

**The Preferred Learning Style of Law Enforcement Officers: A Relational, Quantitative
Study**

by

Angel Diaz

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Abstract

Law enforcement officers are required to be educated in several areas, making decisions based on that education. The problem is that the learning style preferences of law enforcement officers in the United States are unknown, resulting in unsuccessful and ineffective training styles. Understanding officers' preferred learning styles may help with providing instruction in a way officers favor. The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Behaviorism learning theory and transformational leadership theory were used to guide this study. A convenience, non-probability sample of 167 participants filled out a demographic and VARK questionnaire in the research. A chi-square test of independence was used to determine if a relationship exists between an officer's learning style preference and gender and education level. Data gathered and analyzed from the study provided there was no significant relationship between gender and the preferred learning style of law enforcement officers. No significant relationship existed between education level and the preferred learning style of law enforcement officers. Continued research on the preferred learning style of law enforcement officers may offer law enforcement leaders and trainers a greater understanding of how to effectively train law enforcement officers using methods officers find helpful in learning.

Keywords: law enforcement officers, learning styles, behaviorism, transformational leadership, VARK

Dedication

This dissertation is dedicated to my family. To my wife Diane, thank you for believing in me and encouraging me every step of the way. More importantly, thank you for joining me in this journey and being my teammate in school and life. I love you. To my children Chanel, Angel, Adrianna, and Dominick, and my grandchildren Maddox and Scarlett, I love you all so much. I hope I inspired each of you to achieve your goals, and never give up. To my parents, Enrique and Blanca, I am thankful for all your sacrifices and hope I made you proud with this accomplishment. I love you both very much.

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Chapter 1: Introduction

Law enforcement training's primary goal is to ensure officers are adequately trained in relevant topics related to the job. Officers are exposed to several different training courses and programs during a career (Wolfe et al., 2019). Recognizing and knowing the students' learning styles provides information to educators assisting with creating, changing, or developing more effective lesson plans, curriculums, and programs (İlçin, et al., 2018). If students' preferred learning styles are met with instruction that coincides with the style, learning would be easier for students to accomplish (Damrongpanit & Reungtragul, 2013). The use of learning style theories to teach individuals using methods geared towards the learning style preference of the student may improve learning (Costa et al., 2020; Mets & Brainard, 2019; Navarro et al., 2020). Understanding and identifying officers' learning styles may help instructors create lesson plans geared towards the officers' learning preferences, resulting in better attainment of what is being taught. Curriculum for law enforcement courses is created by the FDLE which details what an instructor must cover, allowing the individual instructor to create a lesson that best benefits the students attending the class.

Law enforcement officers are expected to be knowledgeable in several areas, such as laws, ordinances, use of specific equipment, reading and writing, and first aid. Officers are required to keep current with training, obtain knowledge in several areas, and understand the changes in police work. The U.S. Department of Justice recommended learning style preferences be included in police education as a way to ensure recruits and officers are trained in a manner the officer prefers (Kelleher, 2014). Having educated and well-trained personnel capable of adequately performing the duties of law enforcement officers, who retain and learn new

information while considering all society's changes and changes to policing based on societal needs (Dwyer & Laufersweiler-Dwyer, 2004). Well-trained officers are essential to ensure laws are followed and citizens are treated fairly while ensuring the community's safety. Officers are responsible for enforcing laws and county or city ordinances, investigating crimes, writing reports, protecting life and property, and keeping public order (Oliva & Compton, 2010; Roberts, 2018).

Prior research on the topic of the preferred learning style of law enforcement officers revealed differing results. The read/write style (Landry, 2015) and the kinesthetic style (Lauritz et al., 2013; White, 2016) were reported as the law enforcement officers' preferred learning styles. A gap was found in previous research, as the studies limited participation to a few agencies with limited officer demographics, where recommendations for future investigations include increasing the sample size to include officers from multiple agencies where demographics may vary, including gender and education level (Lauritz et al., 2013; Stephens, 2015; White, 2016). The current study fills the gap and expands the body of work in law enforcement officers' preferred learning styles and how learning styles relate to training.

The study aimed to add to the body of knowledge concerning the preferred learning styles of law enforcement officers. Using the visual, aural, reading/writing, and kinesthetic (VARK) learning assessment, the study investigates law enforcement officers' preference for learning styles based on gender and education level. A quantitative research method helped determine if a relationship exists between the variable, preferred learning styles, and the variables of gender and education level. The study's background provides the research context, and a literature review relating to learning, learning styles, and leadership. Included in the study are the research

questions, hypotheses, theoretical framework, and definitions of key terms, assumptions, limitations, and delimitations.

Background of the Problem

Law enforcement is a profession where education and training are vital components of a successful officer and agency. The expanding role of police officers requires a higher level of education to include ongoing training to ensure officers are properly trained to deal with the public (Bartkowiak-Théron, 2019). Officers are required to continually train in new techniques and obtain knowledge in various areas to serve the community. Law enforcement officers are responsible for enforcing laws and county or city ordinances, investigating crimes, writing reports, protecting life and property, and keeping public order (Oliva & Compton, 2010; Roberts, 2018). Although education is paramount throughout an officer's career, no universal guidelines detail the best methods to use when training officers. In the United States, no single governing body enforces or standardizes officers' education or certification standards, causing certification and retraining requirements to vary from state to state (Follett, 2020).

The United States has over 800,000 sworn law enforcement officers (DOJ, 2019; NLEOMF, 2020). Regardless of length of service, every officer completes the required continuing education to keep certifications active. Each state requires a different amount of continuing education hours an officer must complete to maintain law enforcement certification (Armstrong, 2020). Understanding how officers prefer to learn and matching the learning styles with the appropriate instruction may lead to a better-educated officer. Instructors have reported students' learning processes have improved when teaching to a student's preferred learning styles (Papadatou-Pastou et al., 2018).

Research investigating the topic of using learning styles as a way for instructors to effectively teach students in a manner the student prefers (Alkooheji & Al-Hattami, 2018; Amran et al., 2017; Mpwanya & Dockrat, 2020; Ojeh et al., 2017; Parmar et al., 2020; Pooley, 2017; Prithishkumar & Michael, 2014; Villanueva, 2020). Previous studies in VARK learning styles reported the kinesthetic style as the most popular (Balasubramaniam & Indhu, 2016; Espinoza-Poves et al., 2019; Stirling & Alquraini, 2017). Research has been conducted exploring the impacts a student's background and demographics have on learning styles (Gradl-Dietsch et al., 2016; Leasa et al., 2018; Subia et al., 2019; Wahyudin & Rido, 2020). Studies in adult learning preferences of law enforcement officers are limited and have resulted in mixed results (Aguilar-Moya et al., 2014; Landry, 2015; Lauritz et al., 2013; Oliva & Compton, 2010; Stephens, 2015; White, 2016). Previous studies investigating the preferred learning styles of law enforcement officers revealed conflicting results. Of the learning styles, the read/write style was reported to be the most preferred by 32.6% of 101 respondents (Landry, 2015), while another study reported the kinesthetic style as preferred by 34.7% of 163 participants (White, 2016). The relationship between learning styles and officer demographics is unknown. Determining if there was a relationship between law enforcement officers' learning style and demographics may support the development of efficient and effective training for certified officers and recruits in the police academy training.

Statement of the Problem

The problem is the learning style preferences of law enforcement officers in the United States are unknown, resulting in the possibility of ineffective training methods (Beary, 2018; Blumberg et al., 2019; Murphy, 2017), where gender and education level may affect learning

style preferences. The background of the problem is the instruction of law enforcement officers varies from instructor to instructor based on the instructor's preference in teaching styles and not the officer's learning preference. Educators use teaching strategies based on personal beliefs, values, and previous experiences (Dos Santos, 2018; Oleson & Hora, 2014). The extent of the problem is law enforcement officers are required to be trained, but how the officers receive the instruction might not match each individual's preferred learning style, making the learning process harder for officers to retain and fully understand the training. The people affected by the problem are the officers receiving the training, the instructors, and the citizens affected by the officers' lack of knowledge because of the ineffective training. Agencies need to instruct officers on critical topics and ensure those officers receive updated information through in-service training and advanced or specialized training (Russo & Duffy, 2017). Despite the previous research investigating the preferred learning styles of law enforcement officers, there is a gap in the literature as the previous research used officers from one agency and not multiple agencies where officer demographics varied (Birzer & Nolan, 2002; White, 2016; Wolfe et al., 2019).

Training for officers is an essential part of law enforcement, including field training, mandatory training, specialized training, advanced training, and in-service training (Stickle, 2016). In Florida, all certified officers are required to complete 40 hours of training classes every 4 years (Florida Department of Law Enforcement, n.d.-b). Students of all ages learn at different rates and styles; officers are no different. Each student is different in the methods used in learning, gathering, forming, and thinking about information (Peyman et al., 2014). Other factors affect learning style preferences in adults. Adult learning style preferences may be affected by aging, motivation to obtain new knowledge, nervousness about successfully

completing the course and the information being taught (Falasca, 2011). Certain demographics have influenced learning style preferences (Alkooheji & Al-Hattami, 2018; Cleveland et al., 2011; Yousef, 2018).

Purpose of the Study

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Quantitative research involves turning comments or responses into numbers to explain the investigated topic (Bernard, 2018). The research is necessary to determine how better to instruct law enforcement officers in the United States. The sample size for the study required a minimum of 382 participants. If the sample size was too small, the results may not be generalized to the larger group due to issues with meaningful statistical tests (Creswell, 2014; Faber & Fonseca, 2014; McNeish & Stapleton, 2016). The use of a sample size calculator assisted in obtaining the correct number of participants (see Appendix A). Research sample size can be determined using a power analysis from a selected probability of finding a statistically significant result (Fugard & Potts, 2015). Using a confidence interval of 95%, an error of .05, and a population portion of 50%, the study called for a minimum of $n = 382$.

The variables of gender and education level were investigated to determine if a relationship exists in the preferred learning styles of law enforcement officers. A categorical variable has two or more categories, with no intrinsic ordering to the categories (Laerd Statistics, 2017). Gender and education level were defined as categorical variables with two or more categories. Gender was defined as two categories, male and female. While the variable of

education level has six categories: (a) high school diploma/GED, (b) some college/no degree, (c) associate degree, (d) bachelor's degree, (e) master's degree, and (f) doctorate. Preferred learning style is also a categorical variable defined with four categories: (a) visual, (b) aural, (c) read/write, and (d) kinesthetic.

The VARK questionnaire was distributed to law enforcement officers attending courses given at a law enforcement training facility in Central Florida during the study after participants signed the informed consent (see Appendix B). Permission was obtained to use the training facility as the research site (see Appendix C) and the VARK questionnaire (see Appendix D). The site is a law enforcement training facility that offers basic recruit training in law enforcement and corrections and hosts various advanced and specialized classes for certified law enforcement officers. Using the training facility allowed for a wide variety of law enforcement officers representing different jurisdictions to participate in the study.

The investigation adds to the previous and existing literature on the preferred learning style(s) of law enforcement officers (McHenry, n.d.; Stephens, 2015; White, 2016) and any differences caused by gender and education level. Findings of the investigation were documented in a report and shared with the training facility to facilitate better training techniques using the officer's preferred learning styles. The study was designed to determine the preferred learning styles of certified law enforcement officers in the state of Florida. Using a confidence interval of 95%, a margin of .05, and a population portion of 50%, the study required a minimum sample size of $n = 382$ officers attending various courses at a training facility located in Central Florida.

Significance of the Study

The study was conducted to provide a further understanding of the preferred learning styles of law enforcement officers and if a relationship exists between learning style preferences and demographics within the law enforcement community in Florida. Law enforcement trainers may be better able to design and instruct courses using methods that align with the needs and preferences of the adult law enforcement learner utilizing the information obtained from the study. Aligning the instructional style with a student's learning style has been shown to be effective in education (Allen et al., 2013). Determining a relationship between specific demographics and learning style preferences, law enforcement agencies can enhance officer training and improve officer knowledge (Hossain et al., 2009).

Law enforcement agencies look to put the most qualified and competent officers on the street to patrol the community. Agencies can assist in the process by training according to the officers' preferred learning styles to ensure education is taking place in a manner benefiting the officers, community, and trainers. Failure to train officers may result in poorly trained officers patrolling the community. The content of law enforcement training and how the content is delivered plays a crucial role in an officer's education (Blumberg et al., 2019). Policing has changed over the years, including how to train officers. The study addresses the important issues related to assisting an officer's education and knowledge base to support better service for the public in modern policing.

Research Questions

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers and gender or the education

level of officers attending a law enforcement training facility located in Central Florida. Data for the study was gathered using a demographic survey (see Appendix E) and the VARK learning style questionnaire (see Appendix F) and analyzed using a quantitative method. The following questions were used to guide the study:

Research Question 1: What is the relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

Research Question 2: What is the relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

Hypotheses

The null and alternative hypotheses for the study's research questions include the following:

H₁₀: There is no significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

H_{1a}: There is a significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

H₂₀: There is no significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree,

doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

H2_a: There is a significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

Theoretical Framework

Learning takes place continuously throughout a person's life. Every person learns at different times and in different ways. There is no one definitive way education is acquired. Learners obtain knowledge differently (Kirschner, 2017). Various learning theories have been used to explain the different learning processes. The three main learning theories are behaviorism, cognitivism, and constructivism (Agarkar, 2019). The behavioristic learning theory was used to frame the study.

Leadership plays a crucial role in the educational process. Instructors are viewed as the leaders in a learning environment, providing education in a manner assisting in a student's success. Understanding the best method to use when leading and teaching people helps organizations adapt and learn in a continually changing environment (Kezar & Holcombe, 2017). Transformational leadership has been associated with different organizations, including the educational arena. The transformational leadership style is used to motivate followers to improve performance (Bărbîntă et al., 2017).

Theories framing the research include transformational leadership theory and the behaviorism learning theory, using the visual, aural, read/write, and kinesthetic (VARK) learning style inventory. Law enforcement courses are typically graded as pass or fail. In education,

transformational leadership improves the educator's performance and provides students with better education (Al-husseini & Elbeltagi, 2018; Jovanovica & Ciricb, 2016). The VARK learning style inventory addresses how learners prefer to learn or obtain knowledge. The theoretical framework supports the purpose of the study and data collection. Attempting to answer whether the behaviorist approach and transformational leadership affect the variables guided the overall research of the study. Previous research existing within the same theoretical framework is summarized in Chapter 2.

Definition of Terms

For comprehension, several keywords are defined in the section. Included in the definitions are the study's variables. The terms were used in the context of the research and law enforcement community. In addition, terms with multiple meanings within the population are included.

Education Level. The highest level of education an individual has completed (U.S. Census Bureau, 2020). The participant's highest education levels are grouped into six categories, high school diploma/G.E.D., some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree (see Appendix E).

