated and more senior nurses to help delineate and describe nurse performance characteristics in skill development at each stage. Benner (1982) speculates in her research that The Model is a useful tool to understand the differences between a novice and an expert nurse. Benner (1982) defines experience, the foundation of skill development in The Model, is not only a matter of time, but rather the experiences must coalesce with practical situations to help add and build upon stages of skill. This is corroborated by Dreyfus and Dreyfus (2009) who state that *scientific knowledge* is the knowledge learned by the trainee and *rule of thumb* as the on-the-job learning and experience which takes place in practice. Benner and Tanner (2009) found that the practitioners who recognized when to be flexible and loosen fixed rules and procedures were aided in their acquisition of skill development within The Model. Additionally, in a review of studies, Benner (2004) found that the skill of involvement (problem and person engagement) and the development of moral agency (good clinical judgment) are the channels to the development of expertise in nursing.

In the teaching profession, Berliner (2004) reviewed what appeared to be incongruent teaching expertise theories to form the opinion that expert teachers had similar characteristics as other experts in other fields. Berliner (2004) found that

coaching and deliberate practice assist teachers in their movement through The Model's skill stages. Berliner (2004) found knowledge and experience to be situated and contextually bound. Coaching and deliberate practice aid in the premise that expertise is domain dependent (Berliner, 2004). As the learner moves from novice to expert in skill, one must take into consideration the learner is only gaining skill in the task learned. For example, an expert high school mathematics teacher may not be an expert Chair of the Math department. Therefore, learners may move along The Model only if the proper conduits for each task or skill they are currently performing (the domain) are included. Some researchers have suggested the conduit for movement along The Model is a result of inter-professional education using socialization, collaboration, and mentorship as a means of encouraging skill development (Benner, 1982; Peno & Silva Mangiante, 2012).

Using The Model to examine professional practice, Peno and Silva Mangiante (2012) suggest the conduit for movement toward higher stages of skill on The Model requires a mentoring approach that is goal-oriented, purposeful, and ongoing. Peno and Silva Mangiante (2012) agree that experience and knowledge acquisition help in movement along The Model, but were concerned with a) leaving development to chance and b) the development of incorrect practices. Therefore, they operationalized movement through the stages of The Model with their development of the Purposeful Ongoing Mentoring Model (POMM) (Peno & Silva Mangiante, 2012). The POMM includes mentor actions, such as scaffolding (Vygotsky, 1978) and reflection (Schön, 1983, 1987) when working with a mentee in a particular domain. A further review of scaffolding and reflection will follow in the Related Constructs section. See Appendix B for the adapted P.O.M.M.

Previous to creation of The Model, Reynolds (1965) developed a model which suggests that learning skills, happens when knowledge fills the mind with material learned. Reynolds claimed this assisted a learner in being less self-consciousness in their practice as their skill develops, which then allows the learner the ability to concentrate on other skills to develop (1965). Reynold's model does not take into account the learner's experiences, which subsequent research has found to be an integral component to skill development (Argyris, 1980; Benner, 2004; Dreyfus & Dreyfus, 1980). Therefore, the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition was the only model used as an anchor for this study.

Transfer of Training

Training is the most commonly used tool to improve performance in the workplace, though few organizations provide mechanisms that help trainees effectively transfer what they learned to their work (Broad & Newstrom, 1992; Ford & Weissbein, 1997; Grossman & Salas, 2011; Yamnill & McLean, 2001). Training is defined as a process where a permanent change is made in an employee's specific workplace skills, attitudes, and knowledge (Campbell et al., 1970). Transfer of training is necessary for training to be positively achieved in the workplace. Transfer of training is defined as the ability of a learner, through formal and informal training, to successfully apply the behavior, knowledge, and skills they acquired in a learning event, to their practice on the job (Baldwin & Ford, 1988).

Training transfer is an essential issue because much of what is trained in an organization fails to be transferred or used effectively in the work setting (Ford & Weissbein, 1997; Grossman & Salas, 2011). As previously mentioned, research has

reported that only 10-15% of training is transferred to the workplace after one year (Broad & Newstrom, 1992; Hoffman, 1983; Holton, III & Baldwin, 2000). According to Broad and Newstrom (1992), strategies used by managers, trainers, and trainees, before, during, and after the training occurs, support effective transfer of training. This collaborative approach to ensuring transfer includes involving trainees in the program planning process, sending co-workers to train together, involving managers and trainees in the design process, providing realistic work-related experiences, creating opportunities for the creation of support groups, and planning for application of a skill learned (Broad & Newstrom, 1992).

As an example, Broad and Newstrom (1992) found that before training begins, a manager should involve the trainee in program planning, thus enabling the trainee to have a stake in the process. The trainer should provide practice opportunities for the trainee which includes the trainee participating in advanced activities (Broad & Newstrom, 1992). During training, the manager should recognize trainee participation, the trainer should give feedback to the trainee, and the trainee should participate actively (Broad and Newstrom, 1992). Also, once training has completed, the manager should give positive reinforcement to the trainee, the trainer should provide follow-up support, and the trainee should develop a mentoring relationship (Broad & Newstrom, 1992). The strategies are more fully described in Appendix C.

Furthermore, studies suggest there are additional elements in the process of training transfer, which will further enhance learning and retention and may assist in skill development. Baldwin and Ford's (1988) transfer process model includes training inputs

and conditions for transfer which result in training outputs. The model is presented in Figure 1 below.

Figure - 1 Baldwin and Ford Model of Transfer Process (1988)

Baldwin and Ford's (1988) transfer process model identifies the trainee characteristics (i.e., motivation, ability), training design (i.e., realistic training environments), and work environment (i.e., opportunity to use, organizational supports) as the training inputs. Training inputs assist in improving training outputs (learning and retention). Trainee skills are further enhanced and transferred to the job with the involvement of the conditions of transfer (generalization and maintenance). In their work, Baldwin and Ford (1988) found generalization (how close the training context is to the real world of practice) and maintenance (the timing of the training and its use in practice over time) are necessary conditions to improved learning and retention of skills transferred to the workplace practice.

As stated, addressing training inputs in a training program assists the training outputs, learning and retention. However, there is further improvement in training outputs when trainee characteristics and the work environment employ the conditions of transfer, generalization, and maintenance. For example, employment of training design concepts will assist learning and retention. However, the process is stimulated when trainee characteristics, work environment, and conditions of transfer, are included, even after the fact. Explanation of the conduits in the model follows.

First, Baldwin and Ford (1988) found trainee characteristics to include the trainee's intellectual ability, personality, and motivation. Trainee characteristics are further recognized by Burke and Hutchins (2007) who include the trainee's self-efficacy regarding their training, their motivation levels, and personality traits. Furthermore, John Dewey (1997) believed that experience arises from the relationship between continuity and interaction. Continuity is how a learner's experiences shape their future experiences and interactions. For example, today's experience in a course (the present experience) is a function of the experience the learner had yesterday (past experience) and today (Dewey, 1997). The intersectionality between past and present experiences help shape how learners learn. This adds to Baldwin and Ford's (1998) version where human ability and capacity help transform past experiences into a lasting view with varied significance. For example, a learner's success (or failure) in a previous training class and the experiences the learner has in the current class, will affect how they are responding in the current (present) class. Training transfer may possess all the elements discussed, but there may be a need for additional constructs such as the trainee's job function and position in the organization.

There are additional studies, which add to Baldwin and Ford's (1998) transfer process model. Yamnill and Mclean (2001), in their review of supports to training transfer, found training inputs and the necessary supports of each as significant components for positive transfer of learning. For example, the learner's training motivation plays a significant role in the trainee's perception of their success and future job performance (Holton III, 1996).

Lim and Morris (2006) address the issue by adding job function, job position, years of related job experience, and immediate training needs to the list of trainee characteristics. They found a trainee's job function was a significant indication of their overall perceived learning application (Lim & Morris, 2006). For example, different positions held within an organization will affect the trainees' perceived ability to apply their learning to the workplace. See Appendix D for Lim and Morris's (2006) Trainee Characteristics, Instructional, and Organizational Factors Influencing Training Transfer model as an addition to the Baldwin and Ford (1992) Training Transfer Model.

Second, Baldwin and Ford (1988) found that training design should include principles of learning, proper sequencing of training materials, and an evaluated training content design. For LEOs, it has been suggested that the use of the principles of Andragogy, are a more effective approach when training rather than the traditional behavioral instructional approach (Birzer, 2003; Birzer & Tannehill, 2001; Vodde, 2012). Additionally, the order of how activities are presented is important on several levels. Sequencing helps serve as a blueprint of the course program so that information is in logical sequences, relative to the training, is as informative as necessary (Tracey, 1992) and includes over-learning as a strategy when repetition of tasks are completed even

when performance is established (Burke & Hutchins, 2007). Furthermore, Broad and Newstrom (1992) found that training content should include all stakeholders (the trainee, trainer, and manager), align with the organization's goals, use effective adult learning principles, and identify obstacles to positive transfer.

Finally, Baldwin and Ford (1988) reported the work environment and its importance to training as a necessary component in the learning and retention process. The work environment must be supportive of training transfer, which includes the opportunity to use the newly acquired skills (Baldwin & Ford, 1988). Adult learners need early opportunities to apply what they have learned for training outputs (learning and retention) to be positive (Baldwin & Ford, 1988). Additionally, Burke and Hutchins (2008) reported supervisory support, that provides coaching and opportunities to practice new knowledge and skills, as best practice in training transfer.

For learning and retention to be positively transferred to the workplace, the conditions of transfer per Baldwin and Ford (1988) will enhance the outcomes. The conditions of transfer support the training outputs. The two components of transfer outputs; generalization and maintenance will be more fully explored in the next section

Generalization. Klausmeier (1985) suggests an aid to training transfer is to utilize the process of training for one task to a highly similar task (near transfer) or transfer to a task in a different setting (far transfer) which is facilitated by teaching knowledge and skills in a setting that has elements identical to activities encountered in the transfer context. This adds to Vygotsky's (1978) research, which highlights how training affects overall development when the elements, material, and processes are similar across specific domains. Additionally, Lattuca, Voight, & Fath (2004) found that

transfer of training occurs during situated learning. Situated learning theory suggests that complex, real-world problems may enhance learning when trainees engage in authentic tasks relevant to those they will be expected to perform later on (Brown et al., 1989; Lave & Wenger, 2006; Young, 1993). Lave (1991) reported that learning should be situated as it usually occurs, and be embedded within an activity, context, and culture.

Maintenance. Maintenance is how long after skills learned in training are used on the job (Baldwin & Ford, 1988). For example, if a trainee learns a skill six months before they actually have a chance to use it, positive transfer is unlikely to occur. Similarly, if a trainee has the opportunity to use the skill soon after learning it, but then doesn't use it again for a very long period of time, transfer will suffer.

A positive transfer climate is vital for skill maintenance and includes peer and supervisor support, opportunity to perform skills, and follow-up training (Grossman & Salas, 2011). Trainees who are given the opportunity to perform skills learned in training during and/or soon after the training occurred and can use them often, will typically maintain those skills over time (Baldwin & Ford, 1988). This is especially true for the six months immediately following training since trainees who do not have the opportunity to use recently learned skills may suffer a loss of the skill over time. (Baldwin & Ford, 1988).

Reviewing the training inputs and conditions of transfer help to understand better how learning and retention (training outputs) improve and develop. Baldwin and Ford's (1988) model of the transfer process and Lim and Morris's (2006) integrated research framework, assist in understanding how training models may be used as a guide to

improved learning and retention. Furthermore, including related constructs will enhance learning and retention for the trainee.

Movement along The Model from novice to expert and the inclusion of training transfer models as guides, where knowledge is accumulated and transferred to the workplace, may be enhanced with additional constructs. Related constructs, such as, the use of adult learning principles in training programs, mentorship as assisting in learning and retention, understanding the importance of situated learning, the use of scaffolding during and after classroom instruction, and the use of reflection by all of the stakeholders involved in the process, have been found in the literature to assist in skill development (Benner, 2004; Berliner, 2004; Lave & Wenger, 2006; Peno & Silva Mangiante, 2012). The next section illuminates related constructs which assist a learner in movement along The Model.

Related Constructs

Adult Learning Principles

Andragogy is defined as the art and science of helping adults learn, and Pedagogy is defined as the art and science of teaching children (Knowles, 1970). The distinction between Andragogy and Pedagogy are slight since adult knowledge acquisition is similar to how children acquire knowledge. The difference resides mainly with the life experiences and motivation adults bring to their learning; therefore, other assumptions and principles apply.

Understanding the characteristics adults bring to training will help to improve transfer of their training, which will result in improved skill development. Knowles, Holton, III, and Swanson (2005) presented six characteristics of the adult learner. The

learner has 1) self-concept, 2) they come with experiences to use and share, 3) they have a readiness to learn, 4) they are oriented to learn, 5) they are motivated to learn, and 6) they need to know the reason why they are learning. Also, Dewey (1997) stated to improve a student's potential when learning; emphasis must be placed on the student's (novice/trainee) experiences and the necessity for the teacher (trainer) to understand and utilize the student's past experiences and how they enhance classroom instruction. Therefore, attending to these adult learning characteristics in a training session will allow for improved learning and retention of new knowledge and skills (Knowles, 1970).

In law enforcement, Birzer (2003) found to meet the challenges of training police officers in continuing technological advances; Andragogy was the preferred approach to instruction. Andragogy, with an emphasis on the learner (novice) as a self-directed with past experiences, and the use of a trainer who facilitates knowledge, is more valuable, cost-effective, and relevant when meeting the needs of the trainee officer (Birzer, 2003). Additionally, McCoy (2006) found trainers who used a teacher-centered style in the classroom felt the trainee's course results did not match their expectations. For example, when trainees are instructed through a lecture format, there is little opportunity for the trainee to draw upon previous experiences. When instruction techniques include group discussions, demonstrations, and group projects, trainees have the opportunity to discuss their previous experiences and to share them with others. However, when Andragogy was used, the trainees' course results were more closely aligned with what the trainers hoped they were learning in the classroom (McCoy, 2006). This is particularly important to help officers develop skill in crime scenes while improving their problem-solving and decision-making skills and transfer their newly acquired skill to their practice.

Mentorship

The process of mentorship is used to enhance an individual's learning and advancement through a developmental relationship (Fagenson, 1989; Kram & Isabella, 1985). Furthermore, mentorship is complementary to the use of Andragogy in instruction (Chinnasamy, 2013). For example, a novice may have their learning facilitated by a mentor who helps the mentee build upon their knowledge by providing resources and supports (Merriam, 2001). Therefore, a mentor who values the mentee's experiences and helps assist the mentee in setting goals will enhance the mentees progress in developing skill in an organization (Forrest III & Peterson, 2006).

Mentoring may be formal or informal and flexible regarding time and amount of instruction provided, however learning is usually intentional (Lave & Wenger, 2006; Law et al., 2014). A mentoring relationship allows the mentor to assist the trainee in reflecting on their work experiences and revising plans of action, when necessary (Peno & Silva Mangiante, 2012). Accordingly, participation in a mentoring relationship may be based on "situated negotiation and renegotiation of meaning in the world" (Lave & Wenger, 2006, p. 51) which may also assist learning opportunities when they are socially situated in the workplace (Trevethan & Sandretto, 2017).

Situated Learning

Many classroom-learning activities involve abstract knowledge which is often not contextual (Gutiérrez & Rogoff, 2003; Lave, 1996). When learning is situated, it is embedded within an action, context, or culture (Lave & Wenger, 2006). Lave and Wenger (2006) call this a process of legitimate peripheral participation (LPP). Knowledge needs to be presented in authentic settings and situations, such as tasks

completed in practice. Lave and Wenger (2006) call the trainee a newcomer who starts the learning process, like the novice in *The Model* (1980, 1986), with limited abilities when completing uncomplicated tasks through reproduction. An LPP strategy will work with many teaching styles and does not need to be intentional. LPP describes how newcomers become experienced members with the possibility of becoming an old timer (expert) in a community of practice (Lave & Wenger, 2006).