Florida Department of Law Enforcement (FDLE). The agency regulates the training and certifies law enforcement officers in the state of Florida. FDLE assists law enforcement agencies in Florida with criminal investigations, law enforcement misconduct, and law enforcement-involved shootings (Florida Department of Law Enforcement, n.d.b).

Florida Department of Law Enforcement (FDLE) Required Training. Florida requires sworn law enforcement officers to complete 40 hours of training every four years to keep

certifications active (Florida Department of Law Enforcement, n.d.-b). The training can take place at the employing agency or a criminal justice training facility.

Gender. The characteristics and identities of males and females (Canadian Institutes of Health Research, 2020). The participant's gender is being categorized as either male or female (see Appendix E).

Law Enforcement Training Facility. A law enforcement training facility offers courses to certify individuals as law enforcement officers (DHS, 2020) while offering specialized courses to sworn law enforcement officers. *Learning Style Inventory.* An inventory designed to assist respondents to determine if a learning style preference is detected and if so, which learning style is preferred (Mpwanya & Dockrat, 2020). Several learning style inventories are available to individuals to help determine the best learning style used to obtain new knowledge.

Learning Style Preference. The learner's preferred way of learning or obtaining knowledge. Learning styles are the strengths and weaknesses associated with learners' preferences in gaining, recalling, and processing information (Özonur et al., 2020).

Sworn Law Enforcement Officer. A person who has completed the mandatory training and passed the required tests needed to become an officer; and has taken an oath to support the Constitution of the United States, the state of employment, and the laws within the employing agency's jurisdiction (Florida Department of Law Enforcement, n.d.-b).

VARK Learning Style Model. Created by Neil Fleming, the VARK learning model helps determine which learning style is best suited for the learner (Zhu et al., 2018). According to the VARK model, the four preferred learning styles include visual, auditory, read/write, and kinesthetic (Fleming & Baume, 2006).

VARK Preferred Learning Style. Describes how students prefer to learn using the visual, aural, read/write, and kinesthetic (VARK) learning style questionnaire (Benmarrakchi et al., 2017).

Assumptions

Assumptions are an essential part of a study's research methods and are used to test theories (Nkwake, 2013). The study involved collecting data from VARK questionnaires (v8.01) from law enforcement officers in the state of Florida working at the study site. Participants completed the questionnaires while attending various law enforcement-related classes at the study site (training facility). Assumptions were made the participants' gender and education level play a role in their preferred learning styles. Another assumption was the participants wanted to take part in the study and answered the questions honestly and correctly, providing reliable and accurate data. An assumption was made that the VARK questionnaire is a statistically valid instrument in determining the preferred learning styles of the participants in the study. The VARK questionnaire was determined to be a valid and reliable instrument in discovering a person's preferred learning style (Amran et al., 2017; Fitkov-Norris & Yeghiazarian, 2015; Wong & Chin, 2018).

The study relied on obtaining data from law enforcement officers attending courses at a single training facility. It was assumed the participants used in the study from the training facility would be an accurate representation of law enforcement officers in Florida. Researchers using humans for studies must ensure the participants have the right to participate in the study voluntarily and declining to take part will not cause any negative repercussions (Barrow et al., 2020). Processes and procedures were rigorously followed, adhering to the methodology, and

research design, as approved by the dissertation committee and reviewers. Theoretically, the assumption was the study would expand the body of work related to the preferred learning style of law enforcement officers.

Scope and Delimitations

The focus of the study was on the preferred learning style of certified law enforcement officers attending various courses at a training facility in Florida. Using only one training facility as the study site restricts the study to that site where most participants came from local agencies. The study's scope likely limited the generalizability of the results to other training facilities and law enforcement officers outside of Florida.

Delimitations are factors and variables not included in the study but assist in maintaining boundaries and limits, so objectives are possible to achieve (Theofanidis & Fountouki, 2018). Study delimitations for the investigation include participant sample, research site, courses being taught, and participant demographics. Participant sample of officers was selected based on attending a course at one training facility in Central Florida, which also limits participant demographics. The study covered different learning preferences and which preference was preferred by officers in Florida. Multiple training courses in various topics were used to recruit participants for the study but were delimited to only one law enforcement training site in Florida.

Limitations

The study was aimed at learning style preferences of law enforcement officers using the VARK questionnaire (v8.01) and relational research design. Relational research design investigates the degree of relation between at least two variables (Creswell, 2014). Participants were selected based on the convenience of the training site location. Participants selected based

on convenience and availability are convenience samples (Creswell, 2014; Etikan et al., 2016). The results of the study cannot necessarily be used to describe the learning style preference of the larger body of law enforcement officers.

The study was limited due to the possibility of self-reporting bias of participants completing the VARK questionnaire (v8.01). The questionnaire data reflect self-reported data, which may have been subjected to the participants' internal bias. Self-reported data may not be reliable and show bias (Coenen et al., 2020; Weijters et al., 2010). Participants' response bias may come from seeing themselves in a positive light and wanting to complete the questionnaire as fast as possible (Kormos & Gifford, 2014; Peer & Gamliel, 2011).

Another focus of the study was the variable of preferred learning styles of law enforcement officers and if the variables of gender and education level influence learning style preferences. The variables of gender and education level were investigated in the study to determine if the variables influenced learning styles. Specific demographics such as gender, age, course of study, and education level have been reported as having a direct relationship with learning style preferences (Alkooheji & Al-Hattami, 2018; Cleveland et al., 2011; Yousef, 2018). The research sample of law enforcement officers had various demographics adding to the overall data collected in the study.

In quantitative research, the role of the individual conducting the research remains neutral to avoid bias while trying to study the problem from a distance (Johnson & Christensen, 2019). Objectivity was not a limitation in the study because data were obtained from the participants and analyzed for hypotheses testing. Participant responses were coded by assigning a number allowing for anonymity. Adding to the overall credibility of research can be done by

understanding and trying to eliminate internal and external threats and staying impartial throughout the research process.

Chapter Summary

An introduction and overview of the study were provided. The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Use of the VARK questionnaire (v8.01) provided the data needed for the study. The problem addressed was the learning style preferences of law enforcement officers in the United States are unknown, which may result in ineffective training methods (Beary, 2018; Blumberg et al., 2019; Murphy, 2017), where gender and education level may affect learning style preferences.

A brief background of the study and relevant literature related to the study was introduced in Chapter 1. Also discussed in the chapter was the statement of the problem, which indicated law enforcement training methods may meet training requirements but not the needs of the individual learner. The purpose of the study using a quantitative relational method was to provide a further understanding of the officer's learning style preference and if a relationship exists between preferences and demographics was discussed. The study's significance was discussed, which indicated the contributions the study would provide to the body of research concerning learning style preferences of law enforcement officers and the relationship between preferences and demographics.

The study's research questions, hypothesis, theoretical framework used to frame the questions and hypotheses, and the methodology used to address these questions and hypotheses

were discussed in the chapter. A summary of the study's assumptions, scope, delimitations, and limitations was provided in the chapter. Discussed in the chapter were several key terms and definitions to assist with the comprehension of the study. The following section, Chapter 2, presents a thorough review of the literature related to learning, learning styles, leadership, learning style inventories, students' different educational levels, and law enforcement officers' learning styles.

Chapter 2: Literature Review

The use of learning style preferences is intended to identify how people prefer to obtain information during learning. Learning style preferences are the concepts in which learners perceive, process, store, and recall information that is beneficial to the learners while learning (Khan et al., 2019; Parmar et al., 2020). The problem is the learning style preferences of law enforcement officers in the United States are unknown, resulting in the possibility of ineffective training methods (Beary, 2018; Blumberg et al., 2019; Murphy, 2017), where gender and education level may affect learning style preferences. Thousands of law enforcement agencies across the United States have training officers in police academies without set standards across the board on how to conduct and complete training (Desmond et al., 2020).

Law enforcement officers are comprised of individuals from different backgrounds, ages, gender, and education levels (Etter & Griffin, 2011), which affects learning preferences (Cleveland et al., 2011; Naseri & Elliott, 2011). Investigating the learning preference of law enforcement officers to determine if a relationship exists between demographics and learning style may assist in improving the training officers receive (Drago & Wagner, 2004; Hossain et al., 2009). The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Focus was on several law enforcement agencies attending courses at a training facility located in Central Florida.

The literature review chapter had five objectives. First objective was to examine learning and education. Second objective was to identify the behaviorism theory and theories associated

with behaviorism. Third objective was to explore the various learning style inventories. Fourth objective was to discuss the current literature on the learning style preferences of students in different educational settings. Fifth was to identify gaps in the body of knowledge regarding the law enforcement officers and preferred learning styles, indicating a need for further investigation.

In the chapter, the literature search strategy used for the literature review is discussed, followed by the theoretical framework used for the study. Next is the research literature review, in which an overview of learning preferences is presented. The chapter concludes with a summary of the major themes in the literature.

Literature Search Strategy

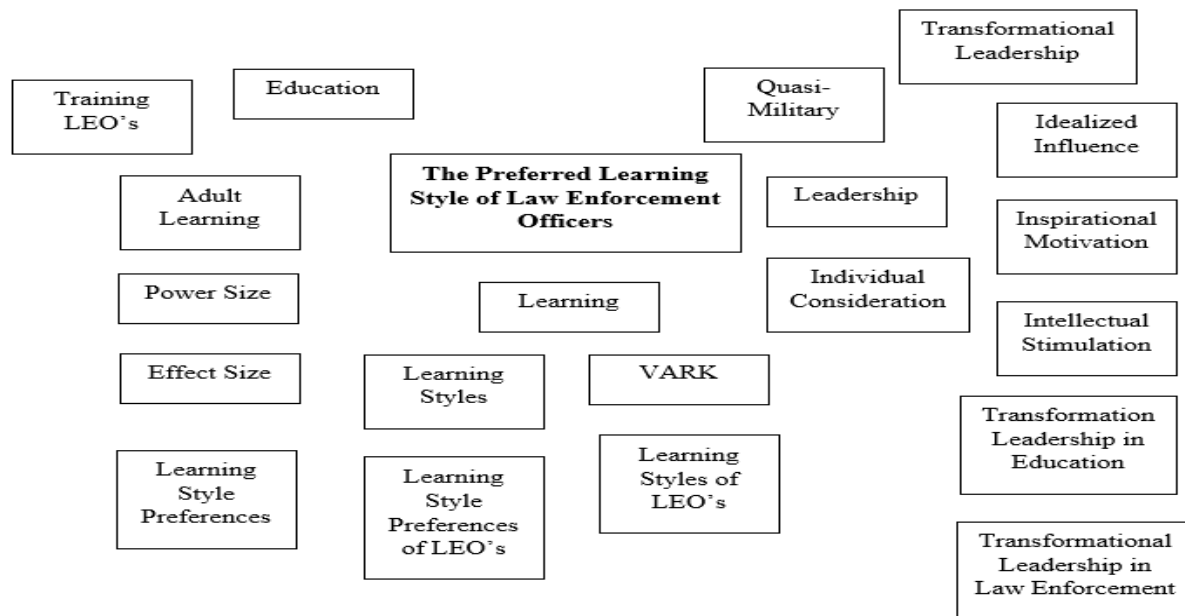
The literature search strategy focused on two primary goals. First is researching and reviewing the different learning styles preferred by students of various ages and education levels. Second is identifying previous research on law enforcement officers and learning style preferences. Literature searching is an essential part of any research where a literature review section is used (Cooper et al., 2018).

A literature search using electronic university library databases from American College of Education, Valencia College, University of Central Florida, and an internet search of scholarly literature using Google Scholar. Google Scholar is the most comprehensive academic search engine providing the largest amount of scholarly information (Gusenbauer, 2019). The American College of Education Library was the main site used to locate and analyze peer-reviewed journal articles. Databases provided full-text electronic copies of peer-reviewed studies, articles, reports, and research on the research topic. Additional online resources used in the research included the

Florida Department of Law Enforcement (FDLE) used to cite the mandatory continuing education training hours in Florida. The following is a list of key search terms and combinations used to search for articles related to the study: *Adult Learning; Education; Effect size; Idealized Influence; Individual Consideration; Inspirational Motivation; Intellectual Stimulation; Leadership; Learning; Learning styles; Learning styles of law enforcement officers; Learning style preferences; Operant Conditioning; VARK; Learning style preferences of law enforcement officers; Power size; Training law enforcement officers; Transformational leadership; Transformational leadership in education; Transformational leadership in law enforcement; Quasi-Military*. Figure 1 displays a visual representation of the key search terms used for the literature review.

Figure 1

Key Search Terms



Note: The figure is not reprinted or adapted from another source. The figure is an original work.

Theoretical Framework

Obtaining knowledge is a lifelong process which begins at birth. Infants start the learning process from birth and continue throughout life (French, 2019). Students acquire knowledge differently and prefer how to obtain knowledge. People differ from each other in several ways to include learning and how knowledge is attained (Kirschner, 2017). Education and leadership play an essential role for individuals who wish to acquire information and succeed in life. Individuals need knowledge to grow and flourish. Leaders need to understand the needs and wants of the learners to provide the proper education and delivery of the lessons while guiding the learners towards success. Learning how to best lead and teach people helps organizations adapt and learn in a constantly changing environment (Kezar & Holcombe, 2017).

Learning

Definitions of learning vary depending on which theorist is defining the term. A generally accepted definition of learning is the attainment of knowledge and skills (Illeris, 2018). Every person continues to learn each day. Learning takes place at home, community, school, or other locations. Learning is an essential part of the education process. The three learning theories include: (a) behaviorism, (b) cognitivism, and (c) constructivism. Each approach has different reasons regarding how an individual processes information and learns. The three main learning models are behaviorism, cognitivism, and constructivism (Agarkar, 2019).

Learning Styles

The use of learning styles has been used to ensure students are being instructed to benefit the student's learning process. Identifying a student's learning style allows students to understand the strengths and weaknesses that enhance the learning process (Bernard et al., 2017).

Learning styles are the strengths and weaknesses associated with learners' preferences in gaining, recalling, and processing information (Özonur et al., 2020). Several learning styles inventories are used by educators to determine a student's learning style to better assist in the student's overall education. Additionally, several learning styles models are in use to assess a student's preferred learning preference: (a) Kolb's learning styles model, (b) Honey and Mumford's learning styles model, (c) Felder Siverman's learning styles model, and (d) the VARK learning styles model (Hasibuan et al., 2016). The learning style inventory discussed in the literature review is the VARK learning style inventory.

VARK Learning Style Inventory

The VARK is a learning assessment tool created by Neil Fleming, which helps students identify the learning style or styles which is best suited for the students to learn or obtain knowledge (Zhu et al., 2018). Preferences associated with VARK are visual, aural, read/write, and kinesthetic (Fleming & Baume, 2006). The VARK assessment categorizes learners as having one learning preference, unimodal, or multiple learning preferences, multimodal (Khanal et al., 2019). Understanding how an individual learns assists in the student's overall learning process and outcome. Knowing the preferred learning styles helps instructors teach to the students' strengths and help the students achieve academic success (Balasubramaniam & Indhu, 2016). Because learners have different learning preferences, teaching to those preferences improves the student's motivation and performance in the course (Parmar et al., 2020). Learning styles could help learners obtain new knowledge and help instructors create learning materials geared towards those learning styles (Hasibuan et al., 2016).

Transformational Leadership

Transformational leadership was introduced by James MacGregor Burns in 1978 and further expounded by Bass in 1985 (Sun et al., 2017). The idea of transformational leadership style is where the leader is passionate, inspires those who follow and is involved in ensuring every group member succeeds (Cherry, 2020a). Transformational leadership is a type of leadership where the leader transforms the beliefs, behaviors, attitudes, motivates, and inspires followers to perform at a higher level of performance (Anderson, 2017).

Leaders who utilize the transformational leadership style use charisma to transform subordinates into attempting to attain higher goals. A transformational leader positively affects the organization and employees of the organization as the style of leadership assists in follower motivation, confidence, inspiration, causing higher levels of performance (Bărbîntă et al., 2017). There are four components to transformation leadership known as the four I's (Alatawi, 2017). The four behavioral components of transformational leadership include the following: (a) idealized influence, (b) inspirational motivation, (c) intellectual stimulation, and (d) individualized consideration (Allen et al., 2016). Following the four components assist transformational leaders to stimulate and motivate followers to go beyond the normal capabilities to achieve a higher level of performance outcomes (Brown et al., 2019).

Idealized Influence

Idealized influence explains transformational leaders are viewed as role models by followers. The leader provides a vision and sense of the task while showing complete commitment to completing the vision and mission (Anderson, 2017). Followers admire, respect, and trust transformational leaders and want to emulate the leader's behavior (Arokiasamy et al.,

2016). Transformational leaders exhibiting the component of idealized influence have high standards of ethical behaviors (Towler, 2019).

Inspirational Motivation

A component of transformation leadership includes inspirational motivation, where leaders inspire and motivate followers. Leaders inform followers of high-performance expectations encouragingly and enthusiastically (Anderson, 2017). Inspirational leaders use behavior to motivate and inspire followers by giving a shared meaning and challenge for all to strive to attain an organizational objective (Ngaihe et al., 2016). Inspirational motivation is an essential part of keeping followers working towards a goal or vision. Leaders showing the inspirational motivation component use effective communication to involve and encourage followers to meet objectives (Malik et al., 2017).

Intellectual Stimulation

Intellectual stimulation explains transformational leaders look at problems from all angles and include followers in finding a resolution. The component of transformational leadership entails the leader to challenge followers to examine and explore new ways of thinking about the task and new ways of completing the task (Anderson, 2017). The transformational leader, intellectual stimulation, challenges followers to take risks and look for all possible solutions (Çekmecelioğlu & Özbağ, 2016). Transformational leaders encourage innovation and creativity from team members. Followers are included in the problem-solving process and play an active role in finding a solution (Arokiasamy et al., 2016).

Individual Consideration

Individual consideration describes the role of a transformational leader acting as a coach or mentor. Leaders using the individual consideration component act as a coach or mentor and provide feedback consistent with each person's needs while challenging the followers to embrace new ideas and tasks (Anderson, 2017). The leader delegates tasks to individuals to develop followers. Transformational leaders are effective listeners, recognizing and accepting the individual differences of team members (Arokiasamy et al., 2016).

Transformational leadership has been a staple in the business arena. In businesses, the transformational leader attends to the employees' motivation and development, leading to an overall improvement in the individual and company (Strukan et al., 2017; Xenikou & Simosi, 2006). Leaders who use the four components associated with behaviors associated with transformational leadership (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration) have a higher level of employee engagement, causing the employees to be more effective and proactive (Change et al., 2019). Employee engagement refers to the attitude employees have towards the organization and work roles within the organization (Moletsane et al., 2019). Positive employee engagement has been found to play a critical role in the performance and success of any business or organization (Burton et al., 2017). In the business realm, transformational leadership has proven to have positive effects on job performance, commitment, and satisfaction (Anderson, 2017).

The use of transformational leadership is not confined to one field or business. With the success of transformational leadership in businesses, other organizations began to follow the trend and use the transformational leadership style. An area where the transformational

leadership style has been accepted and adopted is education. Transformational leadership is used in the field of education by school leaders and administrators. The transformational leadership style is used in educational settings to inspire, motivate, and improve teacher's performance, which results in improved student outcomes (Al-husseini & Elbeltagi, 2018; Allen et al., 2016; Anderson, 2017; Berkovich, 2016; Ebrahimi et al., 2017; Jovanovica & Ciricb, 2016).

School principals are generally in charge and viewed as the leaders of a specific educational facility. Principals are responsible for ensuring the school meets the goals set forth by the school board and the demands of the various stakeholders. The principals using transformational leadership behaviors have been shown to have successful outcomes. Educational leaders using the transformational leadership style have demonstrated success in overall school improvements and teacher and student achievement (Ihsani et al., 2020; Sun et al., 2017). Principals use all four components of transformational leadership to lead the school, teachers, students, and stakeholders. The principal leader promotes teamwork aimed at completing a common goal, provide individualized support, challenges team members to re-examine and rethink how to accomplish tasks better, and expect a high level of quality and performance from team members (Anderson, 2017).

A field where strong leadership is needed is law enforcement. Leadership is a process where leaders and followers work together as a team to improve the motivation and morale within the group (Allen et al., 2016). Law enforcement agencies have long been known as quasi-military organizations. Officers wear uniforms, have a rank structure, chain of command, and follow orders, which is a reason a large portion of police officers are military veterans. Veterans becoming police officers is the third most common career choice after leaving the military, with

around 19 % of police officers having served in the military (Weichselbaum & Schwartzapfel, 2017).

With many veterans joining police agencies across the nation, using a quasi-military leadership style brings a sense of familiarity to veterans transitioning to law enforcement and instills a chain of command system with new non-veteran officers (Weichselbaum & Schwartzapfel, 2017). The quasi-military leadership style in police agencies is an approach police leaders find attractive because the quasi-military leadership approach instills discipline in officers, provides professionalism, and reduces corruption (Potter, 2013). Policing has changed over the years. Law enforcement leadership styles need to change from a quasi-military approach to a style more suited to dealing with the new workforce entering agencies and modern problems facing both police agencies and communities. The leaders of law enforcement agencies can change leadership styles by motivating subordinates to adapt to and accept emotional orientation by creating relationships in the communities in the jurisdiction the employing agency serves and protects (Mohd & Mohd Arshad, 2019).

The transformational leadership style is a method that law enforcement agencies could look at to break away from the quasi-military style. Agencies adopting the transformational leadership style are showing success in the law enforcement agencies where leaders have led using the style (Mohd & Mohd Arshad, 2019). Transformational leadership is a style generally associated within the business field, but law enforcement leadership and officers indicate the want for follower-oriented practices (Pyle & Cangemi, 2019). The significance of transformational leadership in law enforcement agencies is a crucial component for success (Mohd & Mohd Arshad, 2019). Law enforcement officers preferred leaders using

transformational leadership principles and viewed those transformational leaders as role models (Pyle & Cangemi, 2019). Using the transformational leadership style has shown to have a positive effect on work performance and organizational commitment while boosting teamwork (Mohd & Mohd Arshad, 2019). With the success of transformation leadership in businesses, educational institutions, and law enforcement agencies, using the transformational leadership style in a combination of law enforcement and law enforcement training could lead to a higher level of performance and results when training officers.

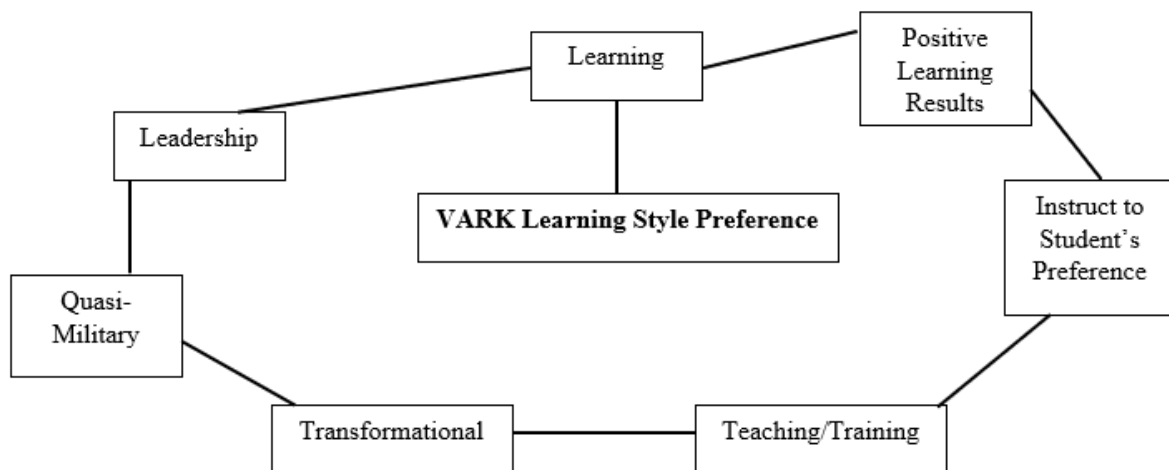
Figure 2 shows the connection between VARK and transformational leadership. The VARK learning style preference influences transformational leadership and vice versa. Understanding and recognizing an individual's learning style might motivate and assist educators in teaching. In turn, teaching to a student's strengths could encourage and assist students in learning. When teachers are aware of students' learning styles, teachers could use the information to design lesson plans and instruct accordingly to provide a better learning experience (Li et al., 2016). Using the combination of VARK and transformational leadership might result in positive outcomes for administrators leading educators, educators teaching students, and students learning. Leadership in educational institutions, businesses, organizations, and law enforcement agencies plays an essential role in each establishment's success.

Law enforcement trainers using transformational leadership and the preferred learning style of law enforcement officers could have better results in teaching officers and a better learning outcome for officers learning. Transformational leadership has shown to be an effective approach in helping with the growth and development of individuals and groups attempting to attain an organizational goal (Dartey-Baah, 2016). Trainers in a training facility following

transformational leadership concepts inspire and motivate students to perform more and achieve at a higher level (Anderson, 2017). Instructors have reported students' learning processes improved when teaching to a student's preferred learning styles (Papadatou-Pastou et al., 2018). Having better educated and trained law enforcement officers is beneficial for all stakeholders (Sereni-Massinger & Wood, 2016). Proper training is needed for law enforcement officers to appropriately respond and react to various calls for service to include dealing with mentally ill individuals (Booth et al., 2017; Shjarback & White, 2016; Taheri, 2016).

Figure 2

VARK and Transformational Leadership Theoretical Framework



Note: The figure is not reprinted or adapted from another source. The figure is an original work.

Research Literature Review

Understanding the influence of learning theories is vital for students to understand the learning preference, which is best in learning, and how educators could better instruct the students. Instruction is more beneficial for the student is presented in a way engaging the student

to enhance personal learning, obtaining knowledge easier, and in a format, the student prefers (Kolb & Kolb, 2005). A person does not stop learning because of graduating from a formal educational institution. Learning continues throughout life, regardless of career, occupation, or location.

Learning is not exclusive to a traditional education setting and can occur informally at different times and places (Pritchard, 2009). Law enforcement officers fall into the category of lifelong learners, learning in formal and informal settings. Lifelong learning is as important as formal education, which takes place in schools, colleges, universities, and other educational institutions (Dumitrasciuc, 2019). The research was primarily focused on understanding how law enforcement officers learn best using the VARK (visual, aural, read/write, and kinesthetic) learning style. The section of the literature review describes, evaluates, and synthesizes the relevant literature within the areas of research.

VARK Learning Style Inventory

The VARK learning style model was created by Neil Fleming in 1987 as a framework for learners to know and understand the different learning styles and decide which is best for learning (Fleming & Baume, 2006). Fleming created the VARK model while working in New Zealand's educational system as an inspector, where some teachers were not reaching students, and others were (Fleming & Baume, 2006). The assessment used to find a learner's preferred learning style consists of a 16-question questionnaire which is used to sort learners into different learning preferences (Khongpit et al., 2018; Kurgun & Isildar, 2016).

Inventories regarding learning styles help individuals gain a better understanding of the best learning style to use when obtaining new information, regardless of whether the information

is in a formal or non-formal setting. The style preferred by persons learning and processing information is known as a learning style (Jawed et al., 2019). Learning styles are defined as how a student attempts to learn something and perform better, which matches individual learning preferences (Subia et al., 2019). Reading, viewing, listening, and doing learning behaviors, which help students learn, are known as learning styles (Hasibuan et al., 2016). Learning style inventories are meant to assist people in determining which learning style best suits the needs of the individual learner for personal learning (Cherry, 2020b). The VARK has four categories a learner's preference falls under, visual, aural, read/write, and kinesthetic.

Visual Learning Preference

Visual learners prefer to obtain information by sight. Learners who prefer the visual style of education are good at recalling information which is seen and learn better when presented with the material in a visual format, such as diagrams, PowerPoint, displays, and graphs (Jawed et al., 2019; Pritchard, 2009). Most people learn by sight. Vision is used daily to get information. During an online VARK questionnaire conducted between May and August 2020, approximately 240,000 completed the survey showing nearly 50% have some preference for the visual learning style (VARK, 2020).

Aural Learning Preference

Auditory learners learn best by hearing the information being presented. The learners enjoy lectures and are good at remembering things that were spoken about during a lecture (Cherry, 2018). Speech alone might not be the best style to use to educate students. With technology readily available, students could lose focus fast if listening to a lecture-only presentation. Using visual aids, in addition to audio, helps students stay focused on the lesson.

Several educational models use a visual and auditory style in classes (Jawed et al., 2019).

Read/Write Learning Preference

Read/write learners enjoy learning by reading the text and taking notes from what was read. The read/write learner is defined as a person who prefers to obtain information through books and taking notes (Vaseghi et al., 2012). Not every learner is proficient in reading or writing. Students might have dyslexia, making learning difficult for the student to learn using reading/writing as a method. Dyslexia is a specific learning disability which similarly affects children and adults in reading, writing, spelling, perception, and memory (Pritchard, 2009).

Kinesthetic Learning Preference

The kinesthetic learner is hands-on and learns best while physically taking part in the class and working through the instruction. Kinesthetic learners are students who learn best by taking an active, physical part of the course and using a hands-on approach to learning (Cherry, 2018). Kinesthetic learning includes movements, drawings, and other activities applied to get students physically involved with the teaching (Chandler et al., 2020). The kinesthetic learning preference was found in almost 90% as a part of preferred learning styles using the VARK online questionnaire (VARK, 2020).