Social interaction and collaboration are vital components of situated learning, such as a community of practice, which expresses certain beliefs and behaviors to be acquired (Lave & Wenger, 2006). For example, collaborative mentoring provides opportunities to build relationships, to seek advice about navigating challenges in the workplace, and reduce the isolation of new participants (Janssens, Smet, Onghena, & Kyndt, 2017). This allows a novice trainee who is developing skill in a shared practice by internalizing knowledge through discovery and transmission when interacting with others in the community (Lave & Wenger, 2006). For example, a novice CSI officer who works with expert CSI officers will share times and experiences through discussions and storytelling which will help to improve their skill in CSI.

Similarly, Brown, Collins, and Duguid (1989) highlighted the idea of cognitive apprenticeship as a support to learning “in a domain by enabling students to acquire, develop and use cognitive tools in authentic domain activity” (p. 39). This idea supports how situated learning and its relationship to Vygotsky’s (1978) concept of learning is through social development. Jean Lave and Etienne Wenger (2006) developed their theory of situated learning by expanding on Vygotsky’s (1978) study on how we build culture through shared experiences and interactions with others. When beginning an

activity, learners depend on others with more experience to help guide them in learning, through participation in the zone of proximal development by way of scaffolding (Vygotsky, 1978).

Scaffolding

Scaffolding is frequently used when discussing the concept of the zone of proximal development (ZPD). Soviet psychologist Lev Vygotsky characterized ZPD as three concentric circles, which represent the learner's current and future stages of skill. The center is what the learner can do by themselves, the next stage is what the learner can do with the assistance of a more knowledgeable other, and the third outer band is what the learner cannot do (Vygotsky, 1978). Lave interprets ZPD as the distance between the problem-solving abilities of a learner working alone and the learner's abilities when collaborating with a more experienced person that includes supports (Lave & Wenger, 2006). Lave and Wenger (2006) add that inside the shared practice the members talk about (stories) and talk within (exchanging information) their practice, which includes reflection.

Furthermore, a study which reviewed FTO's and novice officers suggested the sequence of FTO instruction should follow; modeling, coaching, scaffolding, fading, articulation, and reflection with post-event discussions (Tyler & McKenzie, 2014). Due to the urgency of the setting context where training in the moment may not be applicable, trainers will engage in sharing their practice with debriefing through reflection-on-action, as quickly after the policing event as possible to assist and train the novice officer (Tyler & McKenzie, 2014). The earlier example, of the FTO and the novice sitting in the car

discussing the circumstances of a previous urgent event, is an example of debriefing and reflection-on-action.

Reflection

Schön (1983) reasons novices need to take a step back and look at their situation from a distance. Additionally, whether expert or novice, all professionals should reflect on their practice; generally and about specific situations (Schön, 1983). Schön (1983) continues with the notion that reflection aids in learning and is important in the enrichment of learning in professional practice. For trainers and trainees, reflection will help novices to evaluate their performance and ultimately improve their abilities, especially when dealing with similar future experiences.

In law enforcement, Tyler and McKenzie (2014) found the use of questioning and reflection helped to guide the novice in furthering their skill development. Tyler and McKenzie (2014) presented research of trainer perceptions where reflection-in-action for law enforcement novices during urgent encounters was not optimal. Similarly, Dewey (1997) found learning from experience and then reflecting on what happened (reflection-on-action) were central to his approach to learning and skill development. However, Schön (1983, 1987) finds reflecting-in-action an unconscious act, where learners start to “think on their feet,” not realizing that they are conducting reflective practices.

Conceptual Framework and Chapter Summary

The conceptual framework is the synthesis of literature reviewed to help explain the phenomenon examined. The framework, which lies with the broader frameworks presented, skill development and training transfer, help to inform the study. Baber (2010) and Baber and Butler (2012), found both experience and training better enables LEOs to

interpret crime scenes and problem-solve. They determined novice (little experience and training) and expert (experienced and trained) officers frame their procedures differently when examining crime scenes (Baber & Butler, 2012). Therefore, by identifying the systems, methods, and ways individuals learn to transfer knowledge from the classroom to their practice, including ways they improve their skill after they have left the classroom, we can better understand effective methods to train LEOs in conducting criminal investigations with scientific evidence.

The literature reviewed found experience, knowledge, and supports as aids to movement along the stages of The Model. Also, experience, with opportunities to reflect on actions, knowledge gained through training programs, and discussions with others in their field assist the learner in improving their skill development. Additional supports, such as mentorship, similarly help the learner in using their skill in their practice.

Supports range from training program designs and workplace experiences such as mentorship (Grenier & Kehrhahn, 2008; Peno & Silva Mangiante, 2012). Without supports in place, optimal training transfer may not take place, and the trainee may be unable to move along The Model for continually improved skill acquisition. When developing a “multi-faceted approach” to LEO training and development, Grenier and Kehrhahn (2008) suggest considering the overall role of contextual influences in skill development: the constituency, the environment, the content, and the territory of expertise. In the context of CSI officers within law enforcement, a training developer must understand the needs of the job at hand (constituency), the resources and culture of the organization (environment), the physical scene and its difficulties in collecting

evidence (content) within the domain (territory of expertise: policing), and how they are interconnected, since each affects the development of skill (Grenier & Kehrhahn, 2008).

Second, trainee characteristics such as trainee motivations and experiences from their on-the-job practice and training may advance skill acquisition. For example, LEO's previous training followed a behavioral paradigm model that differs from the suggested constructivist paradigm-training model. Therefore, the design process should allow time to talk about and discuss past training and on-the-job experiences, give the learners the ability to practice what they learn, ask for reflection on the processes they are learning, and give positive feedback which will help improve their acquisition of learning in a constructivist paradigm-training model.

Third, for effective positive transfer, the training design should include achievable learning goals. Development of a program should include the use of relevant content, a program that allows for practice and feedback (Schön, 1987), and the use of over-learning as a strategy for retention (continuing to repeat practice even when performance has been established) (Burke & Hutchins, 2007). Scaffolding (Vygotsky, 1978) and a design that includes active learning strategies, self-appraisal, peer evaluations, and coaching, as a means to improve learning and retention (Burke & Hutchins, 2007).

And, fourth, Burke and Hutchins (2007) found that linking training design and delivery to the work environment is important. Trainers should first assess the cause of performance issues to ensure that the work environment does not preclude learning and retention from unclear performance objectives and inadequate resources and support (Burke & Hutchins, 2007). Burke and Hutchins (2007) found that best practices for improved learning and retention include supervisory support activities, where coaching,

opportunities to perform, interactive training activities, transfer measurement, and job-relevant training.

Therefore, the literature review leads to a program design where skill is developed in a domain and positively assists the transfer of training for the trainee. The trainer should be knowledgeable of training inputs (trainee characteristics, training design, work environment) including an understanding and incorporation in the design for improved conditions of transfer (generalization, maintenance) (Baldwin & Ford, 1988).

Additionally, the inclusion of the use of training model strategies (trainee, trainer, and manager) and using andragogy principles when training adult learners to assist in training retention (Burke & Hutchins, 2007). Improving learning and retention can be accomplished if situated learning and encouraging workplace opportunities are used (Lave, 1991). Lastly, have the students reflect on their past, current, and future learning and the use of scaffolding, coaching, and mentorship to address and assist in understanding the contextual influences in skill development will help improve learning and retention (Peno & Silva Mangiante, 2012; Schön, 1983; Vygotsky, 1978). Figure 2 below is the model developed from the literature review of the conduits, which aid skill development and training transfer.

Figure - 2. Conduit model developed from the literature that aids skill development

Chapter Three: Methodology

Introduction

A qualitative methodological approach helped answer the research questions on the student perceptions of their skill development following a specialized class in criminal investigative techniques. A case study design was used to “gain an in-depth understanding of the situation and meaning for those involved” (Merriam, 1998, p. 19). Additionally, a case study methodology leads to findings, which are comprehensive, holistic, expansive, and richly descriptive (Merriam & Tisdale, 2016). Yin (2009) defines a case study as an empirical inquiry that “investigates a contemporary phenomenon in depth and within its real-life context” (p. 18). In this case, the context is a BCI course that the participants attended. Therefore, a case study design was appropriate because the phenomenon under study is in a bounded context, i.e., all officers are from the same course in BCI (Merriam, 1998).

Sampling Design

Merriam (1998) states to find the best case to study you would first establish the criteria which will guide your case selection and then select a case that meets those criteria. For example, the overarching question of the study is how law enforcement officers improve and transfer their skills once they have left a course in CSI. Students who have completed the course are individual cases. Criteria require as little variation as possible. Therefore, a minimum variation in the sampling was conducted. To ensure that the participant environments are as similar as possible (one criterion) they will all be from one class, rather than participants sampled over several classes.

Moreover, volunteers were participants who believed they would use their newly acquired skill within the six months after leaving the course (second criteria). The ten participants, from ten different law enforcement agencies, attended the same course. However, each participant's experiences, once on-the-job, were distinct and different. Therefore, a multi-case design was employed for the data analysis where each participant constitutes a case. Each case, or participant, were analyzed individually from three data sources for themes presented as vignettes. The vignettes will be followed by a cross-case analysis where categories and themes will help conceptualize the data (Merriam, 1998). The Yin (2009) Basic Types of Design for Case Studies model is presented in Figure 3 below.

Figure - 3. Basic Types of Designs for Case Studies (Yin, 2000)

The research questions reflect the study factors which are central to the study, how or what do the participants, once on-the-job and working independently, perceived as to what improved their skill in crime scene investigations (Maxwell, 2005; Merriam, 1998). First, the research questions helped to understand where the participants believe their skill stage resides, using The Model as a guide, at the time of the course completion and again after six months. Six months has shown to be enough time for skill to develop and improve (Dreyfus & Dreyfus, 2005). Second, the research questions, which are further explored during the interviews, helped to gain knowledge on what the participants attribute changes to, describe their use of, and attribute their ability to use their newly acquired skills in CSI.

The Model was used as an initial guide to help the participants understand where they perceive their skill stage resided and Baldwin and Ford's (1988) training transfer model was used as a standard to what aids transfer in the interviews. For example, during their interview, the researcher asked the participants to further develop and explain their thoughts on workplace supports if they discussed formal or informal supports as an aid in their skill development. Broad and Newstrom's (1992) training strategies and constructs also assisted in the interview process. For instance, if the participant discussed what training programs were available to them at their agency, the researcher would ask the participants to expand on the agencies overall training program.

Participants

The participants were recruited from the thirty-six students who attended a BCI course, which ran from September 2017 through April 2018. Some of the students came from small agencies and did not expect to use their newly acquired skills often in their

practice, if at all. Therefore, sampling was purposive as the researcher wanted to focus on LEOs who work in LEAs where they expected to use their newly acquired skill immediately following the course. The students in the course received an email from the researcher after the course had ended with the purposive criteria. Ten students, who expected to use their skills, volunteered to participate in the study. The students who volunteered received, through email, an explanation of the anonymity of the study and a consent form to sign and return. Pseudonyms are used for each participant.

The participants ranged from three years to seventeen years of experience on-the-job as a law enforcement officer. Four participants worked in a dedicated BCI unit, which allowed them to concentrate solely on the evidence found at crime scenes. The difference between these participants and the other six was that they do not conduct any other function of the investigation. For example, the investigator from a dedicated BCI unit would focus all his or her energy on the collection and processing of evidence and leave duties such as interviewing witnesses to other officers. In addition, each participant came from a different municipality or state organization. Therefore, each participant had a different experience once he or she left the course.

To provide context to the reader of what the practice of a BCI officer looks like, the following explains what actions the LEO completes when processing a crime scene. When a BCI officer attends a possible crime scene, generally other LEOs have already arrived before the BCI officer. For example, a homeowner arrives home and finds their home burglarized. At this time, the homeowner will most likely call their local police or 911 for assistance. The police department dispatcher sends an initial sworn officer to the home to start the investigation. A sworn officer is an officer who has arresting duties (the

ability to arrest individuals). The initial scene officer at the scene is the first to arrive and confirms a crime has been committed. At this time, the initial officer will request the assistance of a BCI officer to process the scene, if available. The BCI officer may be from a dedicated BCI unit, a detective trained in BCI, or a patrol officer who processes crime scenes for their agency. While waiting for the BCI officer, the initial scene officer will secure the crime scene to protect unauthorized intrusions and prevent the movement of physical evidence.

Once the BCI officer arrives at the scene, inner and outer perimeters are established, and boundaries are set. The scene is secured and restrictions are put in place to control all non-essential personnel from entering. The BCI officers' first duty is to start with scene recognition. Scene recognition is the ability to understand what the investigation entails and develop a systematic approach to finding and collecting evidence. A rule in scene recognition is to strive for consistency and the establishment of an operational system, which covers the entire scene. The BCI officer assesses, observes, documents, searches, collects, and processes the crime scene. Duties may include the sketching of the crime scene, photographing the scene and all its components, acting as the primary officer who controls the BCI units approach to finding and collecting evidence, or the secondary investigator where the officer records the evidence, collects, packages, and prepares the chain of custody as the evidence custodian.

Some evidence is processed chemically for enhancement at the scene due to its nature. For example, a fingerprint on a wall will be chemically processed and photographed at the scene whereas a fingerprint on a beer bottle will be packaged and processed back at the agency. Once the BCI officer has decided that they have completed

processing the crime scene, the officer releases the scene back to the homeowner. All the evidence and documentation collected is brought to the agency for further review. The BCI officer will usually continue with the chemical processing of the evidence collected back at the agency and make decisions which pieces of evidence need to be further reviewed and analyzed by their forensic crime laboratory.

However, many agencies have BCI officers who complete the investigation. The BCI detective (or patrol officer) will continue with the investigation by interviewing witnesses, writing and collecting warrants, follow leads and clues, complete police reports, prepare charges, and testify in court. Therefore, the officer who has several workflow tasks may find barriers to improving their skill in BCI and never reach expertise as compared to the BCI officer whose only domain is the collection and processing of evidence (Cornell, Riordan, Townsend-Gervis, Mobley, 2011). See Figure 4 below of study participants.

Name (Pseudonym)	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six- month Stage of Skill Development
Tom	13.5 years	No	Adv. Beginner	Competent
Rocky	7 years	Yes	Competent	Proficient
Mark	4 years	Flexible	Adv. Beginner	Competent
Sam	17 years	Yes	Proficient	Proficient
Max	13 years	No	Competent/ Proficient	Competent
Kate	3 years	No	Competent/ Proficient	Proficient
John	17 years	Yes	Adv. Beginner/ Competent	Competent
Steve	6 years	No	Competent	Competent
Alex	11 years	No	Competent	Competent
Jackson	7 years	No	Competent/ Proficient	Competent/ Proficient

Figure - 4. Study Participants

The Setting for the Study

The study was conducted at a NESCL, which examines the physical evidence collected at crime scenes from local, state, and federal law enforcement agencies and has a rigorous educational program for current law enforcement officers. The laboratory has conducted training for law enforcement officers for over 50 years. The instructors for the training program are NESCL staff members, former students of the BCI course, and experts in the field of crime scene investigative techniques such as current and retired LEOs.

The study's participants all currently work in law enforcement and attended a course in crime scene investigation held at a NESCL. LEOs attend the program at the behest of their law enforcement agencies to gain skill in crime scene investigations using scientific evidence techniques. The LEOs who attended the course under study hailed from twenty-six LEAs from three New England states and possessed varying years of experience on the job. The course is only open to current law enforcement.

The course runs over two semesters (fall and spring) and carries eight undergraduate credit hours. The officers receive instruction on the theory and practice of crime scene investigation, employing modern technologies in crime scene preservation, crime scene search, and the collection, preservation, and transmission of physical evidence. Emphasis is on photography, impression lifting, classification, comparison of latent fingerprints, and report writing. Other topics include evidence from crimes as they relate to firearms, arson, homicide cases, bloodstains, trace evidence, and proper courtroom presentation. The course is held once per week on Fridays for six hours over eight months. Pedagogy includes lecture, workshops, guest speakers, and collaborative

group work in and outside of the classroom, with crime scene simulations. Assessments include quizzes, exams, projects, and presentations.

Data Collection

Data was collected from several sources. There was documentation from participants who self-reported where they believed their skill resided on The Model, written documents from the participants on crime scenes they attended, and semi-structured interview transcripts. However, not a data source, during the course, to enhance the researcher's ability to analyze the data, the researcher had the students in the class review The Model. The students explicated what they believed each stage would look like in the CSI domain. The thirty-six learners were separated into five groups, and each group worked on one stage (novice, advanced beginner, competent, proficient, or expert) and listed the behaviors or characteristics they believed an individual who attains the stage would exhibit. After each group was finished with their review of The Model, the class came together, and each stage was further reviewed by the class. Even though this was not a data source, it assisted the researcher and the future study participants in thoughtful consideration of what each stage looked like in their practice. Having the participants extrapolate what each stage of The Model looks like in their practice adds to the trustworthiness of the study and reliability of findings. See Appendix E for the modified Dreyfus and Dreyfus version of the class-developed model.

Document examination

Documents collected were from multiple time-points. First, once the signed consent form was returned to the researcher at the initial time point of the study, a self-report of their perceived stage of skill development on The Model was requested. Both

models were included in the request, The Model and the class developed model. The participants were to read the descriptors of practice at each stage from novice through expert and decide where they perceived their skill level in CSI resided. Participants included an explanation as to why they perceived their skill resided on the stage they designated.

Self-report is acceptable in this study because the researcher is interested in the LEOs perceptions of their development over time and not their actual level of skill. Therefore, the researcher did not use The Model to confirm that the participants chose the *correct or accurate* perceived stage of skill in CSI. The difference or change in stages was what the researcher was studying so the need for an accurate portrayal of the stage was not important to the study. The participants who changed skill levels or stayed the same, and the reasons they perceived for the change (or lack of), was the focus of the study. However, during the vignettes the researcher and the participants use The Model and the class developed model to help explain the reasoning for their stage of skill development.

Second, just before the six-month time point after the participants left the course in BCI they were again asked to self-report their perceived skill development stage on The Model. They were also asked to include an explanation as to why they chose that stage. Additionally, each participant was asked to forward to the researcher a document, such as case file notes, which included the steps and experiences the participant performed during a crime scene they attended during the six months since the end of the course. The participants were asked to submit documentation of a scene that they found interesting or challenging, if possible. The documents helped the researcher and the

participants reflect on their practice. Some of the crime scene notes were written immediately after a crime scene event, and others were written when the researcher made the documentation request. Either way, the notes were reflections of the steps the participant took when attending to a crime scene. Both forms of documentation were used as talking points in the interview.

Interviews

Six months after the completion of the course, each participant was interviewed in-person. The interviews were semi-structured with open-ended probing questions to obtain data deemed useful by the researcher (Creswell, 2014). With the participants' permission, the interviews were audio-recorded. During the interviews, the researcher provided the participants with a copy of The Model and asked the participant to explain further where they perceived their skill stage resided. This enabled the researcher to explore any perceived changes that occurred. Each step in the data collection process helped to answer a research question. See below for details on the research questions and data sources.

Research Questions	Data Source
#1- How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition immediately after the completion of the BCI course?	Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition Initial time-point
#2- How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition six months after the completion of the BCI course?	Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition Six-month time-point
#3- What do officers attribute any change in their skill development to, during the six months after completion of the BCI course?	Interview

#4- How do LEOs describe their use of crime scene investigation skills six months after the completion of the BCI course?	Interview & Case File notes
#5- What do LEOs attribute their ability to use their crime scene investigation skills to six months after the completion of the BCI course?	Interview

Figure - 5. Research Questions and Data Sources

Data Analysis

A qualitative case study methodology was conducted to understand how the participants made sense of their world (their use of skills in CSI) and their experiences (Merriam & Tisdell, 2016). Qualitative research is used to uncover the meaning of a phenomenon who have an interest in “understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experience” (Merriam & Tisdell, 2016, p. 6). For this study, the data collected consisted of documentation (stage of skill development with an explanation and case file notes generated by the participant) and interviews. The interviews were conducted over two weeks. A professional transcriptionist transcribed the recordings and the researcher read them for accuracy. Using a comparative analysis method to identify categories and themes for comparisons, the transcripts were examined and reviewed, along with the skill stage responses. A qualitative comparative analysis focused on systematically making comparisons to generate explanations (Patton, 2015).

The case file notes submitted to the researcher near or at the time of the interview were reviewed as an additional data source during the interview and again when the documents were compared for emergent themes. The crime scene folders and notes gave detailed steps each participant took when conducting a crime scene investigation. This enabled the researcher to further delve into what processes the LEOs used in their

decision-making tasks. Additionally, the case file notes helped add to the semi-structured interview format and the data analysis process.

The data generated (stage of skill model and explanation, case file notes, and interview transcripts) were reduced and organized around the research questions and read and reread for themes (Patton, 2015). First, coding was performed for attributes, the basic demographic information of the participants, which included reviewing memos written immediately after the interviews for the beginning stages of data analysis (Maxwell, 2005; Saldana, 2016). Second, the data was coded using an open coding method which identified twenty-six initial codes (Saldana, 2016). Further coding defined and refined the open data codes to eight axis codes which helped to define further and refine emergent themes (Creswell, 2014; Saldana, 2016). The data was ultimately refined to yield four overarching selective codes found to aid the participants in improving their skill development, and acted as conduits to their transfer of training: support, experience, reflection, and motivation (Saldana, 2016).

Key informants (member checking) were identified and presented the data analyzed for accuracy following the data collection process and before completing the findings. The researcher gave each participant a copy of their vignette analyzed from the data. Each participant was asked to review the emergent themes in the vignettes as a means of enhancing the credibility of the study and to refine the data analysis further, if necessary (Erlandson, Harris, Skipper, & Allen, 1993; Fraenkel, Wallen, & Hyun, 2012; Huberman & Miles, 1994). Peer debriefing, as an external audit, was conducted with two colleagues who have studied qualitative methodology to confirm that the emergent themes were accurately expressed from the data (Fraenkel et al., 2012). The peer

debriefers were impartial peers who examined the researcher's transcripts, final report, and methodology. Afterward, the debriefers provided feedback to enhance the credibility and ensure the trustworthiness of the study data analysis. In addition, additional audits were implemented on the issues of trustworthiness that are further developed in the next section.

Limitations

As in any study, limitations may affect the findings of the study. A key factor in qualitative methodology is the researcher is the primary instrument. Since the researcher collects the data, examines the documents, and conducts the interviews, there is a possibility of bias which leads to credibility issues of the study and its findings (Creswell, 2013).

Researcher's involvement in course. Rather than eliminate the bias, biases were identified and monitored in the study as they related to the interpretation of the data. To address the researcher's role in the course under study, the researcher, who is a member of the team who helped facilitate, coordinate, and on occasion instruct the students, took a limited role in the course. The role of the researcher during the two semesters that the participants were recruited from was mostly administrative, i.e., registration. The researcher did not grade, test, or assess any activities the learners completed for the course. There were three occasions where the researcher instructed the students, however, evaluations of student course work were not conducted during these events.

Additionally, during data collection (stage of skill model and explanation, case files reviews, and the interview) the researcher used field notes and memos to describe her thoughts and observations and to chronicle any meaningful information discovered

during the interview (Maxwell, 2005). In addition, the researcher maintained a reflective journal to account for and chronicle her experiences during the data collection process. Since reflexivity may unknowingly influence the participants' responses, the researcher used the journal to avert reflexive threats (Yin, 2018). The journal helped to appreciate the sensitivity needed when conducting interviews.

Furthermore, qualitative research is mostly open-ended where participants have more control over the content of the data collected which makes verification of results more abstract (Patton, 2015). Each interview was semi-structured. However, each participant was unique, and conversations followed the path the participant's dialogue directed. Also, finding comparability, found in more structured methodological approaches, is made more difficult due to the inability to compare individuals, times, and settings (Maxwell, 2005).

The control and use of case files as data sources. The case files requested prior to the interviews were not readily available from all of the participants. Several participants brought the case files to the interview and were required to leave the interview with them. Since the cases involved were less than six months old, the adjudication of the case had not been completed. Therefore, open and pending case files were not allowed to leave the LEO's custody. This posed some constraints in reviewing the case files ahead of time, but the interview allowed the participant to talk about the case and inform the researcher of their procedures and practices when conducting an investigation.

Furthermore, to avoid issues with participants self-reporting where their skill resided on the Model, the researcher had the participants bring in the case files as another

source of documentation. This helped the researcher understand why the participants reported as they did on The Model. In addition to the limitations of a study, conditions of trustworthiness help add to establishing criteria for judging qualitative studies trustworthiness (Guba, 1981; Shenton, 2004).

Issues of Trustworthiness

It is important to demonstrate the findings are trustworthy. Study data triangulation, conducted through multiple sources of data, including the use of procedural actions such as member checking, establishing an audit trail, the use of thick, rich descriptions, and peer debriefing assist in issues of trustworthiness (Shenton, 2004). Each step helps in creating a lens where the study's data sources and findings are trustworthy (Creswell & Miller, 2000; Shenton, 2004). Addressing Shenton (2004) and Guba's (1981) research on trustworthiness, issues of trustworthiness are addressed through credibility, transferability, dependability, confirmability.

Credibility. Credibility is the concept of how the researcher confirms their findings are authentic. (Shenton, 2004). Credibility of the study was addressed through several means. For example, Shenton (2004) and Guba (1981) suggest member checks (allowing the participants to review data for accuracy), triangulation (using a variety of data sources) and peer debriefing (interacting with other qualitative professionals for scrutiny of the project) for improved confidence in the data sources.

Transferability. Transferability applies to the ability of the findings to be applied to other situations (Merriam, 1998). The researcher makes no claims as to the transferability of the study's findings. The obligation for demonstrating transferability lies with those who would apply it to a setting or context (Lincoln & Guba, 1982). The

researcher used purposive sampling to provide sufficient, rich, thick description of the participants and context which allows subsequent readers to determine whether the study's findings can be applied to their settings (Merriam, 1998; Shenton, 2004).

Dependability. Dependability of the data sources speaks to the replication of the study (Merriam, 1998). Dependability addresses whether the study would be replicated if it were to be repeated within the same context (Shenton, 2004). Dependability is addressed through an audit of the study's data sources and the corresponding documents generated. An example of the components of the dependability audit is the reflective practices conducted during the data collection, i.e., a reflective journal and field notes (Creswell & Miller, 2000; Shenton, 2004). Dependability was accomplished by documenting the inquiry process through a reflective journal, which helped to avoid researcher bias, as well as the field notes taken during data collection.

Confirmability. A confirmability audit addresses objectivity within the findings of the study (Shenton, 2004). A confirmability audit is a process within an audit trail (Shenton, 2004). For confirmability, an audit trail assists "any observer to trace the course of the research step-by-step via the decisions made and the procedures described" (Shenton, 2004, p. 72). This is accomplished through the availability of the raw data, if needed. The Issues of Trustworthiness are documented in Appendix F.

Chapter Four: Findings

Introduction

This qualitative study sought to understand how LEOs improved their skills in BCI and transferred their learning to the field six months after they left a training course. To understand the phenomenon, multiple sources of data were collected to assist in answering the research questions.

- 1) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition immediately after the completion of the BCI course?
- 2) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition six months after the completion of the BCI course?
- 3) What do officers attribute any change in their skill development during the six months after completion of the BCI course?
- 4) How do LEOs describe their use of crime scene investigation skills six months after the completion of the BCI course?
- 5) What do LEOs attribute their ability to use their crime scene investigation skills six months after the completion of the BCI course?

The findings are presented via vignettes of each participant's experience and through a cross-case analysis to identify themes. First, the individual participant vignettes helped to answer research question one and two. Second, the cross-case analysis helped to answer research questions three, four, and five. Guba and Lincoln (Guba & Lincoln, 1981) reported that a cross-case analysis would help form common conceptual

frameworks gathered from what appears to be diverse accumulated findings. The findings revealed that the LEOs used supports, experiences, reflection, and motivating factors to help them maintain or improve their skill six months after they left the BCI course. The figure below, Figure 6, are the constructs and conduits for movement revealed in the data analysis and their relationships to one another.

Figure - 6. How LEOs develop their skill and transfer training to their practice

At the time of the interviews, seven participants were detectives, one was an investigator, and two were patrol officers. The participants ranged from three to

seventeen years as a LEO. None of the participants had more than three years of forensic experience. Additionally, all participants either work with another BCI trained officer or can call in help when needed.

Dedicated BCI Units	Departments with a Detective/Investigator/ Patrol Officer who attends crime scenes
4	6

Detective	Investigator	Patrol Officer
7	1	2

The following ten vignettes illustrate the depth and diversity of each participant. Each vignette addresses research question one, what stage on The Model do the participants perceived their skill resided immediately following the course, and two, what stage on The Model do the participants perceived where their skill resided on The Model six months after the conclusion of the course. Furthermore, the vignettes include thick, rich descriptions of the participants that was specific to their circumstances and partially addressed the other research questions. Each participant's data, as discussed in chapter three, was refined to yield four selective codes, support, experience, reflection, and motivation. Additionally, each participant is from a different municipality or law enforcement agency, therefore, many had unique experiences in how they developed their skill after leaving the course.

Following the vignettes, a cross-case analysis is presented. The cross-case analysis further explores the themes revealed during the coding process and initially discussed in the vignettes. At this point, the participant responses are further explored,

linked, and patterns found to help answer research questions three, four, and five. Marshall and Rossman (2011) explain the researcher must identify themes, recurring language, and patterns which link people and settings to integrate the categories of meaning. This will help to retain the integrity of the case study by allowing comparisons across the cases (Yin, 2018).

Participant Vignettes

Vignette 1: Tom

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Tom	13.5 years	No	Adv. Beginner	Competent

Tom has worked for a law enforcement agency as an officer for over thirteen years. Before attending the course, he had limited experience in collecting forensic evidence though as a previous member of a specialized task force, he had some evidentiary experience. At the time of his interview, he had been working for two years as a detective who conducts criminal investigations where he collects and processes forensic evidence. Tom works first shift with four other BCI trained officers and rotates on-call duties (nights and weekends). Since the department does not have a dedicated BCI unit, Tom works daily and on-call, nights and weekends, with several other detectives who had previously attended the BCI course. The detectives conduct all aspects involved in a crime scene investigation. For example, they will collect and process the evidence, take witness statements, and complete all follow-up activities to help solve a crime.

At the end of the course, Tom believed his skill development fell in the *advanced beginner* stage of The Model. He stated he was “fairly confident in my decision-making skills” and has “been involved in multiple investigations” though he had not yet processed evidence from a crime scene where he was the officer-in-charge. He stated he was concerned about his processing abilities. According to The Model, learners at the advanced beginner stage are marginally acceptable when performing in their domain. In the class developed model, the students stated an advanced beginner might not process evidence properly, one of Tom’s concerns.

However, six months after the completion of the course Tom felt his skill improved to the *competent* stage. Addressing his concerns when he left the course, he stated he continued to make decisions and stuck with them though he feels he is “kind of rigid, too, because I, I felt like what I was doing was right.” He works hard to improve his skills, including processing, a concern of his when he initially left the course. He stated he was bettering his crime scene processing skills, especially because he felt it made him “a more of a valuable tool” to his department. He felt the competent stage was accurate, “I’ve developed my own plans independently of anybody else. Made my own decisions and stuck with them,” which is comparable to The Model where the learner develops rigid, inflexible rules, is averse to risk-taking, and is fearful of losing control (Dreyfus & Dreyfus, 1980, 1986).

Taking control is a reasonable concern for Tom. When discussing a past crime scene, he reflected that the scene was more chaotic than he preferred. He felt he needed to “be more rigid to make sure that we can be efficient at what we’re going to do as far as evidence preservation collection” and that there may have been a loss of control at the

scene. This is a justified concern, since, as Tom stated, “I knew that I was going to be completing a very comprehensive report, and these types of reports, with accidents, they're gonna be viewed-- I mean, as much as any type of crime scene report or if there's a criminal matter, that's reviewed, and it goes to court.” Therefore, setting rules and following them so as not to have his case unravel when scrutinized was one of the most compelling methods in how he develops skills.