Review of Current Literature

People are constantly learning. Education takes place in different settings and at various times throughout a person's life. Learning is defined as changes in behavior or knowledge, which is obtained because of studying, teaching, or experiences (De Houwer et al., 2013; Illeris, 2018; Pritchard, 2009; Washburne, 1936). Students learn using different methods and techniques. Several factors and variables influence or affect an individual's learning style, such as gender,

age, education level, and experiences. An individual's learning style could be influenced by different backgrounds, interests, motivations, school level, and gender (İlçin et al., 2018; Mašić et al., 2020).

Learning style is defined as the attitudes, behaviors, characteristics, and psychological factors which determine an individual's learning preference (Bernard et al., 2017; Feldman et al., 2015; Vasileva-Stojanovska et al., 2015; Willingham et al., 2015). With knowledge in learning styles, teachers can prepare lesson plans geared towards the student's learning preference. Learning styles are important parts of education which need to be accounted for when designing and conducting lessons (Mašić et al., 2020). Previous research in teaching to the preferred learning styles of adult learners has revealed an improvement in the student's learning and comprehension of the topic being taught (Anderson, 2016; Barry & Egan, 2018; Celli & Young, 2017). Instructors who teach to the student's preferred learning style report improvements in the students' scores and grades (Rijal, 2017). Understanding the students' learning styles and changing teaching techniques to match the learning styles are essential for effective learning to take place and to enhance performance (Mpwanya & Dockrat, 2020).

Elementary School Students

Research has been conducted using the VARK learning style inventory with students of different ages and school levels. In a study conducted using elementary students and learning preferences. The students preferred the kinesthetic learning style over other styles (Leasa & Corebima, 2017). Kinesthetic appears to be the most popular learning preference among elementary students. Research conducted using elementary students and the VARK learning instrument reported students to have more than one learning preference. Nearly 90 % of the

student participants selected the kinesthetic style as the most preferred learning preference, with almost 12 % using more than one learning style but still selecting the kinesthetic learning style as one of the styles (Leasa et al., 2018). A strong preference for the kinesthetic learning style over others in elementary students exists (Pooley, 2017).

High School Students

Students in high school are older than elementary students and have different likes and dislikes. The VARK instrument was used to find a learning preference in high school students in a math class. Research was conducted to increase learning and student engagement in the course. The participants reported having multiple learning preferences, visual, aural, and kinesthetic (Bosman & Schulze, 2018). Students who preferred multiple learning preferences received better scores, higher grades, and were high achievers in the class compared to the students who preferred only one learning style (Bosman & Schulze, 2018).

Online High School Students

With the advent of technology, high school students have the option of taking courses over the internet. Students attending classes over the internet and not in a traditional classroom had unimodal learning preferences; the kinesthetic learning style was one of the styles selected, like students attending traditional classes in a classroom setting (Amran et al., 2017). Kinesthetic was found to be the most popular learning preference for both online and traditional students. Online students preferred different instruction types geared towards the learning preference of choice; visual and aural students preferred videos and visual materials, while the read/write students preferred materials using PDF files or other reading materials (Amran et al., 2017).

Undergraduate College Students

Several studies have researched the preferred learning style of the adult learner using the VARK learning assessment. Research conducted with undergraduate college students was conducted to determine if a learning preference could be identified with undergraduate college students. The kinesthetic learning style was preferred by undergraduate medical students over other preferences (Bhagat et al., 2015). In contrast, undergraduate biology students showed a preference towards a bimodal style, two learning preferences, with one being kinesthetic (Farkas et al., 2016). Other studies conducted using the VARK learning assessment with undergraduate college students revealed the kinesthetic and visual learning styles were preferred over the aural and read/write learning styles (Alkooheji & Al-Hattami, 2018; Chandrasekera & Yoon, 2018). Another study indicated undergraduate college students as being bimodal learners with aural and kinesthetic learning preferences (Prithishkumar & Michael, 2014). Undergraduate college students selected the kinesthetic learning style as the preferred learning method. Regardless of whether the student was unimodal or bimodal, the kinesthetic style was included.

Graduate College Students

Graduate students are still considered students but are seeking higher education. A graduate student is an individual who has earned a bachelor's degree and is pursuing a higher degree in a specific field (U.S. Department of State, 2015). Students attending a law school preferred the visual learning style over aural, reading/writing, and kinesthetic styles of learning (Mohamad et al., 2019). Another study indicated international graduate students preferred the kinesthetic and visual learning styles (Wahyudin & Rido, 2020). Graduate students have reported different learning styles, with kinesthetic being selected most of the time. A study using graduate

medical students revealed the read/write style followed by the kinesthetic style was selected most as the two learning styles preferred by the students (Ojeh et al., 2017).

Online College Students

Technology constantly changes, causing organizations to change and keep up with technology. Education is an area where technology has changed the way students attend classes and how instructors teach those classes (Andalecio et al., 2020). College students attending courses in an online environment continue to grow and are becoming standard. Attending college to earn a degree is a typical choice for numerous students (Kentnor, 2015). In 2018, the total number of students enrolled in at least one online college course was almost 7 million (National Center for Educational Statistics, n.d.).

Using a learning preference instrument with online student participants might not produce the same results as traditional classroom student participants. The kinesthetic learning preference in an online environment could be difficult for students to select as a preferred learning style. Initial research has reported kinesthetic learners in an online course might be the least engaged learners compared to other students with different learning preferences (Sereni-Massinger & Wood, 2016). In a study utilizing online students, the data indicated students with the read/write learning preference prefer online courses, while aural, visual, and kinesthetic learners prefer traditional courses mixed with online components, a hybrid course (Yu, 2020). Another study using online college student participants in a hospitality class revealed the course catered to every preference except the kinesthetic making technical hospitality training difficult (Andalecio et al., 2020).

Gender and Learning Style Preferences

Students make up a diverse group of learners with different demographics and gender. An individual's learning style could be influenced by different backgrounds, interests, motivations, school level, and gender (İlçin et al., 2018; Mašić et al., 2020). Differences in learning style preferences have been identified in gender. Female English college students preferred the communication, aural learning style of learning over other styles (Radwan, 2014). Female dental college students preferred the aural learning style, while male students preferred the kinesthetic style (AlQahtani et al., 2018). Another study revealed female undergraduate students preferred the kinesthetic learning style, and male undergraduate students preferred the visual style (Alkooheji & Al-Hattami, 2018).

Learning Styles of Law Enforcement Officers

Knowing the learning style of law enforcement officers is vital for instructors to provide proper, effective, and productive training. Law enforcement officers are continually learning and required to attend classes to keep certifications active and informed of new laws and crime trends. Any full-time, part-time, or auxiliary Florida law enforcement officer shall complete 40 hours of agency, advanced, specialized, or career development training classes every four years to keep an active law enforcement certification (Florida Department of Law Enforcement, n.d.-b).

Training for law enforcement officers occurs in several environments, including traditional classrooms, gun ranges, driving ranges, defensive tactics training gyms, and over the internet, where officers are graded as pass or fail. Law enforcement training is designed to teach new skills, hone existing skills, and improve performance where the skills are instructed in a

behavioral format (Birzer, 2003). The role of law enforcement has changed from only enforcing the law to dealing with problems facing the community. For officers to handle these new challenges, the training given at training facilities needs to reflect those problems officers face while ensuring the instruction meets the needs of the officers. Officers enrolled in a training course aimed at changing the warrior mentality in officers to more of a community-oriented tactic has shown to have lower arrests and use of force incidents (Owens et al., 2018).

Previous research investigated the learning styles of law enforcement officers using learning style inventories. Prior investigations using VARK learning assessment and law enforcement officers, different methods were selected as the preferred learning style in each research. In one VARK assessment investigation, the read/write styles were found to be the preferred learning style of law enforcement officers (Landry, 2015). Another investigation using the VARK assessment, the kinesthetic learning style was found to be the most selected style by law enforcement officers (White, 2016). The preferred learning style of law enforcement officers was investigated using Kolb's learning assessment, which revealed officers preferred the Converging learning style (Stephens, 2015). In Kolb's learning assessment, the converging learning style is the category associated with people who can solve problems and make decisions by finding explanations to questions and problems (McLeod, 2003).

Gap in Literature

Although there is previous research on the learning style preferences amongst students in various education levels, the research in learning style preferences of law enforcement officers has focused on single agencies. The previous research investigating the preferred learning styles of law enforcement officers (Birzer & Nolan, 2002; Landry, 2015; Massoni, 2009; McHenry,

n.d.; Stephens, 2015; White, 2016) used officers from one agency and not multiple agencies where law enforcement demographics vary. There are different demographics to consider in research, such as age, gender, location, number of participants (Sifers et al., 2002), academic achievement, culture, and intelligence (Alkubaidi, 2014; Prithishkumar & Michael, 2014).

Law enforcement agencies conduct in-house training to keep officers informed of new topics, crimes and ensure officer certifications are kept current. Agencies ensure officers are trained in various topics such as laws, crime trends, community needs, and new equipment (Etter & Griffin, 2011; Ross & Bodapati, 2006). The use of a training facility attended by officers from across the state assists in eliminating the use of participants from only one agency and reporting the results of a single agency as a representation of the entire law enforcement field. Research using a single organization keeps the results of the study too centralized to the one institution used which excludes others, and the results cannot be generalized to the other organizations (Jawed et al., 2019; Kaplan, 2018; Ojeh et al., 2017; Parmar et al., 2020; Subia et al., 2019). Using officers from different agencies may assist in obtaining a better understanding of the preferred learning styles of the law enforcement community, which have not been addressed in previous studies.

Counterargument

Although learning style inventories have become a popular tool, there is debate on if learning style inventories work in determining a dominant learning style and if the learning styles are even accurate. Several investigations into debunking learning styles were conducted, and the results found no relationship between learning style and teaching to preferred learning style improving the student's learning (Newton & Miah, 2017; Pashler et al., 2008; Rogowsky et al.,

2015). Even though the use of learning style inventories is popular with students and teachers, there is no evidence to show the effectiveness of learning styles in the learning process of students. Despite evidence suggesting learning styles do not assist students in learning more effectively, the use of learning style inventories is still widely used to assess students' learning styles (Newton & Miah, 2017).

Chapter Summary

Chapter 2 contains an explanation of the literature search strategy and the theoretical framework guiding the study. Also examined were the topic of learning, behaviorism, VARK learning style, learning preferences of elementary, high school, college, and online students, and law enforcement officers. The VARK learning assessment has been used in several investigations resulting in different results. When the VARK was used with law enforcement officers, one researcher reported the read/write style being preferred (Landry, 2015), while another reported the kinesthetic style being preferred (White, 2016).

The research attempted to fill the gap in the literature on the preferred learning style of law enforcement officers from different agencies and if different variables such as gender and educational level affect those styles (Drago & Wagner, 2004; Etter & Griffin, 2011; Hossain et al., 2009). The study aimed to build upon previous research and add to the literature base to assist in developing effective lesson plans for instructors to provide effective training to law enforcement officers. Using the preferred learning styles of officers in educating law enforcement officers may reduce or close the gaps in training while improving the instruction given to officers (Massoni, 2009). Chapter 3 provides further details about the research methods used in the study.

Chapter 3: Methodology

Modern policing requires law enforcement agencies and training facilities to expand knowledge on how to better train officers (Blumberg et al., 2019). Understanding the preferred learning styles of law enforcement officers can help facilitate improved training for officers. Incorporating the preferred adult learning style in law enforcement training programs may reduce or close the gaps in training while improving the instruction given to the trainees (Massoni, 2009). The problem is the learning style preferences of law enforcement officers is unknown, resulting in the possibility of ineffective training methods (Beary, 2018; Blumberg et al., 2019; Murphy, 2017), where gender and education level may affect learning style preferences. Failure to adequately train and supervise police officers is a cause for civil liability suits against law enforcement officers and agencies (Lim & Lee, 2015).

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. For the proposed quantitative study, three variables (preferred learning styles of law enforcement officers, gender, and education level) were considered. Research questions represent a fundamental step to guide and direct how researchers develop knowledge in research (Thuan et al., 2019). The following research questions guided the study:

Research Question 1: What is the relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

Research Question 2: What is the relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

The null and alternative hypotheses for the study's research questions include the following:

H1₀: There is no significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

H1_a: There is a significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

H2₀: There is no significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

H2_a: There is a significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

In Chapter 3, the methods and design of the research, including the rationale for the study, procedures, and the role of the researcher, are described. The chapter also includes the

population and sample selection, instrumentation, and data collection, as well as data analysis, reliability, and validity sections. The chapter concludes with ethical procedures and a chapter summary.

Research Design and Rationale

The study included the use of the quantitative methodology to examine if a relationship exists between the variable preferred learning styles of law enforcement officers and the variables of gender and education level. Quantitative analyses examine the relationship among variables being measured on instruments. The data are reported as numbers and analyzed using statistical procedures (Creswell, 2014). Quantitative research is used to describe variables and test relationships between variables (Grove & Gray, 2019).

A demographic survey (see Appendix E) was created specifically for the study. The demographic survey determined the participant's gender (male or female) and education level (high school/GED, some college no degree, associate, bachelor's, master's, or doctorate). Demographics have been associated with learning preferences and how a student prefers to obtain information (Alharbi et al., 2017; Meyer, 2016; Naresh et al., 2016). The VARK questionnaire (see Appendix F) was used to determine the participant's preferred learning style (visual, aural, read/write, or kinesthetic).

The proposed research included a relational design using a chi-square test of independence. A chi-square test of independence is generally used to determine if a relationship or association between two categorical variables exists (Deshpande & Mangalwede, 2019; UCLA, n.d.). Relational research design is intended to investigate whether and how variables are

related to each other (Cook & Cook, 2016). The variables are categorical. A categorical variable has at least two categories without an intrinsic ordering to the categories (UCLA, n.d.).

The study may help determine if a relationship exists between the variables preferred learning styles (visual, aural, read/write, or kinesthetic) of law enforcement officers, gender (male or female), and education level (high school/GED, some college no degree, associate, bachelor's, master's, or doctorate). Studies using a quantitative research design have been conducted on the VARK learning style preference, where the data were analyzed by a quantitative method using descriptive and inferential statistics (Almigbal, 2015; Mozaffari et al., 2020). Research questions and hypotheses in the study addressed if a relationship exists between the variable, learning preference styles, and variables of gender and education level. The VARK Corporation has reviewed and approved the methodology selected for the study (see Appendix D).

Role of the Researcher

I am employed as an adjunct instructor at the site location used to obtain participant data. During data collection, I did not take part in teaching any of the courses in which participant data were collected and only obtained the information necessary for the study. Not teaching any classes where data were collected assisted in keeping the data accurate and unbiased. In quantitative research, the role of the individual conducting research remains neutral to avoid bias while trying to study the problem from a distance (Johnson & Christensen, 2019). As an adjunct instructor for the research site location, I have access to potential study participants to obtain the data needed to complete the study. Permission for access to potential study participants was obtained before recruiting. No incentives were offered to any participants volunteering to take

part in the study. Participant responses were coded by assigning a number allowing for anonymity. The data were collected without influencing the participants.