This concern came to fruition when he was told by a senior officer to file evidence from a case, which he did not personally review ahead of time. When he testified in court, the prosecutor questioned him on the stand about the evidence, to which he was unable to elaborate. He stated, “So, at that moment, in front of a courtroom, I knew that was something I needed to make sure I do the next time.” Tom was one of several participants who felt very strongly about how decisions made by him could negatively affect him and his cases. In this way, he was *learning from error* through *reflection-on-action* (Schön, 1983).

Tom reviews and repeats his work continually to perfect his craft. Since becoming a BCI detective, he has found greater satisfaction in his career. Tom is strongly *motivated by his self-perception*, “I’d like to be good or better than that, at what I do.” He was also *motivated by meta-perception*, “I’ll be more valuable in my small unit, and it’ll probably make my work environment better,” what he called his *personal and organizational motivation*.

Vignette 2: Rocky

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Rocky	7 years	Yes	Competent	Proficient

Rocky has worked for a law enforcement agency as an officer for seven years. Six months before the start of the BCI course, he transferred to a dedicated BCI unit as a detective. Rocky works first shift with six other BCI trained officers and rotates on-call (nights and weekends). His responsibilities are only on forensic crime scene evidence collection and processing. Therefore, the BCI unit focuses its energy on the evidence and the evidence alone.

In the months before attending the course, on several occasions when he arrived at work, he found his supervisors had set up crime scene scenarios to assist him with his learning. After processing the crime scene, his supervisor gave him feedback and asked him to reflect on his work. Rocky was in a supportive environment where he was given opportunities to aid in his burgeoning skill development before attending the BCI course. Once the BCI course started, this type of instruction ended which helped Rocky focus on his coursework without workplace barriers. This replicates how Baldwin and Ford's (1988) research found that a supportive work environment was beneficial to improved learning and retention. This high level of workplace environmental support was unusual from the experiences of the other participants. Rocky's experience was a *formal mentoring* program.

Since Rocky had hands-on mock crime scene experience before attending the BCI course, he perceived his skill level after the course was completed to be at the *competent* stage on The Model. He felt he had "an understanding of not only what to use and when but why a particular method or tool worked in a specific situation." This is comparable to The Models description, which states a competent stage of skill is to see that general

principles apply to a wide range of situations. Rocky thought in some instances, his skill was proficient. For example, he stated he was “into the proficient category, specifically in terms of solving problems on the fly.” However, he understood and was aware that since he had only been in the BCI unit a short time, he still had a lot to learn.

Rocky, at six months following the course, perceived he had reached the *proficient* stage. Using The Model’s description of a proficient individual, he felt he could now see the whole rather than the specific parts when attending a crime scene. Rocky attends crime scenes daily in his position as a detective in a dedicated unit. Therefore his experience within his domain may be greater than detectives and officers who are not in a dedicated unit. When attending to a scene, during the day and on-call, he can focus on the evidence. Therefore, he felt that even though he had yet to put multiple years into his practice he has attended many scenes. He stated “the difference from proficient to expert or even competent to proficient, I think it's-- I think it takes a longer time and, you know, a large number of scenes” as necessary for expertise in his domain, BCI.

When asked about challenging scenes he has attended, scenes that stretched his thinking, rather than speak about a case, he discussed a procedure that his department did when he was initially out of the BCI course and independently attending crime scenes to help assist him in challenging situations. To help him to develop his skill further, his supervisor would review his casework as a means of coaching, scaffolding, and fading as Tyler and McKenzie (2014) suggest in aiding law enforcement officers in their skill development. When asked if he felt the reviews of his casework were helpful, he stated the conversations were supportive and not punitive. He stated his supervisor would ask

"Okay, but now knowing next time you have a similar situation, what would you do?" and his review of crime scenes, *reflecting-on-action*, were supportive. He stated the process was "recalling what I actually learned here that I already knew, but I just didn't do on the scene" as supportive using *reflection-on-action* (Schön, 1983). His supervisor's practices assisted him in reflecting on his previous practices and how to handle future challenging situations. Once his supervisors felt he was capable in BCI, the review of cases, as far as he knows, ended. However, Rocky mentioned his supervisors may still be reviewing his cases, but since his skill has improved, they no longer ask him to reflect and discuss his crime scene actions. Compared to other participants, Rocky has a supportive work environment. At each step of his skill development, his BCI unit gave him the support he needed to improve his skill. Rocky believes the support he received and the experience he gained on the job are what aided his skill development after leaving the course.

Vignette 3: Mark

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Mark	4 years	Flexible	Adv. Beginner	Competent

Mark has worked for his agency for four years and currently assists the BCI detectives in crime scene investigations. Mark's agency assigns two patrol officers trained in BCI to each patrol shift so that there is coverage each night of the week. Therefore, Mark works third shift with no other currently trained BCI officer and does not have on-call duties. When they are not conducting crime scene investigations, the BCI trained officer performs patrol officer duties. During a crime scene investigation,

Mark collects the evidence for further review by a BCI Detective the following day.

Mark's experiences are different from the other LEOs who are in dedicated units. Mark's agency uses a flexible, dedicated BCI unit model to improve its staffing efficiency.

At the end of the course, Mark believed his skill fell on the *advanced beginner* stage of The Model. He stated he had become comfortable in police work and "can multi-task" while "I do not lose sight of what I am trying to do." However, he further discussed that on occasion "I collect too much evidence and find myself entering property which is completely irrelevant to the case." His actions correspond with the model developed by the students in the BCI course of the behaviors of an advanced beginner. Mark also stated, "One thing I struggled with was photography. I am taking the correct ones but still do not grasp a good understanding of the F-stop feature and its relevance" which is comparable to The Model's characteristic of an advanced beginner who can marginally demonstrate acceptable performance.

After the six months following the completion of the course, Mark believed his skill improved to the *competent* stage of The Model. Initially, Mark placed a lot of pressure on himself to succeed, to "get it done quickly and proficiently and all that." However, he quickly realized, "now, you can kind of step back and see that that's not so important anymore." Mark can:

...develop a plan for evidence collection and do several tasks at a time. I am able to take photographs as well as process evidence while other responding officers retain scene security. I am able to seize evidence correctly as well as utilize the different storage methods (drying closet/refrigerator). I have also become more skilled at knowing where to locate prints as well as collect them. (Mark)

Mark's improved skill addressed the concerns he had when he initially left the course, such as collecting too much evidence and his ability to collect latent prints.

When discussing a challenging case where the evidence contradicted the complainant, he stated that the case required "a lot of critical thinking" and as the case unfolded, he had to *reflect*. "You learn from it to be like, Oh, well, you know, wait a minute." This allowed him to reflect-on-action, leaving Mark to review his cases so that he can allow the evidence to "kind of speak for itself." Mark is on his shift alone and does not have a support system to assist him in his practice; therefore, he attributes his improved skill to what he learned in the BCI course, his experience on the job, and reflecting on his work.

Vignette 4: Sam

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Sam	17 years	Yes	Proficient	Proficient

Sam has worked for seventeen years in law enforcement. He has worked for his current agency for eight years and had extensive LE experience before coming to the BCI course, especially from his previous agency. Sam works first shift with four other BCI trained officers and rotates on-call duties (nights and weekends). Sam's focus is solely on the evidence without having to worry about the other aspects of an investigation, such as having to take witness statements, as a detective in a dedicated BCI unit.

Sam's skill was tested while in the BCI course. During the first semester of the course, Sam was the primary BCI investigator during a homicide where no other recently trained BCI colleagues were available to assist him. Sam was the only student to have

conducted a serious investigation, without the aid of a seasoned BCI detective, while in the BCI course. With his colleagues unavailable, he had to rely on senior officers who were not current in their BCI skills for guidance. Sam felt if more qualified BCI detectives or colleagues were present, he might have conducted the crime scene differently. For instance, he stated, “I had an idea that they would have me collect way too much, but I was just-- I was doing what I was told.” Sam stated that “way too many items were, uh, were seized. But, you know, it was one of those things where I was just checking, checking off the boxes of things that I had to do at a crime scene.” Sam *reflected-in-action* on past experiences to assist him in his current experience. He recalled what he had learned in the course, “I envisioned my mock crime scene in my head” while processing the scene which Tyler and McKenzie (2014) found as a challenging process during urgent criminal cases, to reflect-in-action. However, without the guidance of his BCI colleagues, he had to rely and reflect at the scene on his classroom experiences. To help bridge the gap in his knowledge and the need for guidance, Sam reached out to an instructor, *a mentor*, in the course for additional support during the homicide. Sam, though inexperienced in conducting such a high-profile case, overcame his issues by reflecting-in-action and reaching out to others for support.

The extensive crime scene exposure Sam had, led him to perceive his skill at the *beginning* of the course as an *advanced beginner* on The Model. However, at the end of the course he perceived his skill to be *proficient* on The Model. He stated he felt he was proficient “because I was learning things in class, and then I was taking what I learned and actually applying, applying it to my everyday duties at the police department.” Also, before attending and during the course, Sam had extensive on-the-job training by two

experienced BCI detectives in his unit who had previously attended the BCI course. Sam was a member of a *community of practice* (CoP) with other BCI detectives from his department.

However, at six months after the completion of the course, Sam continued to perceive his skill resided at the *proficient* stage on The Model. He stated he had not improved his skill from when he first left the course because he had not applied all the techniques learned in the course. He stated he would have to review his notes, “I would have to review, um, some of the documentation that I received at-- in BCI School to jog my memory. But once my memory was jogged, I could actually, physically do things to the proficient level” when completing a task in BCI. He felt the proficient level was still accurate since he must still deliberate when making decisions and did not have enough experience with many techniques taught in the course (Dreyfus & Dreyfus, 1980, 1986).

Sam believes experience is what improves skill. Sam equated the amount of time spent in the field as compared to classroom instruction. Six hours in the field yields more knowledge than six hours in a classroom because “you're not actively learning for six hours being in that classroom.” Sam believes the support he receives from his colleagues is also a factor in his skill development “because if we have a question about something, you know, we can bounce it off each other,” as a member of a CoP.

Vignette 5: Max

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Max	13 years	No	Competent/ Proficient	Competent

Max has worked as an officer for thirteen years. When Max started the BCI course, he was an investigator working with BCI detectives in a training program. Max was promoted to detective shortly after his interview. The detective-in-training program allowed Max and his agency to decide if becoming a detective would be his career path. His agency does not have a dedicated BCI Unit. Therefore, each detective has multiple duties during a crime scene investigation. Max works first shift with four other BCI trained officers and rotates on-call duties (nights and weekends). While “in training,” he was sent to the BCI course, with the hope he would be promoted to detectives. Max thought the detective-in-training process to be supportive. The *organizational support*, allowing him to participate as an investigator in the detective’s unit and take the course while still in training, was a positive quality for Max.

Max left the course with a perceived stage of skill of *competency*, leaning toward *proficiency* on The Model. Max felt he might have been borderline proficient by explaining, “During the class, the scenes became much more manageable due to higher level of understanding and confidence level that accompanied the knowledge gained.” Max mostly felt that his confidence when he conducted investigations aided him in his skill development. The Model recognizes that a characteristic of competency is a person whose rulemaking is flexible when they are confident in their skills.

Max, at six months following the course, perceived he had maintained the *competent* stage, rather than increasing his skill development in BCI techniques. He explained during the six months after the course ended, he did not attend many calls that required processing of evidence. He felt he made judgment calls at the crime scenes he attended as not having forensic evidence for collection. Max stated, he “was able to kind

of determine that there wasn't really anything to process at the scene,” which The Model recognizes a competent individual in their domain would be able to develop plans and recognize which situations are important and which are not.

Max is a participant who practiced *reflection-before-action*. When heading out to a crime scene, Max prepares by reflecting what he will do when he arrives at a scene. “Before you even get out of the car, you're thinking of kind of the steps you're going to take. Um, it definitely slows...slows you down as far as you don't have that sense of urgency to just do something.” Tyler and McKenzie (2014) found slowing the scene down and decreasing urgency was a means that assists skill development through *reflection*. However, Max’s instinctive preparation is what Schön (1983, 1987) called “thinking on their feet” or unconscious reflection-in-action.

Max attended a limited number of crime scene investigations that included forensic evidence. Therefore, there were few occasions to improve his skill leading Max to believe that experience is the primary function for skill development. He felt he had not been processing enough scenes. He was worried his skill would diminish, “whether it be, you know, some blood spatter on the wall or, you know, a shoe impression in the mud. Um, not doing those things I think is probably the hindrance, not keeping up on the skill.” Max believed experience is what will aid him in improving his skill in the future. However, he was motivated by his organizational support and his reflective practices in the six months following the BCI course.

Vignette 6: Kate

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development

Kate	3 years	No	Competent/ Proficient	Proficient
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Kate came to the BCI course with an interesting history. Even though she was the least experienced participant working independently on-the-job, she had the most experience in forensics. Before her employment in a state agency as an investigator, she received a Baccalaureate and Master's degree from a forensic institution. Kate works for a state agency that investigates crime scenes where a possible felony may have been committed, the local LE department has decided the cause of the crime is indeterminate, or an injury or death have occurred. Kate attends crime scenes throughout the state in her job capacity as an investigator, rather than from one municipality. Kate works first shift with six other BCI trained officers and rotates on-call duties (nights and weekends). During an investigation, Kate works closely with BCI investigators from the town or city where the crime is committed. Therefore, she must rely on the assistance and support from individuals not employed by her organization.

At the end of the course, Kate perceived her skill development stage to fall between *competent and proficient* on The Model. She stated that she had attended over 200 scenes and “performed in various capacities (interviews, evidence processing, etc.).” The Model identifies a characteristic of competency as someone who sees the general principles applied to a wide range of situations. Kate felt that her extensive crime scene experiences, which include all the aspects required to investigate a crime scene, assisted her skill development. Kate also mentioned she has difficulty in adapting to unusual circumstances, lacks creativity, and does not trust her intuition, which may be why she

felt she was not fully proficient in skill development. The Model states that a proficient individual in BCI can replace the rules with situational intuition.

At the six-month time point after the end of the course, Kate stated she was still straddling the *competent and proficient* stages of The Model though she felt her skill in BCI was more proficient than competent. As an example, Kate stated, “While I may have the ability to comprehend the whole, I may have to remind myself on the exact procedures.” Kate gave the following example when working with others trained in BCI, “I think in my follow-up email I said that I'm starting to see the whole more because of that, because of working with them. So now, I walk around the entire building, the entire exterior of the building, and say, okay, this door was forced. This door was not.” Working with BCI trained LEOs has helped her skill become proficient by observing how they handle a scene.

“They're coming into it and saying, um, the forced entry over here, um, the broken glass over here, you know. This chair is overturned. That doesn't look right. They're coming into it and really looking at it as crime scene whether it is or not. But they're seeing it in so many different places, and they're compiling all of this together.” (Kate)

This process is a mentoring partnership, a one on one relationship, where the more knowledgeable officer encourages and assists the novice officer. However, Kate's lack of confidence, in this case having situational intuition, may still be a barrier to being fully proficient.

To assist in Kate's skill development, she believes additional training is important. “I'm very pro continuing education. Um, I try to go to as many seminars as I

possibly can.” Therefore, experience on the job, the support of knowledgeable others, and training programs are the elements Kate perceived as improving her skill in crime scene investigations.

Vignette 7: John

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
John	17 years	Yes	Advanced Beginner/ Competent	Competent

John has worked in law enforcement for seventeen years. He transferred to the dedicated BCI unit of his agency about six months before the start of the course. His previous experience in another specialized unit was quite different and John appreciated the collegial atmosphere of his current BCI unit. As a member of a dedicated BCI unit, he can focus solely on the evidence at the crime scene. John works first shift with six other BCI trained officers and rotates on-call duties (nights and weekends).