Being employed by the same agency as some of the officers attending the training classes, I did not influence any of the participants to take part in the study. I only teach at the research site location part-time and do not interact with every class or agency member. Research conducted by sworn law enforcement officers using other officers or agencies to complete graduate studies is becoming more prevalent (Muhlhausen, 2018). The students were instructed taking part in the study is not a requirement and would not cause a positive or negative effect in completing the class. Investigators who conduct research in different settings must have good communication skills (Niemczyk, 2018). The class instructor did not collect data to prevent participants from feeling obligated to participate in the study. I collected all data from the participants in the study.

Research Procedures

The study included the use of the quantitative research method to determine if a relationship exists between preferred learning styles of law enforcement officers in Central Florida based on gender and education level. The following section describes the research-related activities which were completed to attain the goals of the study. Population, sample, recruitment, participation, instrumentation, data collection, and data preparation are included in the descriptions.

Population and Sample Selection

The target population for the study was certified law enforcement officers in Central Florida. Law enforcement officer population continues to grow in the state as the population

increases. In 2012, Florida had over 47,000 certified law enforcement officers (U.S. Department of Justice, 2016). The number of law enforcement officers has grown to nearly 51,000 in 2016 (Florida Department of Law Enforcement, n.d.a). Of the almost 51,000 officers in Florida, approximately 600 are from the county where the research site is located. Participants for the study were a group of certified law enforcement officers who attended a course at the training facility.

The original sample size for the study was identified using a sample size calculator (see Appendix A). Sample size can be determined by using a power analysis from a selected probability of finding a statistically significant result (Fugard & Potts, 2015). Using a confidence interval of 95%, an error margin of .05, and a population portion of 50%, the study calls for a minimum of $n = 382$ participants but having extra participants helps account for attrition, mortality, and incomplete data. Human subjects may decide not to participate in a study before completion, making the data incomplete (Carlson, 2010). Sample size was determined by the approximate number of officers in the state of Florida. The sample population for the research was gathered from officers attending various courses in a law enforcement training facility located in Central Florida. Due to the COVID pandemic, the original sample size for the study was reduced from 382 to 167 participants, with a confidence level of .80.

A convenience sample was used to obtain participants for the proposed research. A convenience sample is a non-random sampling technique where members of the target population meet certain conditions, including easy access to participants, geographical proximity, availability, or willingness to participate in the study (Etikan et al., 2016). Convenience samples are used when the study participants naturally form a group (Creswell,

2014). Using a convenience sample ensures every officer attending a class at the training facility can participate. Sampling is selecting a portion of the population in the research area, which represents the entire population investigated (Landreneau & Creek, 2009).

A non-probability sample was used to obtain participants for the investigation. Non-probability sampling is based on the researcher's choice of the population, which is available and accessible at the time of the study (Setia, 2016). The non-probability sample is a sampling technique where participants for the research are gathered in a process, not giving every person in the population an equal chance of being included or participating in the study (Etikan et al., 2016).

The inclusion criteria for the study were certified law enforcement officers in the state of Florida. Inclusion criteria are key features of the target population to assist with answering the research questions (Patino & Ferreira, 2018a). Exclusion criteria are characteristics of participants may interfere with the study, even though the participant meets the inclusion criteria (Patino & Ferreira, 2018a). The exclusion criteria for the study were participants who refused to sign informed consent, if participants filled out the questionnaire incorrectly, or if participants were not certified as a law enforcement officer and only a recruit.

The site location for the study is a law enforcement training facility in Central Florida. Schools can be a valuable resource to recruit participants to use in a study (Bartlett et al., 2017). The director of the training facility was sent the research selection site permission letter and signed the letter allowing use of the facility (see Appendix C). Law enforcement training facilities provide instruction for primary law enforcement officers, correctional officer recruits, and certified law enforcement officers in multiple topics (Blumberg et al., 2016).

Officers were invited to participate in the study before the class started. The classes given at the training facility are limited to certified officers. Officers attending courses at the training facility meet the inclusion criteria of being a certified law enforcement officer. Recruitment of participants is not necessary, as potential participants were already at the research site to attend a class. The officers were not required to participate in the study and were advised participation is strictly voluntary and would not affect the course. Optional participation in data gathering through the survey method is essential for the success and accuracy of the research (Kılınc & Fırat, 2017).

Officers who agreed to participate in the study completed an informed consent form (see Appendix B). By obtaining consent from participants, researchers safeguard the rights and wellbeing of the human subjects during the study (Widmer et al., 2020). Informed consent was thoroughly explained before obtaining approval from the participants. Once informed consent was signed, participants answered demographic questions (see Appendix E) and completed the paper version of the VARK questionnaire.

Instrumentation

The problem and research questions for the study support the study's purpose, which is to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and education level of officers attending a training facility located in Central Florida. Use of the visual, aural, read/write, and kinesthetic (VARK) assessment may help determine if officers prefer visual, aural, reading/writing, kinesthetic, or have multiple preferences. The VARK questionnaire assists with identifying if a learner has one learning preference, unimodal, or multiple learning preferences, multimodal (Khanal et al., 2019).

Knowing the preferred learning styles may help instructors teach to the students' strengths and help the students achieve academic success (Balasubramaniam & Indhu, 2016). Understanding students learning preferences may assist trainers in finding a beneficial way to instruct current and future law enforcement officers. Educators need to understand students' learning preferences to design effective lesson plans focusing on learning preferences to assist students with learning (Şener & Çokçalışkan, 2018).

The VARK learning assessment questionnaire was created by Neil Fleming in 1987 as a framework for learners to find a preferred learning style (Fleming & Baume, 2006). The VARK assessment (see Appendix F) consists of 16 multiple choice questions and is designed to sort participants into different learning preferences such as visual, aural, read/write, and kinesthetic or multimodal, which is having more than one learning preference (Khongpit et al., 2018; Kurgun & Isildar, 2016). Questionnaires are scored using the responses of visual, aural, read/write, or kinesthetic for each question on the VARK scoring chart (see Appendix G). Each question may have zero to four answers, each corresponding with a learning preference in the VARK acronym, visual, aural, read/write, and kinesthetic. Responses to the VARK questionnaire vary depending on the participant's preferences. After permission was granted to use the VARK (see Appendix D) and informed consent was obtained from the participants, the participants completed the paper version of the VARK questionnaire (see Appendix F). Using the paper version was more optimal than the online version because not every officer had a computer while attending the training facility.

VARK questionnaires were given to the participants before the start of class, which allows instructors to adjust the lesson plan accordingly and allow time for completion. The

questionnaire took around 30 to 45 minutes to complete. In addition to the VARK questionnaire, participants filled out information regarding gender and education level. The VARK assessment is used by students to understand the officer's preferred method of learning and by teachers to create lessons geared towards the student's preferences (Fleming & Baume, 2006). Classes taught during the collection duration for the study varied. Teaching only one specific course may affect the results as different classes are presented in different ways. For example, one class is more hands-on, while another class is a lecture. Various courses may offer a broader perspective on preferred learning styles.

The VARK questionnaire consists of 16 questions, where the four learning styles, visual, aural, reading/writing, and kinesthetic, have been found to have validity using the Rasch model (Fitkov-Norris & Yeghiazarian, 2015), correlated trait-correlated uniqueness (Leite et al., 2010; Wong & Chin, 2018), and Cronbach alpha (Amran et al., 2017; Sarabi-Asiabar et al., 2015). The VARK is a learning preference assessment tool several organizations, including government agencies, public and private businesses, and educational institutions, have used to study learning preferences (Aldosari et al., 2018; Daoruang et al., 2019; Junior et al., 2016; Landry, 2015). Learners who used the preferred learning style preference used the preferred style to advance education which will benefit career goals (Bhagat et al., 2015). Reliability and validity of the measurement tool used in research are essential (Mohajan, 2017).

Data Collection

After obtaining approval from the American College of Education's Institutional Review Board, the law enforcement training facility was contacted to determine data collection dates and times. For all research where human subjects are used, the Institutional Review Board (IRB)

should review and give approval to the researcher prior to data collection (Phillips et al., 2017). Possible participants were given background information on the study, allowing the officers to decide on participating in the study. Participant recruitment is essential for studies involving humans (Newington & Metcalfe, 2014). The officers who agreed to participate in the study received a hand-delivered informed consent form. After the willing participants read and signed the informed consent form, the VARK and demographic questionnaire were handed out. The data were entered into a Microsoft Excel spreadsheet for review.

In addition to the research instrument questionnaire or survey, demographic questions were added to obtain data about the participants in the study. Quantitative relational research requires the collection of demographic data from the participants at the time of the study (Ponto, 2015). The VARK questionnaire was used to obtain the data required in the preferred learning style of law enforcement officers and to determine if a relationship exists between the variable learning styles and the variables of gender and education level. The demographic questions were used to collect the data from the participants, which includes gender and education level (see Appendix E). Demographic questions are essential to include in almost every research study where humans are used to provide an accurate description of the research sample (Hughes et al., 2016). Secondary sources were not used to obtain demographic or any other information or data.

The learning preferences data only, without participant identifiers, was shared with the VARK Corporation to compare with previous assessment takers and to add to the overall learning preference data kept by the VARK Corporation. The VARK questionnaire assists with identifying if a learner has one learning preference, unimodal, or multiple learning preferences, multimodal (Khanal et al., 2019). Information was required to be shared with the VARK

Corporation to determine the participant's preferred learning preference and if the preference is unimodal or multimodal (see Appendix D). Results received from the VARK Corporation were used for analysis.

Data obtained from the participants are stored in a locked file cabinet for a minimum of 3 years. Securing human participant research data are vital in respecting the privacy of research subjects and complying with protocols and requirements (O'Toole et al., 2018). Identifying information was removed during data collection to protect the identity of participants. After the completion of the study and the data has been secured for a minimum of 3 years, the data will be discarded per the U.S. Department of Health and Human Services (45 CFR 46.115(b)) and the American College of Education requirements for data destruction (American College of Education, 2018; U.S. Department of Health and Human Services, 2018a). Research involving human subjects as participants often have a time frame when the data are required to be destroyed (Kung & Campbell, 2016). After the data collection, the participants were thanked for taking part in the study and instructed to call or email the contact information on the informed consent form to obtain the individual's learning style preference or the entire study if wanted.

The collected data points were entered into a Microsoft Excel spreadsheet for review. Any participants with missing data points were eliminated from the study. The Excel spreadsheet contained data points for each participant, which included participant number (assigned when the survey was collected), gender (male or female), and education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, or doctoral degree).

The Excel spreadsheet also contained data points for each preferred learning style, visual

(V), aural (A), read/write (R), and kinesthetic (K). Participants were able to select one or multiple answers to each question, meaning participants may have one preferred learning preference or multiple learning preferences, multimodal. Multimodal is categorized as either bi-modal, tri-modal, or all four modes, type 1, or type 2. Bi-modal is categorized as VA, VR, VK, AR, AK, or AV learning preferences, tri-modal as VAR, VAK, VRK, ARK, ARV, or AKV, and all four as VARK Type One who are flexible learners who switch from mode to mode depending on what is being learned and VARK Type Two who want input in all learning preferences (VARK, 2020).

Data Analysis

The chi-square test for independence was used to analyze the data. The chi-square test for independence is used for multiple variables, each with several categories (Aron et al., 2013). Using the chi-square test assisted in determining if a relationship was present between the categorical variables of preferred learning style of law enforcement officers (visual, aural, read/write, kinesthetic) and participants' gender (male or female) and education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, or doctoral degree). A chi-square statistical analysis was performed using Excel version 2102, the most current version of Excel software available. Using Excel is more convenient than other data analysis programs and allows the data to be easily transferred to other Microsoft products when preparing reports, graphs, or presentations (Kolluri et al., 2016).

Four assumptions need to be considered to run a chi-square test for independence (Laerd Statistics, 2017). Three assumptions are related to the measurement of the variables. The assumptions are as follows: (a) There are two nominal variables. (b) The observations are

independent of each other and hold no relationship between groups or individually. (c) Testing of the null hypothesis cannot be used with all sampling types, and cross-sectional sampling is best suited, and (d) How the data fits the model (Laerd Statistics, 2017). The first assumption is met because more than two nominal variables were used in the study. Participants can only fit into one category within each group and satisfy the second assumption. Data were gathered at one point only during the investigation, complying with the third assumption.

The fourth assumption relates to how the data fits the model and is tested in SPSS Statistics. Data will contain counts in each cell, which are more than or equal to five (Laerd Statistics, 2017). The assumption is interpreted using cross-tabulation. Cross tabulation is the summarization of categorical data into a table with each cell in the table containing the frequency (either raw or proportional) of the observations, which fit the categories represented by each cell (Momeni et al., 2018).

The quantitative analysis examines the relationship among variables measured on instruments where the data are reported as numbers and analyzed using statistical procedures (Creswell, 2014). Demographic data and the results from the VARK questionnaire were entered into an Excel spreadsheet. The data were coded to ensure the protection of participant identities. Any questionnaire missing data or completed improperly was not included in the final data used for the research. Having accurate and consistent data before processing the data for analysis assists in ensuring the results are reliable (Chu et al., 2016). After the data were scrubbed, the data were analyzed through chi-square tests using Microsoft Excel.

The CHISQ.TEST calculates the p-value and the CHISQ.DIST. RT tests for a chi-square test of independence. A p-value is the probability associated with the test statistic of the chi-

square test of independence. The p-value measures the difference between the data and a null hypothesis, usually in the assumption of no difference or no effect (Held & Ott, 2018).

The chi-square test of independence was used to determine if the data from the sample population are consistent with the hypothesized distribution. If the data are consistent with the specific distribution, then the null hypotheses are accepted. If the data are not consistent with the specified distribution, the null hypotheses are rejected; thereby, the alternative hypotheses are accepted. Null hypotheses are when no relationship or no significant difference exists in the research, while the alternative hypotheses reveal there is a difference (Hayes, 2020). The p-values for the various hypotheses assists in determining if there are learning preferences of law enforcement officers based on the factors indicated in each hypothesis.

The Bonferroni correction test was completed after a statistical significance was reported to compensate for a Type I error. The Bonferroni correction is used to correct Type I error or discovering a false-positive result, where the true null hypothesis is rejected (Yormaz & Sünbül, 2017). Bonferroni's adjustment is made by dividing the number of tests into the alpha value (Laerd Statistics, 2017). Cramer's V test was used to report the strength of association between the variables. Statistical strength tests are relationship measures; for the chi-square statistical test, Cramer's V is the most used strength test (McHugh, 2013).