John stated he worked with several skilled detectives who have spent many years investigating crime scenes and processing evidence. This allowed him to “observe, assist, and learn from many different styles and learning traits.” John felt his skill stage resided somewhere between *advanced beginner* and *competent* at the end of the course using The Model as a guide. He stated that he had seventeen years’ experience as an officer and additional exposure to BCI activities by observing and assisting which helped support him in his skill development. John felt he was able to complete the photography duties needed at a crime scene so, therefore, the advanced beginner stage on The Model, where an individual should be able to demonstrate marginally acceptable performance, was an

appropriate level. Additionally, John felt he was competent in other crime scene duties since he understood that general principles apply to a wide range of situations since he has had extensive LE experience.

John believes that he has achieved the *competent* stage on The Model after six months working as a BCI detective. However, even though John did not list any situations he felt needed improvement at the initial time point, he still believed he was in the learning process. He credits his improved skill during the six months since the end of the course by continuing to observe others in his BCI unit who “have, far more experience than I do. And we, we come together, and we speak about things.” He is now recognized in his unit as having enough knowledge and experience to be a skilled member of the team. He stated colleagues who have “far more experience than I have, I will point something out, and they said, you know, you're right. Let's, let's, let's take that as evidence.” Therefore, he felt he could make plans, recognize which situations are important, and make decisions, which he has consciously contemplated as documented in The Model for competency. John’s experiences are those of a member of a CoP, where he improves his skill development through working with and interacting with other CoP members.

John’s experience with his new unit has been positive. He stated “Oh, we're a, a very tight-bonded team” and “I have to be honest, I-I've never been in a unit in, in this police department that, that molds this well together.” John has extensive LE experience and finds his BCI colleagues he is working and their style of training to be supportive. Therefore, John perceives experience and the supportive environment from his BCI unit are the means that improved his skill development in BCI.

Vignette 8: Steve

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Steve	6 years	No	Competent	Competent

Steve has six years' experience in law enforcement. Steve expected to move into the detective's unit at the end of the course. However, he was not promoted until just before the interview. Steve works first shift with six other BCI trained officers and rotates on-call duties (nights and weekends). Steve felt his skill resided at the *competent* stage of The Model at the course completion. Steve felt he had a "good understanding of how to systematically approach and document a crime scene. Throughout my career in law enforcement, I have always been descriptive in my documentation and always handled major scenes with an organized and systematic approach." The Model labels a competent individual in their domain to have the ability to develop a rigid set of rules, is averse to taking risks, and uses considerable contemplation when considering a problem. "I would say that I would over-document rather than under-document a scene. If I was unsure about processing a particular item, I would either research or review how to do so before just processing something not knowing if the correct method is being used."

Since Steve stayed in the patrol division for the five months after the end of the BCI course, he experienced a lag in his exposure to crime scenes as the officer who conducts the investigation. Even though he was trained, he was not allowed to collect or process evidence during investigations. This led him to believe his skill did not improve over the six months. However, he does feel he was able to retain the skills he had in BCI

throughout the six months by observing colleagues in the field and reviewing his class notes.

Therefore, six months following the course, even though Steve had very little opportunity to use his skill in crime scene investigations, he perceived he had maintained the *competent* stage of The Model. To keep his skills, he reviewed his classroom materials and observed BCI Detectives at crime scenes when he attended them as a patrol officer. He stated, “Although I have had little experience since the school, the skills learned are still fresh to me and I believe I will be using them soon.” Steve, at times, needs to *review* information from the course, “I know where it is. I know where to find it...at least for now, I'm just trying to let people that have had the experience so, you know, if, if I do run into something that I'm not sure about, I'm going to ask someone o-or look it up.” Therefore, Steve uses *the support of peers* to assist him in his skill development. Additionally, since he spent the last few months observing detectives at crime scenes, he used the occasions to observe and reflect what they were doing. Steve used what Schön (1983) calls *reflection-on-action*, through reflecting on the practice of others. This allowed Steve to observe, reflect, and think of the actions and possibly decide, on some occasions, that he would have accomplished some tasks differently. Dewey (1997) stated learning can be accomplished from experiences and then reflecting on what happened. Though not his experiences, Steve found when observing others at crime scenes, such as, taking the photos at a scene or processing evidence with latent print powders, he believed he might have performed them differently.

Steve is only able to perceive on how his skill will develop in the future by what he had done in the past. For example, Steve was not in the unit who conducts BCI

investigations until very recently, therefore, he could not discuss the use of mentorship or a CoP to develop his skill. Therefore, he stated, “Basically just experience and, uh, doing a little research just to prepare myself for when something does come up.” He did realize though that by “talking to some of the guys I work with, the other detectives” would be ways to improve skill development.

Vignette 9: Alex

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Alex	11 years	No	Competent	Competent

Alex has been employed as a patrol officer for eleven years. When the opportunity was offered to go to BCI School, she applied to the program. Alex works first shift as a patrol officer and rotates on-call BCI duties (nights and weekends) with other BCI trained officers. She is an on-call BCI police officer who processes crime scenes on nights and weekends when they fall on her on-call schedule.

At the end of the course, Alex perceived her skill level to reside in the *competent* stage of The Model. She stated, “I believe the lessons and practical’s performed during class time have given me a solid base.” She went on to say she “would be able to determine what elements of the scene would be useful to reconstruct the scene and to determine the pieces of evidence that would assist in identifying a suspect. I believe I would be cautious in my approach, not taking risks because at this point, I would not have the confidence, experience, and intuition of a seasoned investigator.” The Model reports competency in a domain as someone who develops their own plans, can recognize what is important, and is rigid and averse to taking risks if they lack confidence. Alex

was not immediately placed on the on-call rotation list until several months had passed. Therefore, she has only presided over a handful of crime scenes at the six-month follow-up interview.

At six months following the course, Alex stated she was still at the *competent* stage in The Model due to a lack of opportunity to use her BCI skills. Alex felt her skills diminished over the first few months after the completion of the course, therefore, she had to work at bring them back to the level of when she left the course. She stated she had limited opportunities to use her skill, “I probably have not been given enough opportunity.” Alex felt “my skills in photography decreased. I forgot certain settings for close-up or just general familiarity with the camera. I wasn't as confident.” However, she took responsibility for her diminished skill since it is “a perishable skill, not using it for a few months. And I blame myself because I didn't take the initiative to re-familiarize myself and stay on top of it in between that time.”

Alex improved her skills by asking to go to additional training opportunities and reviewing her notes and textbooks. “There's always just reviewing, you know, processes and procedures on how to do everything. And then, I mean, I could always just take the camera and take photographs and just practice if I wanted to.” Alex took the initiative by reviewing other officer's notes and narratives “to understand, all right, this is the pertinent information that needs to go into it and just kind of taking the knowledge that I learned in class and then tweaking it to how my department wants, wants the report done.”

At this time, Alex stated that “upon arrival at scene I feel competent in developing a plan and determining which pieces of evidence are important and those that can be

ignored” which is reflected in the competent characteristic of The Model. Moreover, Alex believes practicing techniques will help her to better develop skills in crime scene investigations. She stated, “There’s always reviewing. I still have all of my textbooks. There’s always just reviewing, you know, processes and procedures on how to do everything. And then, I mean, I could always just take the camera and take photographs and just practice if I wanted to.”

Furthermore, Alex is motivated to improve her skills by her increasing confidence and *self-reflection* of her skills. She felt when you are initially on the job you have not conducted the investigative aspects of a crime scene, “but then once you start responding to calls, and you realize what you’re supposed to do, that experience increases your confidence.” Alex’s confidence was shaken when she did not perform any crime scene investigations when she was first out of the BCI course but found after reviewing her notes from the course, practicing her skills, and working on crime scenes helped her build her confidence back. Alex stated, “Well, I liked being able to go out into the field and dust for prints, lift the prints. I think that doing it just gives you a lot more confidence.”

Vignette 10: Jackson

Name	Length of employment	Works in a dedicated BCI Unit	Perceived Initial Stage of Skill Development	Perceived Six-month Stage of Skill Development
Jackson	7 years	No	Competent/ Proficient	Competent/ Proficient

Jackson has been employed as a law enforcement officer for seven years. He is a detective who conducts investigations on crime scenes that range from evidence collection and processing to witness interviews. Jackson works first shift with seven other BCI trained officers and rotates on-call duties (nights and weekends). Like another

participant, Jackson's department has a detective-in-training program where he was able to apply and participate in a program to help introduce him to their practices. Jackson was in the detective-in-training program for over a year, before taking the BCI course. While in the training program, Jackson worked with senior detectives who had previously attended the BCI course. Jackson stated the more senior colleagues would walk the detective-in-training through many of the elements of the job, similar to a *formal mentoring* partnership. He talked about how they assisted in learning how to operate the camera, how to collect and process fingerprints, and other practical work. This allowed Jackson to start the course with experiences in BCI techniques.

Jackson perceived his skill stage during the course went from *advanced beginner* to *competency* in BCI techniques and after the course completion, he fell between *competent* to *proficient* on The Model. He stated his previous experiences with detectives from his agency and the classroom instructions as reasons for his developed skill. He stated at the end of the course that he felt competent. "Where I would go out to scenes by myself, and I could...I could comfortably, um, process a scene, you know, competently." He further discussed that "I would add that I feel proficient in handling most crime scenes that I respond or am called out to."

However, six months after the completion of the course Jackson felt his skill was still between *competent* and *proficient* on The Model. For example, Jackson stated at scenes he can decide what is and is not important (competent) and he has "a better understanding of, I guess, the bigger picture" (proficient) as described in The Model. Jackson stated he now realized when he is at a crime scene there are more items of evidence than the obvious. Jackson felt he has added to his skill though he previously

thought he processed evidence well. Now, he stated even though he could previously process a scene, now “I’m, I’m thinking of other ways where I might be able to have a better chance of, of catching the suspect.” This matches The Models characteristic for proficiency, where rules are replaced with situational intuition.

Jackson feels he had the support of the other detectives in his unit. When working a crime scene that is unfamiliar to him, he stated, “in terms of a lot of the guys have previous detective and BCI experience, and they know what they’re doing. So, it’s easier for me as a detective to go to a scene when if, God forbid, there’s something that I’m not comfortable with or I’m not sure of, I know I can ask that lieutenant or sergeant because I’m sure he’s dealt with that situation before.” Furthermore, Jackson feels his organization is supportive. Jackson thought his department was supportive of additional training to improve skill because “we’re, we’re big enough where we can, you know, afford to go to trainings, and they offer us, uh, pretty much-- it’s not like we’re competing with a ton of people to go.”

Jackson, in addition to his *colleague’s and organizational support*, has sought support from members of the laboratory where he submits his evidence. He stated when submitting latent finger prints the analyst will suggest ways to help support him in his skill. For example, “when they have something that they hit on, or when they have something that they don’t hit on, I talk to them, and they explain, ‘Hey, you, know, this is probably why,’ or this is why they were able to get someone or why they weren’t able to get somebody.”

Jackson spends time reflecting and improving his critical skills in his practice. Jackson stated, “but if I’d found, maybe, um-- or if I had looked a little differently, in

terms of finding evidence to tie them to that scene-- uh, I probably would've done that differently.” Also, Jackson now could make decisions on what is and what is not important when collecting evidence. “I think I'm more likely to look at, especially with print evidence, more likely not to submit stuff if I-- I'll get a good-- I'll do a closer examination of it and say, ‘Yeah. I don't think, you know, this is worth submitting.’ It's not worth, you know, our time and the crime lab's time to submit something that's probably not gonna come back with anything.” Jackson experienced a mentoring partnership, reviewing his BCI course material, and membership in a CoP as ways he improved his skill development.

The vignettes answered research question one and two, how do law enforcement officers describe their skill level on The Model immediately and six months after the completion of the BCI course. The path to skill development for each was different, though. For example, dedicated BCI units mainly focus on forensic evidence without other investigative duties and are usually from larger departments. This was the case for the three of the four dedicated BCI units, they were from larger municipalities and had the resources and equipment larger agencies usually have, as previously reported (Cordner & Gordon, 2011; Koper, Maguire, Moore, & Huffer, 2001). Whereas, the fourth participant was from a smaller community with a quasi-dedicated BCI unit who had to do double duty as a BCI investigator and patrol officer, when needed. Overall, each participant had different variables in their quest to improve their crime scene investigative skill development.

Research question three, four and five were initially answered in the individual vignettes but are more fully examined in the following cross-case data analysis. The

cross-case analysis allows for themes to emerge to help conceptualize the data from the cases (Merriam, 1998). This helps diverse case studies come together under a common conceptual framework for cumulative findings (Merriam, 1998).

Cross-Case Analysis

Coding and recoding the data during analysis helped the researcher understand how possibly divergent participants are inter-connected, through the development of a conceptual framework. Selective codes revealed from refining and defining the codes were support, experience, reflection, and motivation. Each of the constructs emerged as the foremost themes and concepts for transfer of training and improved skill development by the participants during the data collection. To explicate each theme, they are presented through a cross-case analysis of the data using the dialogue of the participants.

Support

All of the participants expressed they had a support system in place. The support system the participants experienced answered research question three, what do the participants attribute to their change in skill development. Supports varied from peer support, formal and informal mentoring partnerships, communities of practice, and organizational supports.

Several participants had colleagues who had previously attended the BCI course and had a higher level of skill than they had. The experienced and trained officers, more knowledgeable others (MKO), were an asset to helping the participants improve their skill. The relationships exhibited the elements of membership to a community of practice or a mentoring partnership. However, not all participants had the opportunity to

tap into a more skilled officer's knowledge. Therefore, they relied on peers, others who have had the same lived experiences.

Additionally, perceived supports from their organizational leadership ranged from funding for up-to-date equipment to additional training opportunities.

Organizational support helped to answer question five: what do the participants attribute their ability to use their BCI skill six months after the course concluded? The following section is separated into three sections: peer support, support from more knowledgeable others, and organizational support.

Peer Support. Peer support is defined as people who have similar lived experiences. Therefore, they can better relate and offer authentic empathy and validation to one another (Mead & MacNeil, 2006). Grossman and Salas (2011) found peer support assisted in positive transfer climate. The sharing of ideas is an effective way to critically think and problem-solve issues that arise through discourse with peers while helping to improve skill development (Allen, Rhind, & Koshy, 2015). The participants appeared to value the comments, suggestions, and assistance from their supports, including similarly skilled peers. LEOs who work in BCI must be able to problem-solve while out in the field and back at their agency when processing evidence. When the LEO talks about crime scenes with others, for different perspectives, it helps the officer problem-solve for future crime scenes.

Peer support was especially important to the participants who did not have shift support. Shift support is when the participant works, during their shift, with other currently trained BCI officers, rather than formerly trained officers who are not up-to-date with their BCI skills. For example, Mark works third shift as the only BCI officer

who is current in his skills. Mark preferred not to wake-up officers who are current in the BCI skills and ask for assistance during his shift. His agency has officers on all shifts who formerly took the BCI course, but their skills were not up-to-date. However, Mark attributed his improved skill development (advanced beginner to competent) to the formerly trained BCI officers he worked with. He stated, “when I first got out of this class, I relied heavily on the, uh, people who had taken ...the BCI school beforehand. And now, the role is kind of reversed where I'm the most senior guy with this knowledge and, and, you know, giving that, uh, to the other people on my shift.” The need to reach out to a peer, others with the same lived experiences as him, was helpful. However, Mark did mention, if necessary, he would reach out to BCI classmates who also work third shift, if needed, so as not to disturb a BCI officer from his agency.

Steve, the officer who continued as a patrol officer for five months after the end of the course and did not use his skills during that time, instead observed BCI officers while working. Steve perceived his skill as stationary (competent) between the two time points. To keep his skill level from declining, Steve used a peer as support. Steve has a colleague who he is friendly with, and when he observed and assisted as a patrol officer at crime scenes, he felt comfortable giving his opinion. He stated he felt the friend could have conducted a task differently. Steve said to his colleague and friend "You should, you should probably do this," when the colleague was processing a crime scene, “and he was fine with it.” He also said his friend understood he wanted to be helpful and respected his comments.