The first three assumptions were met for the chi-square test of independence. The fourth assumption was violated due to the cell count in less than 80% of the cells being under five. Small cell counts of less than five, including zero, are an assumption violation in the chi-square test of independence (Yin & Jin, 2020). Because of this violation, the SPSS statistical testing software was used to verify the results found in the Excel statistical testing software. SPSS

allows for chi-square statistical testing when the fourth assumption is violated using likelihood to analyze the data. A likelihood ratio chi-square test analyzes observed frequencies with frequencies predicted by a model based on expectations estimated by maximum likelihood (Sharpe, 2015).

Reliability and Validity

External threats relate to the type of sample used and how the sample was selected (Greenaway & Cruwys, 2019). External threats to validity include selection biases, generalizations, effects, and history (Laerd Statistics, 2017). Selection bias was minimized as every certified law enforcement officer attending the training facility had the opportunity to participate in the study. The participants were not separated into any groups based on demographics. An external threat to the research validity is attempting to generalize the results of the study to the entire population of law enforcement officers in Florida. Using a small sample of subjects to represent the broader population may cause the research to be less reliable (Fowler & Lapp, 2019).

Internal threats deal with how the research was conducted and if the results from the population studied are based on the data and not from methodological mistakes (Greenaway & Cruwys, 2019; Patino & Ferreira, 2018b). Examples of internal threats to research include history, maturation, instrumentation, testing, selection, regression to the mean, social interaction, and attrition (Bhandari, 2020). Internal threats to validity in the study were history. History internal threats refer to occurrences which take place in the environment and could affect the results (Laerd Statistics, 2017). An example is participants who attend a specific course and answer the questionnaire based on the course attending. The participants in the study participated

in various classes, lectures, hands-on, or a combination, minimizing the internal threat of history. Instructors used in research have a significant role in the study and may influence the results if the participants are instructed differently to obtain a specific response (Cuncic, 2020).

The ability to reproduce results over time constitutes reliability (Pauluzzo, 2020). Data were collected on the preferred learning style of law enforcement officers, gender, and education level. Replication of the study is possible at other training facilities to examine if a relationship exists between preferred learning styles of law enforcement officers based on gender and education level. The research can be replicated. Correctly replicated studies provide the same results as the original study (Patil et al., 2016).

The meaning of objectivity is captured by the attribute of impersonality, which reduces vulnerability to biases (Munro & Hardie, 2019). Objectivity was not an issue in the study because data were obtained from the participants to be analyzed for hypotheses testing. No outside influences swayed the participant's answers allowing for unbiased responses. The ability to be objective is a critical aspect of effective research (Creswell, 2014). To minimize threats to reliability and validity, a valid and reliable instrument was used (VARK questionnaire) while affording participants anonymity and privacy to encourage honest answers. The VARK questionnaire was determined to be a valid and reliable instrument in discovering a person's preferred learning style (Amran et al., 2017; Fitkov-Norris & Yeghiazarian, 2015; Wong & Chin, 2018). Participant responses were coded by assigning a number allowing for anonymity. Adding to the overall credibility of research can be done by understanding and trying to eliminate internal and external threats and staying impartial throughout the research process.

Ethical Procedures

Data obtained was analyzed with strict confidentiality to protect the anonymity and privacy of the participants. All questionnaires were collected after completion, and participant names were coded for anonymity. After the completion of the study and the data has been secured for a minimum of 3 years, the data will be discarded per the U.S. Department of Health and Human Services (45 CFR 46.115(b)) and the American College of Education requirements for data destruction (American College of Education, 2018; U.S. Department of Health and Human Services, 2018a). The questionnaires are kept in a locked file cabinet, and any digital information is secured in a personal password-protected computer. Each participant's responses were coded using random numbers for identification to keep responses confidential. Research ethics deal with protecting the human rights of participants used in research, including rights to privacy and protection from harm (Miller et al., 2015). The three ethical principles of respect for person, beneficence, and justice are vital to upholding ethical research (U.S. Department of Health and Human Services, 2018b).

The autonomy of the research participants is guaranteed and protects the integrity of the participants in a study (Widmer et al., 2020). Each participant was given an informed consent letter (see Appendix B) before the start of class by direct hand distribution. All possible participants were provided a copy of the informed consent. The informed consent was read out loud to ensure participants understood the form and asked questions as needed.

Students were advised participation is voluntary and taking part in the study would not affect the class or final grade. Directly communicating with participants before joining a study and during the research process is vital in earning and maintaining trust (National Institutes of

Health, 2016). The director of the training facility was present during the explanations of the research but did not assist in collecting the questionnaires or data analysis. Law enforcement officers in the class had the ability to accept or decline participation on the form to remain private in the decision to participate in the study or not. The completed informed consent forms were collected and placed in a concealed envelope, which remained unopened until the consent forms were no longer in the classroom or training facility.

Chapter Summary

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Target population for the study called for approximately 382 certified law enforcement officers in the State of Florida selected through a convenience sample. Incorporating the preferred adult learning style in law enforcement training programs may reduce or close the gaps in training while improving the instruction given to the trainees (Massoni, 2009). Methodology proposed in the chapter is a quantitative design to address the research questions to determine if a relationship exists between the variable, preferred learning style, and variables of gender and education level. The study used the VARK questionnaire to collect numerical data and use the chi-square test to examine the data. Data collection survey consisted of the 16 question VARK learning assessment.

The methodology used to conduct the research included research design and rationale, the role of the researcher, population and sample selection, instrumentation, data collection, data analysis, reliability and validity, and ethical procedures. The conducted research aims to

contribute to the larger body of knowledge about the learning styles of law enforcement officers (Birzer & Nolan, 2002; Massoni, 2009; McHenry, n.d.; Stephens, 2015). Results of the data analysis are reported in Chapter four.

Chapter 4: Research Findings and Data Analysis Results

Law enforcement is a profession where education and training are a vital part of a successful officer and law enforcement agency. The role of police officers in dealing with various situations requires a higher level of education to include ongoing training to ensure officers are properly trained to deal with different scenarios and the public (Bartkowiak-Théron, 2019). Even though education is paramount throughout an officer's career, there are no universal guidelines detailing the best methods to use when training officers. In the United States, there is not a governing body enforcing or standardizing the education or certification standards for officers, causing certification and retraining requirements to vary from state to state (Follett, 2020).

The problem is the learning style preferences of law enforcement officers in the United States are unknown, resulting in the possibility of ineffective training methods (Beary, 2018; Blumberg et al., 2019; Murphy, 2017), where gender and education level may affect learning style preferences. Although law enforcement officers are required to be trained, how officers receive training may not match the individual preferred learning style making the learning process harder for officers to fully understand and comprehend the training. The persons impacted by the problem are the officers receiving the training, the instructors, and the citizens affected by the officers' knowledge or lack of knowledge because of the ineffective training.

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. Three variables in the study include the preferred learning styles of law enforcement

officers, gender, and education level. Participants filled out the VARK questionnaire to determine preferred learning styles. Research has been completed on the VARK questionnaire used in the study and was found to be a valid and reliable test. The VARK questionnaire was determined to be a valid and reliable instrument in discovering a person's preferred learning style (Amran et al., 2017; Fitkov-Norris & Yeghiazarian, 2015; Wong & Chin, 2018). A chi-square test of independence was conducted to address the questions and hypotheses of the study.

Chapter 4 includes a summary of the data collections used in the study. Data collection was conducted using a questionnaire method, including participant demographic information. The chapter summarizes the results of the statistical analyses described in Chapter 3. A discussion of how these results address the study's research questions and hypotheses is also provided.

Data Collection

The study sample of law enforcement officers was obtained using a law enforcement training facility located in Central Florida. The training facility hosts various training courses for law enforcement officers, where officers from across the state are allowed to attend. Before discussing the research with possible participants and data collection, approval was obtained to use the training facility (see Appendix C).

During class, possible participants were given background information on the study allowing the officers time to decide on participating in the study. The participants who agreed to participate in the study received a hand-delivered informed consent form (see Appendix B). After reading and signing the informed consent form, participants were given the demographic (see Appendix E) and the VARK (see Appendix F) questionnaire.

Data collection occurred in person between July and August 2021. Every officer attending a course at the training facility during the collection period agreed to participate in the study. A total of 167 participants took part in the study and filled out the questionnaire. No officer declined in participating in the study, yielding a 100% response rate. All participants signed informed consent before proceeding to the questionnaire stage of the study. Each participant filled out the questionnaire completely and correctly, resulting in 167 questionnaires collected for analysis.

The sample size for the research was reduced from the original 382 to 167 participants due to the COVID pandemic. The reduction in sample size suggests 164 participants and changes the confidence level to .80 (see Appendix H) from 382 participants and a confidence level of .95 (see Appendix A). OTECH, the training facility and research site, followed the health protocols of the school district by canceling classes, closing the facility, and limiting the number of officers allowed in class to attend training courses. Numerous educational institutions throughout the world suspended or removed in-person classroom teaching because of the coronavirus pandemic (Mahdy, 2020). Unlike other educational institutions, most advanced law enforcement training courses are not offered online or are able to change to an online option. During the pandemic, several schools changed in-person classrooms to online classrooms (Daniel, 2020). A participant sample size of 167 officers was used to generalize the law enforcement population of 55,000 officers in Florida.

Data were collected using a demographic questionnaire (see Appendix E) and the VARK questionnaire (see Appendix F). The demographic questionnaire contained questions regarding participant gender and education level. The VARK questionnaire consists of 16 questions

allowing participants to select up to four choices for each question, with each selection correlating with one of the four learning styles. Use of the VARK questionnaire allows participants to select more than one response to each question, which provides a strong indication of the preferred learning style for each participant (Aldosari et al., 2018; Balfaqeeh et al., 2017; Hassanzadeh et al., 2019).

Participant Demographics

Data collection provided information regarding participant demographics. Participant demographics measured in the study fell into two categories, gender, and educational level (see Appendix E). The gender category had two choices, male or female. The educational level category had six choices, high school diploma/G.E.D., some college/no degree, associate degree, bachelor's degree, master's degree, or a doctorate.

Data revealed the number of female officers attending courses was much lower than male officers during the 2-month data collection period in the study. Of the 167 participants who took part in the study, 82% identified as male (137), and 18% (30) identified as female. The information is summarized in Table 1. Further comparisons were made between the number of male and female officers participating in the research and the differences in gender across agencies in the United States. There are over 670,000 officers serving in various agencies across the United States (Department of Justice, 2019). Of the officer population, 87.5% identified as male (586,494), and 12.5% (83,785) identified as female.

Table 1*Gender Demographics*

| Group | Total | % |
|-------------------------------|--------------|----------|
| Number of male participants | 137 | 82% |
| Number of female participants | 30 | 18% |
| Total number of participants | 167 | 100% |

Data collection provided insight into the overall educational attainment, associate degree or higher, of participants in the research. The data revealed nearly half of the participants in the study have a college degree. The information is summarized in Table 2. Degree indicates conferral of an associate degree or higher.

Table 2*Educational Attainment, Associate Degree or Higher of Officers in Research Sample*

| Participant Sample | Degree | No degree | % With degree | % No Degree |
|---------------------------|---------------|------------------|----------------------|--------------------|
| Male participants | 59 | 78 | 43% | 57% |
| Female participants | 23 | 7 | 77% | 23% |
| Total participants | 82 | 85 | 49% | 51% |

Additional comparisons were made between the educational attainment of law enforcement officers in the study and officers in the United States and Florida. The study indicated nearly half of the participants in the study had a college degree. Research data revealed the law enforcement officers in the study sample were more highly educated than officers throughout Florida, with 49% having a degree compared to 37% for the general population of law enforcement officers in Florida (Russo & Duffy, 2017). The study sample of participants

with a college degree, 49%, nearly matched the overall general population of law enforcement officers in the United States with a college degree at 51% (Gardiner, 2018). Officers in the study were more highly educated than the population of officers in Florida and on par with the population of officers across the United States.

The data show the varying levels of educational attainment among the study participants. The most common level of educational attainment was the bachelor's degree level (42), with the associate degree level (33) coming in second. Many participants (65) had some college but no degree. Table 3 depicts the levels of educational attainment of the study participants.

Table 3

Levels of Educational Attainment of Study Participants

| | Male | Female | Total |
|------------------------|------|--------|-------|
| Participants | 137 | 30 | 167 |
| Educational Attainment | | | |
| High school/G.E.D. | 20 | 0 | 20 |
| Some college/No degree | 58 | 7 | 65 |
| Associate degree | 24 | 9 | 33 |
| Bachelor's degree | 30 | 12 | 42 |
| Master's degree | 4 | 2 | 6 |
| Doctoral degree | 1 | 0 | 1 |

The data obtained from the VARK questionnaire used in the study fell into four categories-visual, aural, read/write, and kinesthetic (V, A, R, K). Participants may show a

preference towards one or multiple learning styles (multimodal). Multimodal is categorized as having more than one learning preference and categorized as either bi-modal (any two preferences), tri-modal (any three preferences), or VARK (all preferences) (VARK, 2020). The VARK scoring sheet (see Appendix G) was analyzed for individual participant learning preferences. Table 4 depicts all learning preference results based on demographic variables.

Table 4*Learning Preference All Variables*

| Demographic Variable | Learning Preference | | | | | | | Total |
|------------------------|---------------------|----------|----------|----------|-----------|------------|-------------|-------|
| Gender | V | A | R | K | BI | TRI | VARK | |
| Male | 2 | 5 | 0 | 77 | 26 | 11 | 16 | 137 |
| Female | 1 | 4 | 0 | 12 | 8 | 3 | 2 | 30 |
| Education Level | | | | | | | | |
| High school | 0 | 0 | 0 | 12 | 4 | 1 | 3 | 20 |
| Some college/No degree | 0 | 3 | 0 | 36 | 15 | 3 | 8 | 65 |
| Associate degree | 2 | 2 | 0 | 20 | 7 | 1 | 1 | 33 |
| Bachelor's degree | 0 | 4 | 0 | 17 | 8 | 8 | 5 | 42 |
| Master's degree | 0 | 0 | 0 | 4 | 0 | 1 | 1 | 6 |
| Doctorate degree | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Data Analysis and Results

The data collected for the study provided the opportunity to deliver information regarding preferred learning styles of law enforcement officers from agencies across Florida and not limit the participants to one specific agency. In addition to learning style preferences, participant demographic information was also obtained. All data were used to address the study's research questions and hypotheses. A chi-square test of independence was conducted on Excel and the latest version of Statistical Package for the Social Sciences (SPSS) to address the research questions and verify the statistical results.

Assumptions

Four assumptions were associated with the chi-square test of independence which was used for this study. The four assumptions include the following: (a) There are two nominal variables. (b) The observations are independent of each other and hold no relationship between groups or individually. (c) Testing of the null hypothesis cannot be used with all sampling types, and cross-sectional sampling is best suited. (d) Each expected cell count is at least five (Kim, 2017; McHugh, 2013).