You know, he knew I just got out of school and he'd be the first one to tell you that he hasn't done, you know, this type of processing since the school. As far as

the pictures, I mean, that's something he was doing. I wouldn't necessarily, you know, take them the way he did, but I'm not going to-- I wasn't going to correct him on that. But the process, yeah, I gave him a hand. (Steve)

Support of More Experienced Colleagues. Support from a more experienced colleague may be through mentorship (one other colleague) or a community of practice (several other colleagues) in a domain. Learning in a mentoring relationship and a community of practice may be formal or informal. Purposeful ongoing mentorship, informal for many of the participants and formal for a few, used a more knowledgeable other to help the participant reflect on their practice and scaffold when needed (Peno & Silva Mangiante, 2012; Schön, 1983, 1987; Vygotsky, 1978). Many of the participants stated they frequently worked alongside one or two skilled colleagues at crime scenes or back at their agency processing evidence. For example, techniques to reveal a fingerprint on a piece of evidence (i.e. a beer bottle) may be conducted through several techniques. The participant may be comfortable with one technique and would need encouragement to use another. This was an informal discussion between colleagues assisting one another to improve the newcomer's skills. Whereas, communities of practice are groups of people who engage in a "process of collective learning in a shared domain of human endeavor" (Wenger, 2011, p. 1). A community of practice (CoP) is a group of people, known to one another, who participate in an activity from one domain, each with varying levels of skill (Wenger, 2011). A community consists of members who build relationships in which to learn from one another. The individuals practice their skills through shared experiences, tools, stories, and systems to address repeated problems (Wenger, 2001). The relationships formed between the new BCI learner and the more

skilled and knowledgeable peers help the new learner gain skill in BCI by sharing and interacting regularly. This relationship, with MKOs, formal and informal, assisted the participants in transferring skills learned in the classroom to their practice.

The role of MKOs help bolster the learner's development and provide support for the learner to improve skill through scaffolding and transfer to practice (Vygotsky, 1978). Lave and Wenger (2006) relate scaffolding, supports for initial performance, and its relationship to Vygotsky's (1978) zone of proximal development as a dimension of societal practice. Learning involves the relationships in social communities where activities, tasks, functions, and understandings occur as part of a broader system of relationships (Lave and Wenger, 2006). Legitimate peripheral participation (LPP) is based on the relationship between the production of participants' identity and the changing communities of practice. The members of a community have different interests, different levels of commitment, and different levels of skill.

Additionally, the engagement of social activities acts as a foundation for higher-level cognitive functions (Vygotsky, 1978). Lave and Wenger (2006) call this evolving learning process as a condition of membership (Lave & Wenger, 2006). The study participants who found support from an MKO came from three variants of support. Some participants found support through formal or informal MKO mentors and others through an association within a community of practice.

Rocky, a newcomer, is an example of an individual who interacts with other BCI colleagues within his agency, old-timers in a CoP. Rocky appreciates each of the unit member's talents, experience, and knowledge. Rocky believed his skill improved from competent to proficient during the six months following the course completion for

positive training transfer outcomes. He uses all the individuals in his unit to assist his skill development.

I mean, the knowledge of all the folks in the unit, right? Because now it's not just me, so I can say, "Okay, I have-- this is here, and this is here. How do I piece these two things together?" And somebody that's been there 15 years can say, "Oh yeah. I've seen that before." Uh, so that's huge. (Rocky)

Rocky's supervisors also supported him through a formal mentoring partnership which included coaching, reflection, and fading, through practice crime scenes, evaluation of his work, and frequent conversations among the BCI Unit to help develop his skill. He said he and his supervisor would sit down following a case he had processed and discussed how things went. Rocky had a positive experience with his supervisor, a formal mentoring partnership, during conversations about his practice.

Alright. Let's sit down. Let's review your photos. And he's like, "what happened here?" and I'm like "Uh, this is what I did, and this was my thought process and the reason I settled for this because of this." He's like, "Okay but now knowing next time you have a similar situation what would you do? (Rocky)

The process Rocky's agency uses, formal purposeful mentoring and a CoP environment, successfully assisted him in transferring his training to his practice.

John also relates his experience and the support he has received from his dedicated BCI Unit as improving his skill (advanced beginner to competent) in BCI. John states that the "more repetitions going to these crime scenes, to make sure that nothing was missed" made him a better investigator. Even though several of John's colleagues in his BCI unit have informally mentored him, he respects one individual in particular who

has assisted him in his skill development. John especially admires this MKO and his work ethic. He said:

He has the same methodological approach to every crime scene. So, to have that asset there on scene with you, it's actually a blessing because you don't, (he) doesn't get upset, doesn't get overworked, or no anxiety. Everything flows when you have some of that kind of experience on the scene. And, you learn from it. (John)

John also thinks his whole BCI unit works well with one another, relying on each other, newcomers and old-timers in a CoP.

I have watched people that have far more experience than I do. And, we come together, and we speak about things. And, then someone with far more experience than I have, I will point something out, and they said, "You know, you're right. Let's take that as evidence. Or, let's check that evidence. Let's go in more depth on that." And I have also had the same thing said to me. "Hey, maybe we should go to this area and take that piece of evidence." Which I can say without any, any problem is that it, it, it helped solve the case, or I might have overlooked it at this time in my career. (John)

Kate has a slightly different experience than the other participants. She believes her skill on The Model went from competent to proficient. She is a member of an informal mentoring partnership and community of practice. Her supports are made from the BCI officers from other agencies she works with when processing crime scenes and her colleagues in her agency who she works with daily. She attributes her improved skill development to "the application of what I learned and, predominantly, working with

more experienced BCI detectives either on the local police department or with my own colleagues.” When working with BCI detectives from other agencies she stated, “it was extremely helpful to me though having the experienced BCI detective because he sort of reigned me in a little bit” and the help she received while “working with the BCI detective he was explaining” how to process the scene. Kate, the least job-related experienced participant, has higher education degrees in forensic science but lacks experience on-the-job. Therefore, the help the local BCI detectives she works with “for the most part, are great, you know, and are willing to talk me through things or let me help with them which give me that opportunity which gives me the practice leading towards more confidence.” The support she received helped her transfer what she learned in the course to her practice.

However, some participants experienced an informal mentoring process with one MKO. The relationships do not appear to be a formal mentoring partnership with intentional support, but rather discussions between colleagues where one has more skill and experience than the other. Alex did not use her skill during the six months after the course ended as expected. Alex reported her skill was still at the competent stage of The Model. During the six months, her perceived skill level declined so she needed the help of an MKO to bring her skills back to here they had currently been. Alex stated:

The BCI detective is very helpful. Because he understands I haven’t been exposed to a lot of this stuff, so he always answers all my questions. He’s knowledgeable, he’s nice. And, he’s always very helpful. So, that’s been a positive experience working with him. (Alex)

Organizational support. The organizational support participants experienced helped to answer research question five, what do the participants attribute their ability to use their skills. Organizational supports ranged from supports such as funding for supplies and training and the detective-in-training program available to two participants. Having the tools and funds available was important to the participants. Sam's skill improved *during* the BCI course from advanced beginner to proficient by the end of the course. After the course was completed, he felt he was still proficient. He attributes his skill development to his agencies commitment to funding the officers properly.

Our departments very different from other departments. Um, our department provides us with any training, any equipment, anything that we need to, to make our jobs better. I started BCI, just as a quick example, I started BCI School. We had a D300 camera, and it was the camera that every on-call detective would use for that...for any crime scene that they went to. Since BCI School, they've purchased D500 cameras for all three of the BCI detectives in there. So, anything that we say that we need, and if we can document the need for it, our department will buy it for us to make sure that we're adequately prepared to go to a crime scene. (Sam)

Jackson felt his department was large enough which afforded him the ability to go to training. Even though his skill stayed stationary at competent, he was appreciative to his organization's commitment to training. He said, "We're big enough where we can, you know, afford to go to trainings, and they offer us "additional training to improve their skills."

Lack of organizational support, in this instance the lack of the agency having dedicated BCI Unit, had a negative impact. The LEOs who were not from dedicated units are required to conduct additional duties during a crime scene investigation and may have organizational policies that impede their skill growth. Cornell et al. (2011) reported that barriers to critical thinking might result when learners in one domain are also learners in another. For example, The LEOs who conduct all the duties during an investigation, as compared to the LEOs who only handle forensic evidence, may not reach expertise in BCI skills. These officers must be skilled in several domains, therefore, they may have barriers in reaching expertise in BCI skill development and transferring training to practice.

Two participants, Rocky and Sam, out of the four officers who perceived they were proficient after six months in the field were from dedicated BCI units. The other two officers who perceived their skill stage as proficient, Kate and Jackson, had more than one support to aid them in their skill development. Kate had previous forensic experience before attending the course, and a robust mentoring relationship, and a CoP. Jackson had strong organizational support in the detective-in-training program, a mentoring partnership, and membership in a CoP. These participants appeared to be able to overcome barriers to skill development in the field by the robust support systems they each experienced.

Even though all the participants attributed changes in their skill stage from supports on the job, the levels of support varied. The three participants from fully dedicated BCI Units, Rocky, John, and Sam, each appear to have experienced higher levels of support than the other participants. They each spoke about how they worked

together and discussed scenes, individually and as a group, afterward. Each felt supported by their organization and the colleagues within their unit, their community of practice.

Mark, Steve, and Tom found support with peers who had a similar skill level to them rather than more experienced BCI colleagues. Whereas, Alex, Jackson, and Max found support through informal mentoring from one or two colleagues. The exception is Kate, who has a community of practice within her agency, but also works with MKO's from other agencies when she processes a crime scene in their community.

Even though the participants expressed that the supports received improved their skill development, their experiences on-the-job is what most of them thought was the factor in maintaining and transferring their knowledge of BCI techniques and duties to the job. Experience is defined as experience in a domain; the officers who attend and conduct criminal investigations where they collect and process forensic evidence.

Experience

Experience-based learning is effective because it helps establish lasting behaviors. Learners do not simply gain a new skill; rather they develop new habits and behaviors. David Kolb's (1984) research examines how mastering expertise is a continuous process of experience, reflection, conceptualization, and experimentation. The experiential model is a framework which examines and strengthens critical links between education, work, and personal development (Kolb, 1984). Research question four, how the participants describe their use of crime scene investigative skills, was uncovered in their discussion about their experiences at crime scenes. The research question was initially answered in

the vignettes when the participant talked about their experience at a challenging crime scene and then again when they discussed their reflective practices.

Each participant, other than Kate, had experience on the job as a patrol officer before they became a BCI officer. Experience ranged from four to seventeen years. At the time of the interview, they all had no more than two years working with forensic evidence collection and processing, except for Kate who had a total of three years of experience collecting and processing forensic evidence at a crime scene. However, the participants from dedicated BCI Units (Rocky, John, and Sam) and Kate had the most BCI on-the-job experience. The supports they discussed and their immediate and continual use of the BCI skills helped them transfer, and grow their skill, from what was learned in the class to their practice. As in Baldwin and Ford's (1988) transfer of training model, using the skills learned in the course, immediately and continually, greatly assist learning and retention. However, related experience may have also assisted the participants in developing skill and transferring it to practice.

John and Sam had the most related experience in law enforcement with seventeen years. At their interview, they both understood how important experiences and learning from them for future reference was to their development of skill. Lim and Morris (2006) included years of related experience as a construct to trainee characteristics in their model and John and Sam perceived their many years as an officer on-the-job assisted them in their skill development. However, this was not always the case. Rocky has only seven years working as a law enforcement officer but perceived his skill stage as proficient and successfully transferred his classroom instruction to his practice. However, an in-depth look at how years of related experience and how it influences learning and retention was

not fully developed in this study. The participant's discussions on how they perceived experience related to their skill development follows.

John understood that one domain was different from another. For example, he spoke about how long it took him as a patrol officer to feel comfortable on the job. John believed experience on-the-job would aid in him to further develop and improve his BCI skills. John added, his department is busy which will add to the experiences he needs in his new domain.

I think it's just overall experience because we, we are-- we do have a lot of crime scenes in the city I'm in. It's, uh, it's very busy. It's very tedious work. And, you have to be very careful what you do. (John)

Sam, also a long-time officer, believed his previous experience in conducting crime scenes was beneficial in improving and transferring his current skill in crime scene collection and processing. "Actually, doing crime scenes. Um, practical experience, I would say was the biggest thing that, that, uh, moved me" in his skill development.

Rocky had less time on-the-job as than the other two but has had a lot of experience going to crime scenes with forensic evidence due to the size of his agency since the conclusion of the course.

The most helpful, uh, I have to say, hands-on experience alone, uh, and I think that just happens is because there's so few of us and there's so many cases that you're-- whether you want to or not, you're going to them very regularly. And so if I had to go, like I said, if I had to go a year before seeing another similar case, that would-- that would hinder me. It would take forever to gain, you know, uh, comfort and experience in processing things, but when you're doing this pretty

much on a daily basis, um, and more often than not you are by yourself because let's face it. I mean, money is always an issue. (Rocky)

Jackson attributes his experience going to crime scenes as the factor that makes him proficient.

I think just the more-- the more time you have on, the more scenes you go to, um-- again, we're, we're not, you know, I guess, balls to the wall all the time, but we're busy enough that you don't lose your, your skills. So we can practice our skills on a regular basis, even if it's just patrol saying, "Hey, I, you know, I got this from a B&E and that we didn't call you guys out for because there's not much to it, but can you process this?" or, "Can you process that?" And maybe something that would've taken me, a year or so ago, a while to do, I can do it relatively quickly. Um, and then move forward from there. So, I, I think-- I guess, to answer your question, just time on and, and the more you do something, the better you're gonna be at it. (Jackson)

Conversely, Alex and Steve were not given the opportunity to process crime scenes for several months after the conclusion of the course. Baldwin and Ford (1988) stated that learners need early opportunities to apply what they have learned in the course for training outputs to be positive. Steve and Alex did not gain in BCI skill during the six months after the course. Additionally, Alex believed she lost some skill because she was unable to transfer what was learned but recovered her skills by the time she was interviewed. Alex had the expectation when she left the BCI course she would be conducting crime scene investigations shortly afterward but instead had a lag between the end of the BCI course and the start of her on-call duties in BCI. She felt her skill

diminished immediately after the end of the course because she was unable to transfer what was learned to her practice.

I feel my skills in photography decreased. I forgot certain settings for close-up or just general familiarity with the camera. I wasn't as confident. When I went to that first scene and when I picked up the camera, I realized I wasn't as confident as when I left class. And, that was just because of, you know, a perishable skill, not using it for a few months. And I blame myself (be)cause I didn't take the initiative to re-familiarize myself and stay on top of it in between that time. (Alex)

Alex had to use her time wisely and used “the experience, um, watching other BCI personnel when they go out to a call, watching what they do, continuously reading more reports, taking more initiative of myself to make sure that I'm brushing up and staying polished on skills” as a means to improve her diminished skills to her current level.

Steve also used the five months he was not conducting crime scenes to observe others work and reviewing his course notes. He attempted to keep his skills level by reflecting on how his colleagues conducted crime scenes, asking himself if he would do things differently, and reviewing his course notes.

I do have...a folder, um, as far as processing. You know, techniques, um, steps of how to do certain things. So I, I do have that which I would take out and look at, you know, if I'm in the station about to process something, well, why not? Got all the steps right there. I'm going to take it out and look at it. (Steve)

The participants found supports (peers, more knowledgeable others, and organizational) and experience, related experience and domain experience, as factors they

all believed aided (or would have aided) their skill development. Six participants thought their skill improved overall six months after the conclusion of the course and four participants perceived their overall skill stayed stationary. Peer and supervisory support and follow-up training assist in the positive transfer of skill development (Grossman & Salas, 2011). However, a short period between using skills developed during training and then using them on the job assist in the positive transfer of training (Baldwin & Ford, 1988). Steve, Alex, and Max had less chance to use their skill than the other participants, for various reasons, and perceived their skill did not develop as expected, mainly due to the lack of opportunity. The literature on transfer training corroborates that learning and retention may be accomplished without ongoing opportunities to use the skill. However, skill may not improve without continual opportunities to use it (Baldwin & Ford, 1988).