The first assumption was met because more than two nominal variables were used in the study. Participants can only fit into one category within each group, which satisfies the second assumption. Data were gathered at one point only during the investigation, complying with cross-sectional sampling. The fourth assumption relates to the expected cell count being five or more (Laerd Statistics, 2017). In the fourth assumption, the values in the expected cell count should be five or more in at least 80% of the cells, if this cell count is not met, a violation occurs

(Frimodig, 2020; McHugh, 2013). Violation of the fourth assumption occurred because the cell counts were not five or more in at least 80% of the cells.

Due to the fourth assumption being violated, an additional chi-square test of independence was conducted using SPSS to verify the initial results and run the likelihood report. Researchers in social sciences utilize Windows-based software tools such as SPSS for statistical evaluation (Kumar, 2019). The chi-square statistical analysis was performed using the most current version of SPSS software available. SPSS addresses analytical issues from planning, data collection, analysis, and reporting (Aljandali, 2016).

Using SPSS allowed the likelihood ratio to be reported due to the violation of the fourth assumption. The likelihood ratio chi-square test is most often used when the data set is too small to meet the sample size assumption of the chi-square test (McHugh, 2013). A likelihood test estimates the probability distribution of a sample. Where expected frequencies in cells were less than 5, the likelihood ratio of chi-square statistics could be more effective than chi-square statistics alone when analyzing data (Özdemir & Eydurán, 2005). The likelihood ratio provides a clearer interpretation of the strength of the evidence for or against an effect than does a p-value (Etz, 2018).

Research Questions and Hypotheses

To achieve the purpose of the quantitative relational study, the research questions and hypotheses for the study were as follows:

Research Question 1: What is the relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

H1₀: There is no significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

H1_a: There is a significant relationship between gender (male vs. female) and learning style preference (visual, aural, read/write, kinesthetic) among law enforcement officers attending classes at a law enforcement training facility located in Central Florida.

To answer questions one and two of the study, a chi-square test of independence was conducted. A chi-square test of independence is generally used to determine if a relationship or association between two categorical variables exists (Deshpande & Mangalwede, 2019). Using the chi-square test assisted in determining if a relationship is present between the multiple variables of the preferred learning style of law enforcement officers (visual, aural, read/write, kinesthetic) and participants' gender (male or female) and education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, or doctoral degree). The chi-square test for independence is used for multiple variables, each with several categories (Aron et al., 2013).

For Question 1, the gender portion responses of the demographic and VARK questionnaire were used. The area of questions allowed participants to select one of two choices, male or female. Results of the chi-square test of independence revealed there is no significant relationship between gender and learning style preference among law enforcement officers attending classes at a law enforcement training facility located in Central Florida, $X^2(6, n=167) = 7.38, p < 0.05$. The chi-square is 7.38, df is 6, sample size (n) is 167, p -value of .288, where .288 > 0.05. Due to a violation of the fourth assumption, cell counts were not five or more in at least

80% of the cells, the likelihood ratio ($G^2 = .262$) was used to accept the null hypothesis and reject the alternative hypothesis (see Appendix I). This assumption violation was due to the cell count not reaching 5 in at least 80% of the cells. Table 5 depicts the data analyses for research question one.

Table 5

Chi-Square Test of Independence, Learning Preference and Gender

| Gender | V | A | R | K | BI | TRI | VAR | Total |
|----------------------------|----------|----------|----------|----------|-----------|------------|------------|--------------|
| Male | 2 | 5 | 0 | 77 | 26 | 11 | 16 | 137 |
| Female | 1 | 4 | 0 | 12 | 8 | 3 | 2 | 50 |
| Expected Value | | | | | | | | |
| Male | 2.46 | 7.38 | 0 | 73.01 | 28 | 11.5 | 14.77 | |
| Female | .54 | 1.62 | 0 | 15.99 | 6.1 | 2.51 | 3.23 | |
| X^2 | 7.38 | | | | | | | |
| df | 6 | | | | | | | |
| p -value | 0.288 | | | | | | | |
| Likelihood Ratio (G^2) | 2.62 | | | | | | | |

Research Question 2: What is the relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida?

H₂₀: There is no significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

H2_a: There is a significant relationship between education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree) and learning style preference (visual, aural, read/write, kinesthetic) among officers attending classes at a law enforcement training facility located in Central Florida.

For Question 2, the educational level portion responses of the demographic and VARK questionnaire were used. The questions allowed participants to select one of six choices, high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, doctorate degree. Results of the chi-square test of independence revealed there is a statistically significant relationship between education level and learning style preference among law enforcement officers attending classes at a law enforcement training facility located in Central Florida, $X^2(30, n=167) = 78.03, p < 0.05$. The chi-square is 78.03, *df* is 30, sample size (*n*) is 167, *p*-value of $< .001$, where $.001 < 0.05$.

Because of a violation to the fourth assumption, cell counts were not five or more in at least 80% of the cells, the likelihood ratio ($G^2 = .096$) was used to accept the null hypothesis and reject the alternative hypothesis (see Appendix J). The assumption violation was due to the cell count not reaching 5 in at least 80% of the cells. A Bonferroni correction test and Cramer's V test were also conducted due to a reported statistical significance, where Bonferroni correction = $.0012$ and $G^2 = .096$, $.096 > .0012$. Bonferroni correction test is used as a way to discover a false-positive result (Type I error) where the true null hypothesis is rejected (Yormaz & Sünbül, 2017). Cramer's V test was used to report the strength of association between the variables where Cramer's V = $.028$ and $G^2 = .096$, $.096 > .028$. Cramer's V is the most used strength test

for the chi-square statistical test (McHugh, 2013). Table 6 depicts the data analyses for research question two.

Table 6

Chi-Square Test of Independence, Learning Preference and Education Level

| Demographic variable | Preference | | | | | | | |
|------------------------|------------|------|---|-------|-----|------|------|-------|
| Education Level | V | A | R | K | BI | TRI | VARK | Total |
| High school | 0 | 0 | 0 | 12 | 4 | 1 | 3 | 20 |
| Some college/No degree | 0 | 3 | 0 | 36 | 15 | 3 | 8 | 65 |
| Associate degree | 2 | 2 | 0 | 20 | 7 | 1 | 1 | 33 |
| Bachelor's degree | 0 | 4 | 0 | 17 | 8 | 8 | 5 | 42 |
| Master's degree | 0 | 0 | 0 | 4 | 0 | 1 | 1 | 6 |
| Doctorate degree | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Expected Value | | | | | | | | |
| High school | 0.36 | 1.08 | 0 | 10.66 | 4.1 | 1.68 | 2.15 | |
| Some college/No degree | 1.17 | 3.50 | 0 | 34.64 | 13 | 5.45 | 7.00 | |
| Associate degree | 0.59 | 1.78 | 0 | 17.59 | 6.7 | 2.77 | 3.56 | |
| Bachelor's degree | 0.75 | 2.26 | 0 | 22.38 | 8.6 | 3.52 | 4.53 | |
| Master's degree | 0.11 | 0.32 | 0 | 3.20 | 1.2 | 0.5 | 0.65 | |
| Doctorate degree | 0.02 | 0.05 | 0 | 0.53 | 0.2 | 0.08 | 0.11 | |
| X ² | 78.03 | | | | | | | |
| <i>p-value</i> | <.001 | | | | | | | |
| Bonferroni Test | 0.0012 | | | | | | | |
| Cramer's V | 0.28 | | | | | | | |
| Likelihood Ratio | 0.96 | | | | | | | |

Reliability and Validity

Several threats to the validity of the research existed, both internal and external. Internal threats look at how the research was completed and if the results from the study population were

based on the data and not from methodological errors (Greenaway & Cruwys, 2019; Patino & Ferreira, 2018b). Some internal threats to this research included attrition, experimental bias, and history. Attrition is when participants leave or do not take part in a study leaving the results to participants who decided to participate and may be more motivated in taking part in the study (Cuncic, 2020). Experimental bias comes to play when the researcher treats participants differently to elicit specific responses. The person conducting the research must remain neutral to avoid any bias while conducting the study (Johnson & Christensen, 2019). History internal threats refer to occurrences which take place in the environment and could affect the results (Bhandari, 2020).

External threats included selection biases, generalizations, and situational factors. The external threat of selection bias is having a research sample or group which is not representative of the population being studied (Cuncic, 2020). An external threat to the research validity is generalizing the study results to the entire population being investigated. Using a small sample size of participants to represent the larger population may cause the research to be less reliable (Fowler & Lapp, 2019). Situational factors include using different locations, times, and settings to collect the data may affect the study (Johnson & Christensen, 2019).

The external threats to the study were addressed to ensure validity. Every Florida law enforcement officer attending courses at the training facility in Central Florida had the opportunity to participate in the study. Allowing every officer the chance to take part in the study minimized the possibility of selection bias. Ensuring the minimum number of participants used to reach the confidence level of .80 (see Appendix H) was met to address the external threat of generalization. Data collection took place at one location in different classrooms, at the same

time of day in the morning before the start of the class. The classrooms in the training facility are similar in appearance, temperature, and setup. Using one location and similar classrooms to collect data addressed the situational factor external threat.

Chapter Summary

Data collected in the study provided detailed and comprehensive information on two levels. The first was to reveal demographic information on the participant sample relevant for a comparison of the training facility used for the research site and other training facilities in the United States. The second was to address the research questions and hypotheses in the study.

The study sample consisted of 167 law enforcement officers attending courses at a training facility located in Central Florida. A chi-square test of independence was performed to assess the relationship between gender and learning preference of law enforcement officers. Data revealed there was no significant relationship between gender and the preferred learning style of law enforcement officers. A chi-square test of independence was also performed to assess the relationship between education level and learning preference of law enforcement officers. Data revealed there was no significant relationship between education level and the preferred learning style of law enforcement officers. The findings, interpretations, conclusions, limitations, recommendations, and implications for leadership are presented in Chapter 5.

Chapter 5: Discussion and Conclusion

The purpose of this quantitative relational study was to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and the education level of officers attending a law enforcement training facility located in Central Florida. The VARK questionnaire was used to obtain the officer's preferred learning style. Participants for the research sample consisted of 167 law enforcement officers across Florida who attended a law enforcement class held at the training facility during the two-month data collection period.

The rationale for carrying out the study was to assist law enforcement trainers throughout the United States, who are tasked with creating and delivering training, with an understanding of the preferred learning style of law enforcement officers. As disclosed in Chapter 2, there is minimal research investigating the preferred learning style of law enforcement officers using multiple agencies. The current study was designed to expand the body of literature on the relationship between the preferred learning style of law enforcement officers and gender and education level.

Chapter 3 included the methods used to address the study's research questions and hypotheses. A quantitative relational methods design was used to investigate if a relationship exists between the multiple variables of the preferred learning style of law enforcement officers (visual, aural, read/write, kinesthetic) and participants' gender (male or female) or education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, or doctoral degree). The study utilized one research site centrally located in Florida.

The data gathered and summarized in Chapter 4 provided demographic information about the gender and education level of the study sample, revealing the sample to have a higher percentage of female officers (18%) than in the United States (12.5%). Law enforcement officers in this study were also shown to be more highly educated than officers in Florida, with 49% having a degree compared to 37% for the general population of law enforcement officers in Florida. The research sample of officers having a degree, 49%, was slightly lower than the overall population of officers in the United States having a degree at 51%.

The data obtained in Chapter 4 provided information regarding the questions investigated in the study. Findings were in response to Question 1, if a relationship exists between gender and learning preference of law enforcement officers, and Question 2, if a relationship exists between education level and learning preference of law enforcement officers. Data revealed there was no relationship between gender and learning preference or education level and learning preference. The kinesthetic style of learning was selected the most by participants. The read/write learning style was not selected as a preferred learning method by any of the participants in the study.

Chapter 5 encompasses the findings of this study, interpretations of the data, and conclusions made from the results. Also presented are limitations of the study, recommendations for law enforcement stakeholders, and future researchers. Chapter 5 also provides a discussion of the implications on the study of leadership.

Findings, Interpretations, Conclusions

Data analysis results described in Chapter 4 provided the information required to address this study's research question and hypotheses. The theoretical framework offers the context for

further interpretations and conclusions drawn from the data of the study. Findings, interpretations, and conclusions of the study are located within the body of literature.

Research Findings

Using the procedures described in Chapter 3, a chi-square test of independence was used to address the hypotheses. For research question one, the dependent variable of gender (male or female) was compared to the independent variable of the officer's preferred learning style (visual, aural, read/write, kinesthetic). For research question two, the dependent variable of education level (high school diploma/GED, some college/no degree, associate degree, bachelor's degree, master's degree, or doctoral degree) was compared to the independent variable of the officer's preferred learning style (visual, aural, read/write, kinesthetic).

For Research Question 1, the data revealed there was no significant relationship between gender and learning style preference of law enforcement officers in the study sample. For Research Question 2, the data revealed a significant relationship between education level and learning style preference of law enforcement in the study sample. Because of a violation to the fourth assumption, an assumption, cell counts were not five or more in at least 80% of the cells for Questions 1 and 2, the likelihood ratio was used to accept the null hypothesis and reject the alternative hypothesis for both research questions. The kinesthetic learning style was selected most by participants in the study, while no participant in the study selected the read/write style as a preferred learning method.

Interpretation of Findings

The results of this study were like much of the literature discussed in the literature review. Data for this study presented information that showed the preferred learning style of the

study group to be kinesthetic, regardless of gender and level of education. At the same time, the data also revealed the read/write style of learning to be a non-factor. No participant in the study group selected the read/write style as a preferred style of learning. No significant relationship was discovered between gender or education level in the preferred learning style of the sample population.

The study results showed the overall preferred learning style regardless of gender or education level was the kinesthetic style. Data revealed the participant sample of law enforcement officers used in the study preferred the kinesthetic learning style over other learning styles, which is consistent with the overall reported preferred learning style (VARK, 2020), elementary and high school students (Amran et al., 2017; Leasa et al., 2018; Leasa & Corebima, 2017; Pooley, 2017), undergraduate and graduate students (Bhagat et al., 2015; Wahyudin & Rido, 2020), and law enforcement officers (Lauritz et al., 2013; White, 2016). Data also revealed that the participants used in this study did not prefer the read/write learning style, which contradicts earlier studies (Landry, 2015; Ojeh et al., 2017; Yu, 2020). Kinesthetic learners may be drawn to occupations that involve physical interaction, such as a firefighter, police officer, or military (Jones, 2017; Logsdon, 2021; Quibol-Catabay, 2016). Kinesthetic learners are hands-on and enjoy taking an active role in obtaining new knowledge. Learners who prefer the kinesthetic style of learning enjoy taking part in physical activities which assist in storing information (Leasa & Corebima, 2017).