When opportunities to use learned skills are immediately following or close to the conclusion of the course, learning and retention, are enhanced (Baldwin & Ford, 1988). Rocky, Sam, Kate, and John have had significant BCI crime scene experiences since leaving the course and each perceived their skill was at the proficiency stage on The Model after six months. The participants who felt they had a good support system and continual use of their skill perceived the skills learned in the course transferred and continued to improve in their practice. Reflection and motivation were additional constructs that aided training transfer. However, there are differences in how LEOs reflected on their practice and what or who motivated them to improve their skill, compared to the current literature.

Reflection

How the participants reflect on their practice help to answer research question four, how do the participants describe their use of crime scene investigation skills after the completion of the BCI course? The law enforcement literature reviewed found training usually involved reflection-on-action rather than reflection-in-action. The example of the FTO officer sitting in the squad car with the new officer after a call and reviewing what happened at a scene was the previous example of reflection-on-action. According to the literature, the nature of LE is fast-paced, therefore, limiting reflection while in-action (Tyler & McKenzie, 2014). However, Schön (1983, 1987) reported officers must “think on their feet” which is unconscious reflection-in-action. The participants studied added a different dimension to reflection literature. Several of the participants, when attending to a crime scene stated that before collection or processing a scene they reflected, but rather than in-action or on-action, the participants reflected-before-action. Reflection-before-action and beyond-action are two new dimensions of the reflection framework, as cited in the literature (Boud, 2010). Reflection-before-action is the process of continued reflection upon earlier experiences to add to and transform them into deeper understandings (Boud, 2010). Reflection-beyond-action is the telling of stories after the fact (Boud, 2010; Edwards, 2017). Edwards (2017) states when students tell stories, they are interpreting, and reinterpreting, what they have experienced. Reflection-beyond-action was not examined for this study; however, reflection-before-action did come up in the interviews.

Reflection-before-action. The participants used the crime scene notes during the interview to describe and explain the processes they used when they attended a crime

scene. They discussed the need to take a step back, think things through, think about what they were taught in the course and developed further in their practice, think about prior crime scenes they processed, and what steps they needed to take to process the current crime scene. Reflection-before-action was mainly conducted by the officers when they were on their way to a crime scene, before arriving. They went through a mental list in their head: what do I need to do first, what was I taught in class, have I gone to a similar scene before?

I think class definitely sets you up to think before you even go. Um, you kind of know when something comes in whether it's a, you know, a breaking and entering or a felony assault. What to look for kind of when you're even arriving on scene. Before you even get out of the car, you're thinking of kind of the steps you're going to take. Um, it definitely slows, slows you down as far as you don't have that sense of urgency to just do something. (Max)

Reflection-in-action. Reflection-in-action, defined as when “spontaneous, intuitive performance of the actions of everyday life” demonstrates to the individual as being knowledgeable, in a special way (Schön, 1983, p. 49). Previous research on LEOs reported that reflection-in-action was not a usual process due to the fast-paced nature of police who are usually the first responders to a crime scene. However, the participants in this study could reflect-in-action, since the crime had already been committed and they were there to collect and process the scene, without a sense of urgency. Rocky discussed how he reflects when he starts processing a scene.

So, I think, typically, I make sure I have everything that's available to me because you never know if you will or won't need it. Um, and then, as I get there, my first

thought is, "Okay. Grab, ah, a notepad and pen and just walk through." Ah, see who has been there, who hasn't, what's been touched, what hasn't. Um, just the whole layout of the scene. Um, and I think that holds true for, for any scene. Let me see what I'm dealing with first, where things are. What do I need immediately? Ah, your course of action, I think, ah, differs based on, is it evidence that's, that's, has the potential to, you know, degrade quickly or will it be there? Is it okay if I take 18 hours to do this, or do I need to get this done in an hour and-- so things like that? Um, and I think that I, I'm capable now, of, of going into any scene, really. And, obviously, a helping hand is always welcome, but, you know, I'm, I'm confident that I could, ah, go into a scene, figure out what I need to do in what order, do it, and then-- and then reassess and say, "Okay. Did I miss anything?" And, so maybe it's not always flawless in terms of continuity of, what do I do first, second, and third? But, you try to do that. (Rocky)

Sam stated originally, he had to think while attending to a scene, using a mental checklist. However, after six months it became more intuitive and he feels confident in his skills.

Photographing the scene. I have to photograph the scene. I have to search for evidence. And, it was more just like a table that I was following. Where, now, going to crime scenes-- or at that point going to crime scenes, it was like, "Okay. This is the overall picture of what I have to do. I know what I have to do, and I can do the skills." (Sam)

The intuitiveness needed to reflect-in-action relates to the proficient and expert stages on The Model. The Model states a proficient individual may be able to replace

rules with situational intuition (Dreyfus & Dreyfus, 1980). Both, Rocky and Sam believed their skill was proficient at the end of the course. Though this study was not to corroborate that the participant's perceived stage on The Model was accurate, however, their actions did confirm their perceived stage of skill in BCI is what they perceived themselves to be.

In addition, Max used reflection-in-action during a late evening crime scene. Max believed when he initially left the course, he was bordering on the proficiency stage but after six months, with few crime scenes with forensic evidence attended, he stabilized at the competent stage. However, Max's intuitive actions are a characteristic of a proficient individual on The Model

It was nighttime, um, pushing midnight. Pretty horrific stabbing scene. Um, and there was blood. There was a trail of blood from the house to the street. I began photographing that. Um, meanwhile there's detectives that are taking ...witnesses in for statements. So, I'm out on the scene by myself at that point with patrol, with ...with the scene sectioned off. And, I had a feeling like the weather was changing a little bit. So, I checked my phone, and sure enough it was about to start down-pouring. So, knowing that the rain was coming, I didn't want to lose any of that blood on the sidewalk. Rather than go to the house which, of course, we didn't obtain the search warrant yet...I just swabbed blood on the sidewalk before we lost it to the rain. We didn't have anything to cover it with. Um, but of course, you know, the BCI thinking says, okay, what's next? So how do you-- before I would just say, "Oh, no, it's raining. What do we do?" So, we collected that. I collected that swab, and we just, you know submitted it for evidence. (Max)

Reflection-on-action. Some participants reviewed their crime scenes after the fact. Both Sam and Rocky would have discussions with other members of their CoP to reflect on their practice and see if processes could be done differently. Other participants reflected on their actions at a crime scene, internally, trying to decide if they would have done something different. Max took lessons learned from the BCI course and transferred the technique to his practice when attempting to process a scene which challenged his thinking.

Because I remember especially in BCI school taking a step back, thinking to yourself, how would I-- what makes the most sense for somebody to either get into there, or how did that fall over, or how did that item get from across the room to over here. So, I think just kind of sitting back and looking at it after I processed it and saying, "It wouldn't never make sense for somebody to put their hand in that spot to get into this window, which was cracked open because it was a warm day." It just wouldn't do it. It wouldn't make sense. It didn't add up. (Max)

The participants reflected on crime scenes and activities related to the scenes, which in turn motivated them to improve their skill. For example, after a participant reflected on what transpired at a crime scene, they were motivated to do better at future crime scenes, look better to their supervisors, and to feel better about their accomplishments and skills. After the participants reflected on their practice, they were motivated to do better at the next crime scene.

Motivation

All the participants stated they were motivated to improve their skill, though the motivating factor was different for many of the participants. For example, two

participants perceived how their actions affected others and the outcome of their investigations. The participant's responses are what Argyris and Schön (1974) found when individuals "maximize internal commitment" to the decisions they make (p. 89). Additionally, when individuals feel responsible for their actions, they become intrinsically satisfied which improves their psychological success and ultimately increases their areas of experience (Argyris & Schön, 1974).

You're talking about-- you're talking about changing somebody's life, potentially, for better or terribly worse. And so, you have that weighing on your shoulders. My mental challenges come in, because I start to think about, um, one, this is a young person I'm talking about. And so, if they get convicted of this, their life is going to be infinitely more difficult. (Rocky)

The officers felt a responsibility in solving the case and took ownership of the outcome. Mark completed a scene and felt that his skills did not meet his expectations. He said, "It's my decision. It's my case, so it should've been better." Tom had similar feelings of responsibility. He stated, "Those investigations are my investigations. So, whether someone influences it or not, the outcome is my outcome."

Participants paid close attention to how errors occurred and what they needed to correct their action in the future. As discussed in chapter one, improving skills only through trial and error, particularly in law enforcement, may not be effective (Doyle, 2012; Yule et al., 2006). However, the participants did learn by error, which turned out to be a significant motivating factor. Learning from error resulted from the participants making an error or someone else made an error.

Tom had a unique problem. Tom let a seemingly small act motivate him to do things differently in the future. As discussed in his vignette, when another agency member asked Tom to do something, he did so without follow through. Tom found out the hard way when he was asked to place evidence, a DVD, in a crime scene folder, which in hindsight he should have reviewed ahead of time. When discussing the evidence in court, he realized blindly following instructions from a colleague affected his credibility at court. The defense attorney asked him what was in the evidence and his reply was:

And I said, 'I can't tell you that. I was instructed to put it straight into evidence, which is what I did.' So, he was like, 'You took a piece of evidence. You did not review it, and you just placed it in evidence.' So, at that moment, in front of a courtroom, I knew that that was something that I needed to make sure I do the next time. (Tom)

Steve's agency has a new vehicle where all the forensic equipment was stored to assist the BCI detectives at a crime scene. Quickly, the detectives realized that not all equipment should be stored in this manner. While at a crime scene, the forensic camera did not operate properly. Steve said when at the scene "we ran into an issue with the camera. It was left in, uh, the new, uh-- the new BCI vehicle overnight and it kept fogging up, so the pictures were taken with just a normal, normal camera." He quickly learned that certain pieces of equipment needed to be stored properly for optimal crime scene evidence performance. Sometimes the mistakes made were not their mistakes, but they understood if the crime scene "belonged" to them, the errors made were a reflection on their skill.

Lastly, another motivating factor was competition. Participants wanted to do well for two reasons: self-perception, how they perceive themselves and meta-perception, how others perceive them. Jackson perceives he is a better officer when he takes advantage of training opportunities to better himself.

If I had an opportunity to do something, I'm gonna take it. If-- you know, if I can go to a training, I'm gonna go to it, whether I want to go to it or not. But if, if somebody offers you a training, the more trainings you have and certifications you have, it's 100% better for you, especially in this line-- you know, in this career. (Jackson)

Mark believes he was asked to attend the BCI course because he believed his agencies leaders liked his work ethic. He stated, "I was approached by a supervisor. Um, actually, so just through my - I don't know - my, my work ethic" to take the BCI course. Therefore, he strives to meet their expectations and not let them down for their decision to approach him. Tom reflects-on-action for most of his cases, which, in turn, motivates him to do better. He strives to be better at crime scene processing and uses case review and his actions to better his skills. He also wants to be a better BCI Investigator for his agency making him a more "valuable tool."

So, if I find a fault in something that I'm doing, I like to correct it. And, basically, I'd just rather be better than anybody else. So, if I can make myself better at, um, crime scene processing, that'll make me more of a valuable tool. So, I guess, it's organizational and personal motivation. I'll be more valuable in my small unit, and it'll probably make my work environment better, along with me being, um, utilized more for more important things. (Tom).

Chapter Summary

During the six months following the BCI course, LEOs used contextual factors and strategies to transfer what was learned to their practice and improve their skill. The participants who had a strong support system in place (peers, mentorship, or a community of practice) and were able to immediately use their newly acquired skills back on the job, experienced a perceived stage of skill greater than some of the other participants. Chan et al. (2003) reported the concepts of socialization (as supports) and reflection aided the learner's abilities. The interactions the participants experienced, shared stories and discussions with others, helped transfer their training and improve their skills in BCI. The participants believed support and immediate use of their new skills on the job allowed them to transfer their BCI coursework to their practice and further improve their skill development.

The participants who did not have as high a support system relied on other ways to transfer skills learned with the hope of improving their skill. Primarily the participants would reflect on their practice: before-practice, in-practice, and on-practice and make changes accordingly. Reflection allowed the participant to think about current and past experiences in crime scene processing, and think about how they could improve their skill in the future. Reflection was a means that helped to motivate the participants to improve their skills through transferring what was learned.

Reflection revealed other processes that motivated participants; self-perception, meta-perception, internal commitment to the job, and learning from error. A common theme among the participants was feeling proud of what they accomplished. They wanted to feel they did the best they could (self-perception), they wanted their agency leadership

to value their input and skill (meta-perception), and they wanted their actions to be a fair and accurate representation of the crime scene (internal commitment). No one wanted to make a mistake in his or her practice and negatively or erroneously impact the lives of the victim or suspect. The constructs were all found to be supports which aided the BCI officers in their skill development.

Chapter Five: Summary, Conclusions, Implications, and Recommendations for Future Research

This purpose of this study was to determine which factors assisted LEOs in transferring what was learned to their practice and improve his or her skill development when attending a crime scene where forensic evidence is collected and processed. The study was conducted with participants who had recently left a course in BCI techniques. This chapter includes the summary, conclusions, implications, and recommendations for future research.

Summary of the Study

How skill develops in the workplace has been studied for many professions (Benner, 2004; Berliner, 2004; Peno & Silva Mangiante, 2013). However, there was limited research that examined the transfer of training in law enforcement officers and virtually no research on how LEOs with BCI duties improve and transfer skills learned in a course in BCI. The Model (1980) and the Baldwin and Ford (1988) transfer of training process model were the two primary theoretical frames used as a guide to this study.

The Model (1980, 1986) was used as an anchor to help answer two research questions and as a means for further development of processes to improved skill development during the interviews. The development of skill may be defined as the growth of a worker's skill, in a particular domain, throughout their career (Dreyfus & Dreyfus, 1986). The Baldwin and Ford (1998) transfer of training process model was used to help answer the remaining research questions by extrapolating supports that influenced the transfer of training. Transfer of training is defined as the ability of a learner through formal and informal training, to successfully apply the behavior,

knowledge, and skills they acquired in a learning event, to their practice (Baldwin & Ford, 1988). The need for skilled LEOs in BCI is well established. However, the tools and constructs LEOs use to transfer what is learned in a course in BCI techniques has not been documented.

The study design was a qualitative multiple-case design with ten participants, from ten different agencies who attended a two-semester course at a New England State Crime Laboratory. The interviews and document data were coded using an open coding system that identified twenty-six initial codes. The data was further defined and refined through axial coding. The data was ultimately refined to yield four selective codes which aided the participants to transferring what was learned in a BCI course; support, experience, reflection, and motivation.

Therefore, the study, which used documents and semi-structured interviews to assist the researcher in answering the research questions concluded that there are several constructs that aid training transfer. The questions that guided the study and were answered through the data collection are:

- 1) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition immediately after the completion of the BCI course?
- 2) How do law enforcement officers describe their skill stage on the Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition six months after the completion of the BCI course?
- 3) What do officers attribute any change in their skill development during the six months after completion of the BCI course?

- 4) How do LEOs describe their use of crime scene investigation skills six months after the completion of the BCI course?
- 5) What do LEOs attribute their ability to use their crime scene investigation skills six months after the completion of the BCI course?

Conclusions

The conclusions that developed from the research study found that LEOs perceived skill in BCI benefitted from several constructs. The revealed constructs that aided the LEOs were support, experience, reflection, and motivation. However, the participants had varying levels of support (through peers and colleagues or within their organization), experience (related and in the field as a BCI officer), reflection (on their past practices, course instruction, and the work of others), and motivating factors that aided them in transferring their training to their practice.

The participants with the greatest supports, formal mentorship or a CoP, perceived they had the highest level of skill developed and transference of training to the workplace. The participants who did not have the same level of support had to seek less formal methods to advance their skills once on the job. These participants sought out at least one other colleague for engagement in an informal mentoring partnership and asked for assistance when issues, problems, and questions occurred in their practice. If the LEO did not have this type of support, whether formal or informal, the participant found their skill leveled at what they perceived it resided in when they left the course. They believed they transferred what they learned in their coursework but were unable to further improve their skill.

Moreover, the participants all believed that experience on the job, in their original domain of law enforcement, was the factor for transferring what was learned and further improving their skills in the new domain, an LEO who works in BCI. Several participants with less overall time as a law enforcement officer who perceived they had a high level of skill in BCI, attribute their ability to transfer what was learned in the course to their ongoing and continual crime scene experiences. Lim and Morris (2006) posited that related experience assists the learner. The findings revealed that years on-the-job as a police officer may be a catalyst in assisting transference of training but not was not further explored in this study.

Furthermore, the elements of training inputs, particularly, the trainee characteristics and work environment were found to be essentially important inputs in the learning and retention processes for LEOs who work in BCI. The four constructs found through selective coding helped aid the participant in transferring their training to their practice and furthering the development of their BCI skills: support, experience, reflection, and motivation. The constructs were each found to be valuable to the participant's transference of training and perceived BCI skill development, though the level of importance was participant dependent.

Implications

The findings from the study may have implications for law enforcement agencies, practitioners, policy makers, and researchers who are interested in the advancement of law enforcement strategies and theories in skill development and training transfer. The study's findings will help agencies improve clearance and conviction rates for crimes committed using established scientific evidence by officers who should continually

improve their skills in BCI. Therefore, the need for agency leaders to understand and put into place the tools and supports which aid BCI officers to transfer their training and further develop and improve their skills once the officer is working independently in BCI is essential.

The participants of the study indicated that supports, such as informal and formal mentoring and communities of practices, helped them use the skills gained in a BCI course and then positively transfer them to their practice. The Dreyfus and Dreyfus Five-Stage Model of Adult Skill Acquisition (1980, 1986) and the Baldwin and Ford Model of Transfer Process (1988), were used as the theoretical foundations for this study. The Dreyfus and Dreyfus (1980, 1986) model does not suggest how to encourage or assist the movement of learners through the levels of skill. However, this study supports Peno and Silva Mangiante's (2012) assertion that ongoing support, in the form of mentoring, will aid a trainee in movement along the skill model.

Furthermore, Baldwin and Ford (1988) do not assign either of the training inputs (training characteristics and work environment) as having more weight than the other in the training transfer process. However, this study found that some training inputs were more effective in assisting BCI officers in transferring their skills acquired in the BCI course to their practice. The workplace environment was the primary catalyst for transference of training to the participants practice. Support from colleagues and the organization plus the opportunity to use their BCI skills were the primary constructs for transferring training to their practice and further improving their skill. The participants in a formal mentoring relationship or members in a community of practice perceived to have transferred their training into their practice and believed they had a high level of

perceived skill using The Model as a guide. The findings support Hunter-Johnson and Closson's (2012) study on Bahamian law enforcement training strategies and the value of a supportive environment.

The participants who had less of a support system, and instead had to rely on their personal attributes, such as motivation, were able to transfer training and further develop their skill after the course ended, though they perceived their skill did not develop as far as the participants who had larger support systems. Also, the participants who only had an informal mentoring partnership without ongoing opportunities to use their skill perceived their skill level as static from the time they left the BCI course until they were interviewed, six months later.

The participants who had workplace and trainee supports in place, but did not have ongoing opportunities to use their skill, did not perceive they gained skill. However, even worse is the fact they felt they lost some of their skills. This is particularly important for smaller agencies. As previously discussed, large departments, usually in urban communities, are associated with higher crime rates, and therefore the LEOs may have more opportunity to use BCI skills (Glaeser & Sacerdote, 1999). Smaller agencies, many without dedicated BCI units, need to have LEO supports in place and give their workforce opportunities to use their skills for a higher level of learning and retention as much as any agency in the U.S.

First, the participants who experienced a workplace environment that nurtured their BCI skills perceived their skill stage on The Model to be high. They believed they transferred the skills learned in the course and were able to improve upon them. Therefore, law enforcement agencies should intentionally create a workplace setting

where individuals in BCI have the opportunity to share experiences, tools, stories, and systems to address repeated problems in the domain (Wenger, 2001). The workplace supports may be formal or informal mentoring or the opportunity to be in a community of practice. The supports help the learners discuss individual cases, equipment and tools used, and situations encountered so that their actions in their practice become intuitive and guided by experiences.

Second, the participants who had an opportunity to use their skills immediately following the completion of the course and continued to use them during the next six months perceived greater transference of training and improved skill development. Therefore, law enforcement agencies should provide new learners opportunities to use their BCI skills. The opportunities may be a manufactured setting. For example, one participant processed mock crime scenes before attending the course and found the opportunities beneficial to improving his BCI skills. So, regardless of the size of the agency, new BCI officers may continue to transfer their training and improve their skill, with and without real crime events.

Lastly, Broad and Newstrom's (1992) training partnership, the trainee, trainer, and manager, are important elements of an agencies training process. The training partnership trio, where each member is an important factor, assists the learner in transferring their newly acquired skills to their practice, the goal of training. For example, all the participants volunteered to attend the BCI course rather than attending involuntarily by applying to their administration to attend the course. Broad and Newstrom (1992) state one training strategy prior to attending a training program is for the trainee to be given the opportunity to actively explore training options.

In addition, the participants who could use their burgeoning skills while taking the course were able to participate in advanced activities, another Broad and Newstrom (1992) strategy. Several participants were assisting in crime scene investigations once they entered the training program, this allowed them to aid in transferring their training. Additionally, having the learner participate in training programs where the instructors have had the same lived experiences, added to the participants feeling that the mock crime scenes were authentic.

One last concluding consideration is how the findings may change the training process for the BCI course. Adding to the curriculum ways to encourage mentorship and peer support should be deliberated. The participants are placed in groups throughout both semesters, however, the students did not appear to utilize their course colleagues as peer support once they left the course. Building on the relationships made in the course may be a way to encourage students, especially those with limited support in their agency, to gain the similar benefits to developing skill and transferring it to their workplace that students with large support systems benefit from. This is particularly true for the students who do not expect to use their skill with any frequency once they have left the BCI course, these students would gain the most from a support system, regardless of how it is created.

Recommendations for Future Research

Based on the findings from this research, there are several recommendations for future research. The qualitative multiple-case case study allowed for an in-depth review of where the participants perceived where their skill resided six months following the completion of a course in BCI and what, if any, constructs assisted in their skill

development and training transfer. Lim and Morris (2006) reported trainee characteristics should include related experiences, however, related experiences, the years the officers had on-the-job, was a construct developed in this study. Several participants had extensive law enforcement experience, which may have assisted them in developing skill and transferring to their practice. The focus of this study was on the officers perceived skill stage after they left a BCI course, what helped them to transfer their training to their practice, and further develop and improve their skill. Therefore, further research that includes an in-depth and thorough review of the participant's previous law enforcement training and on-the-job experiences may reveal additional concepts that aid their transfer training.

Second, a limited number of participants were included in this study. This study asked for volunteers who expected to use their BCI skills after the completion of the course. The purposive sampling focused on the strategies the participants took to improve their skill in BCI, with the expectation they would have the opportunity to use their skill. However, some participants did not have expected ongoing opportunities to use their skill, which gave them different experiences than the other participants. Therefore, the participant's different experiences resulted in a two-fold recommendation. If a study changed the sampling criteria (i.e. participants who may not expect to use their new skills often), a future study may find additional constructs to aid in the continual development of skill, which transfers to their practice. Additionally, expanding the participant criteria to include a larger number of participants in a study may reveal additional constructs that aids the participants in transferring training to their practice and improving their skill.

Third, the work environment was a key training input in assisting officers to improve their learning and retention. Therefore, a study that looks at organizational leadership and training policies and how the different agencies, particularly smaller agencies, assist their officers in maintaining and improving their skill development in skills such as BCI and other problem-solving and decision-making skills would be an important and interesting study.

The three recommendations for future research came from areas the participants discussed, though not fully examined during their interview. The findings of this study, mentorship, communities of practice, continual opportunities to use their skill, reflection, and trainee motivations are no- or low-cost opportunities to assist trainees in transfer training and improvement of skills. The concepts revealed improved the trainee's developed skills from a course to positively transfer to their practice, but further studies in LEO training transfer may reveal additional, low cost solutions to improve and transfer LEO skills.

Appendix A
Novice to Expert Skill Development Model
(Adapted from Dreyfus and Dreyfus, 1980, 1986; Dreyfus, 2004))

	Novice	Advanced Beginner	Competent	Proficient	Expert
Characteristics	<p>Applies rules learned in class to guide his/her actions without flexibility.</p> <p>Works by the book – everything is black and white - sees no gray area when making decisions</p> <p>No experience with the situations/ environment in which they are expected to perform</p>	<p>Sees that rules have exceptions in some cases</p> <p>Can demonstrate marginally acceptable performance</p> <p>Unable to see the entirety of a new situation (may miss some critical details)</p> <p>Begin to see recurring situational aspects and can apply these in new situations</p> <p>Has difficulty sensing what is important and/or handling challenging situations.</p>	<p>Develops own plans recognizing which situations are important and which can be ignored.</p> <p>See that general principles apply to a wide range of situations</p> <p>Able to see their actions regarding long-range goals or plans</p> <p>Decisions are based on considerable conscious contemplation of a problem</p> <p>Develops own rigid, inflexible rule making, if averse to taking risks, if lacks confidence, or if fearful of losing control.</p>	<p>Perceives situations regarding “wholes” rather than in specific “parts”</p> <p>Uses rules and general principles that are tempered by experience</p> <p>Replaces rules with situational intuition.</p> <p>Still deliberates when making decisions.</p>	<p>Guided by intuition and experience</p> <p>Reacts flexibly with intuitive practiced, understanding from thousands of hours of reflective performance.</p> <p>Aware of the context and the needs of those they serve.</p> <p>Operates from a deep understanding of the total situation</p> <p>Possesses domain-specific knowledge.</p>

Appendix B
Purposeful Ongoing Mentoring Model
(Peno & Silva Mangiante, 2012)
(Characteristics section adapted from Dreyfus and Dreyfus, 1980)

Learner Stage	Goals	Mentor/Coach Action
Novice	To increase awareness of context of situations. Examine rules as applied.	*Assist the learner in reflecting on current practice. *Model an effective strategy for using a rule/process/procedure in a new context. *Allow time for learner practice of the new approach. *Provide feedback on the learner's construction of a new approach.
Advanced Beginning	To increase awareness of the relative importance of different situations.	*Assist learner to reflect on practice as applied in different situations. *Model alternative approaches. *Provide feedback on the learner's construction of practice in a variety of situations.
Competent	To increase efficacy in ability to handle difficult, threatening, or uncertain situations.	*Model strategies for continuous reflection-on-practice in typical and challenging situations. *Model self-regulation in challenging situations. *Help learner develop options with the purpose of expanding possible responses.
Proficient	To increase analysis of and reflection while in situations.	*Model strategies for continuous reflection-in-practice. *Assist learner to become self-directed in their reflection in situations. *Provide regular feedback to support reflective thinking.
Expert	To increase intuitive thinking to guide practice in new situations	*Assist learner to consider how they can transfer their experience to new domains. *Assist learner to consider how they can transfer their experience to new domains.

Appendix C
Training Strategies
(Adapted from Broad and Newstrom, 1992)

	Manager	Trainer	Trainee
Before Training	Build transfer of training into supervisory performance standards Collect baseline performance data Involve supervisors and trainees in needs analysis procedures Provide orientations for supervisors Involve trainees in program planning Brief trainees on the importance of the training and course objectives, content, process, and application to the job Review instructional content and materials Offer rewards and promotional preference to trainees who demonstrate new behaviors Arrange conferences with prior trainees Send co-workers to training together Provide a positive training environment (timing, location, facilities) Plan to participate in training sessions	Align the program with the organization's strategic plan Involve managers and trainees Systematically design instruction Provide practice opportunities Develop trainee readiness Design a peer coaching component for the program and its follow-up activities	Provide input into program planning Actively explore training options Participate in advance activities

	Manager	Trainer	Trainee
During Training	<p>Prevent interruptions Transfer work assignments to others</p> <p>Monitor attendance and attention to training</p> <p>Recognize trainee participation</p> <p>Participate in transfer action planning</p> <p>Review information on employees in training</p> <p>Plan assessment of transfer of new skills to the job</p>	<p>Develop application-oriented objectives</p> <p>Provide realistic work-related tasks</p> <p>Provide visualization experiences</p> <p>Give individualized feedback</p> <p>Provide job performance aids Actions under the control of trainers or trainees</p> <p>Create opportunities for creation of support groups</p> <p>Help trainees prepare group action plans</p> <p>Have each trainee create individual plan of actions</p> <p>Design and conduct a relapse prevention session</p> <p>Help trainees negotiate a learning contract</p>	<p>Link with a "buddy"</p> <p>Participate actively</p> <p>Form support groups</p> <p>Plan for applications</p> <p>Anticipate relapse</p>

	Manager	Trainer	Trainee
After Training	<p>Plan trainees' reentry</p> <p>Psychologically support transfer</p> <p>Provide a "reality check"</p> <p>Provide opportunities to practice new skills</p> <p>Have trainees participate in transfer-related decisions</p> <p>Reduce job pressures initially</p> <p>Debrief the trainer</p> <p>Give positive reinforcement</p> <p>Provide role models</p> <p>Schedule trainee briefings for co-workers</p> <p>Set mutual expectations for improvement</p> <p>Arrange practice (refresher) sessions</p> <p>Provide and support the use of job aids</p> <p>Support trainee reunions</p> <p>Publicize successes</p> <p>Give promotional preference</p>	<p>Apply the Pygmalion effect</p> <p>Provide follow-up support</p> <p>Conduct evaluation surveys and provide feedback</p> <p>Develop and administer recognition systems</p> <p>Provide refresher/problem-solving issues</p>	<p>Practice self-management</p> <p>Review training content and learned skills</p> <p>Develop a mentoring relationship</p> <p>Maintain contact with training "buddies"</p>

Appendix D
Integrated Research Framework
(Adapted from Lim and Morris, 2006)

Appendix E
Characteristics and Behaviors Developed in Class
(Adapted from Dreyfus and Dreyfus, 1980, 1986)

	Novice	Advanced Beginner	Competent	Proficient	Expert
Characteristics and Behaviors Developed in Class	<ul style="list-style-type: none"> *May overuse powders *May be unable to establish a perimeter *May contaminate scene or evidence *May use improper collection techniques * May exhibit poor camera techniques 	<ul style="list-style-type: none"> *At times, may rush through a scene *Understands the camera and its settings. *May not take enough scene photos *May collect too little or too much evidence *May process evidence in the wrong order *May not be equipped with the proper tools and materials needed to process the scene 	<ul style="list-style-type: none"> *Understands and applies crime scene guidelines. *Operates systematically and rigidly when approaching a crime scene *Uses proper processing techniques *Properly documents and collects evidence at the scene *Understands limitations in skills, modifies when necessary, and knows when to ask for help 	<ul style="list-style-type: none"> *Is able to discern the relevancy of the scene and its evidence. Visualizes the scene in its entirety *Understands each situation is different and applies the proper processes used for evidence development *Assesses and articulates how evidence pertains to a case *Possesses the ability to identify potential issues and is able to problem-solve 	<ul style="list-style-type: none"> *Exhibits confidence and leadership abilities *Intuitively adapts and overcomes crime scene and evidentiary challenges *Is observant and meticulous *Has the ability to plan, organize, and reorganize tasks.

Appendix F
Issues of Trustworthiness of a Qualitative Study
(Shenton (2004), Guba (1981) and Lincoln & Guba (1982))

	Credibility	Transferability/ Generalizability	Dependability	Confirmability
Member Checking	X			
Peer Debriefing	X			
Triangulation	X			
Thick description of the participants and context		X		
Purposive Sampling		X		
Dependability Audit (reflexive journal and field notes)			X	
Confirmability Audit (raw data available)				X

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