The theoretical framework discussed in Chapter 2 consisted of the two theories, the behavioristic approach to education and transformational leadership. Behavioristic principles in the learning process, reinforcing correct responses, and eliminating incorrect responses were

shown to be relevant in law enforcement courses as many are contingent on passing an exam to obtain credit for the class. The behavioristic approach assists students in emphasizing the desired answers while attempting to remove incorrect answers (Inankul, 2016; Johnsen et al., 2016).

Transformational leadership is vital in education as the instructor is viewed as the leader, and the students are viewed as the followers. In education, transformational leadership improves the educator's teaching and provides students with better instruction (Al-husseini & Elbeltagi, 2018; Jovanovica & Ciricb, 2016).

Demographic data obtained during the study's data collection process revealed the study sample of law enforcement officers to have a higher percentage of female officers than compared to the percent representative of females in the United States. The data also revealed officers in the study were more educated than officers in Florida and almost equal to the percentage of officers in the United States with a college degree. Significantly fewer female officers compared to male officers are in the United States and in the study. Across the United States, there are nearly 650,000 law enforcement officers, with the majority being male officers at almost 590,000 and female officers at around 84,000 (Department of Justice, 2019). The disparity had the potential to influence the study, providing fewer female officers for overall comparison to male officers.

Conclusions

The data gathered and analyzed in the study provided no conclusive evidence of a relationship between the preferred learning style and gender or education level in the study sample. Data extracted from the study showed the kinesthetic learning preference to be preferred by the sample population regardless of gender or education level. The study provided additional

data and insights to the body of research investigating the relationship between the preferred learning style of law enforcement officers and gender or education level.

Limitations

Validity refers to whether an instrument measures what it is intended to measure (Patino & Ferreira, 2018b). Study limitations should explain possible limitations, implications of limitations, offer possible alternate approaches, and describe steps taken to alleviate the limitation (Ross & Bibler-Zaidi, 2019). The convenience sample consisted of 167 law enforcement officers from various agencies located in Florida attending one training facility in Central Florida. Having a larger sample size and the use of more than one research site may have provided a larger recruitment pool for participants representing different regions of the state, with a broader range of demographic backgrounds. Using a larger sample size and multiple training facilities from various parts of the state may have provided more data resulting in a statistical significance. To increase internal validity, investigators should ensure proper study planning, including recruitment strategies, data collection and analysis, and adequate sample size (Patino & Ferreira, 2018b). The scope of the study likely limited the generalizability of the findings to other law enforcement training facilities beyond the study site.

Limitations in studies represent weaknesses within a research design that may influence the results and assumptions of the study (Ross & Bibler-Zaidi, 2019). The study was limited to one learning style instrument, the VARK, to measure the preferred learning style of law enforcement officers. Multiple methods measure an individual's preferred learning styles, including the Honey and Mumford Learning Style Inventory and Gregorc's Learning Style Inventory (Hasibuan et al., 2016). The different learning styles were discussed in the context of

the literature review. Using multiple learning inventories in a study to investigate learning preference may result in a more statistical significance revealing the learning style documented by more than one learning inventory.

The validity and reliability of the VARK instrument (see Appendix F) used in the study were discussed in Chapter 3. While this instrument was found to be valid and reliable in the literature, the instrument is incumbent on the honesty and openness of the participants filling out the questionnaire. The data obtained reflected information presented by the participants in the study. Limitations to the VARK instrument came from the possibility of self-reporting bias from participants completing the questionnaires. Data obtained from participants in research using self-reporting instruments may not be reliable because of participant bias (Coenen et al., 2020; Weijters et al., 2010). To obtain research data, the participants completed VARK (v8.01) and a demographic questionnaire.

Recommendations

Law enforcement officers continue to be tasked with learning new and changing topics to better serve the community in the agency's jurisdiction. The literature review revealed the need for additional studies to investigate the preferred learning style of law enforcement officers to inform stakeholders in the agency. Additional research is recommended at this research site as well as other training facilities across the United States.

Executives at the study site should consider reexamining the training curriculum to reflect the study's participants' overall preferred learning style, kinesthetic and least preferred learning style, read/write regardless of gender or education attainment level. The increasing role of police officers entails a higher level of education, including continuing training to ensure officers are

adequately trained to deal with the public (Bartkowiak-Théron, 2019). Replication of the study may provide further valuable insights into law enforcement officers' preferred learning styles and demographics.

The study was limited to a sample of 167 VARK questionnaires from 167 law enforcement officers attending one training facility in Florida. Due to the COVID pandemic, the participant size of 167 limited the ability to generalize the findings to the total law enforcement population in Florida. Future researchers should consider these limitations and improve the generalizability of the results by having a significantly larger sample size and using more than one research site. Future studies should also consider sampling academy recruits to obtain a preferred learning style prior to starting a career in law enforcement and revisit the topic later to investigate if the learning style has changed due to law enforcement work, experience, assignment, or course being taught.

Ethical implications were raised in the study for future researchers wishing to investigate the preferred learning style of law enforcement officers and demographics. While all the data in the study were provided freely and with consent from all participants, researchers should consider questions asked and the wording to not discriminate or offend against any person. One area of concern was the gender identity question. Researchers planning on using gender identification in a future study should consider using appropriate terms and not assuming genderism is the only acceptable choice for the participants. Genderism is the belief that there are only two genders, male or female, and those genders are assigned at birth (Konopka et al., 2020). Future researchers should consider the ethical implications of their position within the agency or

research site. The researcher's position may influence officers' responses or willingness to participate in a study.

Finally, future researchers should consider using other research methodologies to investigate the relationship between the preferred learning style of law enforcement officers and demographics. The study exclusively used quantitative methodologies. The inclusion of qualitative or mixed-method data may provide information and data not included in the VARK questionnaire.

Learners' learning styles can change depending on the topic, environment, and learning material or curriculum (Koohestani & Baghcheghi). Law enforcement courses vary on topics, qualifications, and students who attend. Firearms or driving courses have more physical interaction than classroom instruction. Students taking courses where physical movement is part of the class may select the kinesthetic learning style over other learning styles. Other law enforcement courses are more lecture-based instruction which may cause students to select the aural or visual learning style. Interviewing participants to gather information on why certain learning styles were selected and if the course played a role in picking a learning style may provide more in-depth data on the preferred learning style of law enforcement officers.

Implications for Leadership

The study is significant to leaders and trainers in law enforcement training facilities and law enforcement agencies. Agency and training facility executives have been provided with evidence of the kinesthetic style of learning being preferred by law enforcement officers attending training courses at the research site. In addition to the read/write preference not being selected as a preferred learning style by any participant, the information in the data may provide

law enforcement leaders the opportunity to adjust and create lesson plans catering to the law enforcement officer. The leaders have also been provided with information that no relationship was determined between learning preference and demographics. Results of the study, though inconclusive, support other literature-based evidence of the kinesthetic style being preferred by learners (Amran et al., 2017; Bhagat et al., 2015; Leasa et al., 2018; Leasa & Corebima, 2017; Pooley, 2017; VARK, 2020; White, 2016).

Implementing the recommendations and continuing to investigate the preferred learning style of law enforcement officers and demographics has potential benefits for law enforcement leaders, executives of training facilities, law enforcement officers, and society. Training facility executives can use the information to gear recruit and officer training towards the students' preferred learning style, creating an environment more encouraging to learning and beginning the process law enforcement leaders can continue at the agencies employing the officers.

Teaching to the student's preferred learning style improves motivation, performance, learning, and comprehension of the topic being taught (Anderson, 2016; Barry & Egan, 2018; Celli & Young, 2017; Li et al., 2016; Papadatou-Pastou et al., 2018; Parmar et al., 2020). Law enforcement leaders responsible for training may gain a better understanding of how to effectively implement in-house training curriculum and instruction to officers within the agency who will be better educated and more knowledgeable to provide the highest level of service to the public. Having better educated and trained law enforcement officers provides the community with knowledgeable officers who may provide a more positive interaction, minimizing the us-versus-them mentality, possibly reducing the number of complaints and lawsuits filed against officers and agencies while keeping use of force incidents to a minimum (Beary, 2018;

McHenry, n.d.; Pantoja, 2016). All law enforcement agencies and training facilities stakeholders will benefit from having a highly trained, more knowledgeable officer serving the public.

Conclusion

The study uncovered new knowledge surrounding the learning style law enforcement officers perceived as effective and ineffective in learning while attending courses at a training facility. Data from the study revealed important information which law enforcement leaders and trainers may use. Although statistically significant results were not obtained, the kinesthetic learning style was the most preferred, while no officer selected the read/write style as a preferred learning style. Law enforcement leaders and trainers should take this information into account as many classes, directives, and policies are still designed in the learning style of read/write, while the data reports this is the least preferred style of learning by law enforcement officers in the study. Training courses should be geared towards the kinesthetic learner but using other styles to keep all officers engaged, ensuring students are instructed in a way which promotes learning.

An overview of previous chapters was presented in Chapter 5. A summary of the problem investigated in the study, the purpose of the study, and the methodology used to address the study's research questions and hypotheses were provided. The study revealed no significant relationship between the preferred learning style of law enforcement officers and demographics. The kinesthetic learning style was preferred by the sample group, without any relationship to the participants' demographics. Results of the study were inconclusive, which is consistent with many of the studies discussed in the literature review. Because the study consisted of a small sample size and was limited to one training facility as the research site, the generalizability of the study's results was also limited. Despite the limited generalizability, the study investigated the

set of data from the research sample, which is unique from existing research and contributed to the body of research examining the relationship between the preferred learning style of law enforcement officers and demographics.

Law enforcement executives continue to be tasked with setting and creating a training curriculum that best suits the needs of law enforcement officers; future research was recommended. In Chapter 5, recommendations were offered for future researchers interested in investigating and adding to the body of literature. A more thorough understanding of the relationship between the preferred learning style of law enforcement officers and demographics has implications for law enforcement leaders wanting to provide the best training environment to enhance learning to provide the highest level of public service.

References

- Agarkar, S. C. (2019). Influence of learning theories on science education. *Resonance: Journal of Science Education*, 24(8), 847–859. <https://doi.org/10.1007/s12045-019-0848-7>
- Aguilar-Moya, R., Melero-Fuentes, D., Navarro-Molina, C., Aleixandre-Benavent, R., & Valderrama-Zurián, J. C. (2014). Disciplines and thematic of scientific research in police training (1988-2012). *Policing: An International Journal of Police Strategies & Management*, 37(4), 696–711. <http://doi.org/10.1108/PIJPSM-02-2014-0014>
- Alatawi, M. A. (2017). The myth of the additive effect of the transformational leadership model. *Contemporary Management Research*, 13(1), 19–29. <https://doi.org/10.7903/cmr.16269>
- Aldosari, M. A., Aljabaa, A. H., Al-Seaibany, F. S., & Albarakati, S. F. (2018). Learning style preferences of dental students at a single institution in Riyadh, Saudi Arabia, evaluated using the VARK questionnaire. *Advances in Medical Education and Practice*, 9, 179. <https://doi.org/10.2147/amep.s157686>
- Alharbi, H. A., Almutairi, A. F., Alhelih, E. M., & Alshehry, A. S. (2017). The learning preferences among nursing students in the King Saudi University in Saudi Arabia: A cross-sectional survey. *Nursing Research & Practice*, 1–7. <https://doi.org/10.1155/2017/3090387>
- Al-husseini, S., & Elbeltagi, I. (2018). Evaluating the effect of transformational leadership on knowledge sharing using structural equation modelling: The case of Iraqi higher education. *International Journal of Leadership in Education*, 21(4), 506–517. <https://doi.org/10.1080/13603124.2016.1142119>

- Aljandali, A. (2016). *Quantitative analysis and IBM® SPSS® Statistics*. Springer International Publishing.
- Alkooheji, L., & Al-Hattami, A. (2018). Learning style preferences among college students. *International Education Studies*, 11(10), 50-63. <https://doi.org/10.5539/ies.v11n10p50>
- Alkubaidi, M. A. (2014). The relationship between Saudi English major university students' writing performance and their learning style and strategy use. *English Language Teaching*, 7(4), 83-95. <http://dx.doi.org/10.5539/elt.v7n4p83>
- Allen, G. P., Moore, W. M., Moser, L. R., Neill, K. K., Sambamoorthi, U., & Bell, H. S. (2016). The role of servant leadership and transformational leadership in academic pharmacy. *American Journal of Pharmaceutical Education*, 80(7), 1–7. <https://doi.org/10.5688/aipe807113>
- Allen, S., Swidler, M., & Keiser, J. (2013). Aligning pedagogy of American business language with marketing students' preferred learning styles. *Procedia—Social and Behavioral Science*, 70(25). <https://doi:10.1016/j.sbspro.2013.01.185>
- Almigbal, T. H. (2015). Relationship between the learning style preferences of medical students and academic achievement. *Saudi Medical Journal*, 36(3), 349-355. <https://doi.org/10.15537/smj.2015.3.10320>
- AlQahtani, N., AlMoammar, K., Taher, S., AlBarakati, S., & AlKofide, E. (2018). Learning preferences among dental students using the VARK questionnaire: A comparison between different academic levels and gender. *JPMA. The Journal of the Pakistan Medical Association*, 68(1), 59–64. <https://pubmed.ncbi.nlm.nih.gov/29371720/>

- American College of Education. (2018, August 24). Institutional review board (IRB) handbook. <https://catalog.ace.edu/index.php?catoid=11>
- Amran, A., Desiani, A., & Hasibuan, M. S. (2017). Detection learning style VARK for out of school children (OSC). In *IOP Conference Series: Materials Science and Engineering*, 190(1), 1-7. <https://doi.org/10.1088/1757-899x/190/1/012031>
- Andalecio, A. B. P., Ferrera, E. I. V., Martinez, M. G. A., Singayan, S. I. A., & Tamag, G. R. D. (2020). An assessment of an online learning program of hospitality college in a private university. *Journal of Physics: Conference Series* 1529(3), 1-5. <https://doi:10.1088/1742-6596/1529/3/032065>
- Anderson, I. (2016). Identifying different learning styles to enhance the learning experience. *Nursing Standard*, 31(7), 53–63. <https://doi.org/10.7748/ns.2016.e10407>
- Anderson, M. (2017). Transformational leadership in education: A review of existing literature. *International Social Science Review*, 93(1), 1–13. <http://digitalcommons.northgeorgia.edu/issr/vol93/iss1/4>
- Armstrong, J. (2020, July 9). *A letter to the American public: We need to increase the quantity and quality of police training*. <https://www.police1.com/police-training/articles/a-letter-to-the-american-public-we-need-to-increase-the-quantity-and-quality-of-police-training-PEIoRJqWTIG55dqy/>.
- Arokiasamy, A. R. A., Abdullah, A. G. K., Ahmad, M. Z., & Ismail, A. (2016). Transformational leadership of school principals and organizational health of primary school teachers in Malaysia. *Procedia-Social and Behavioral Sciences*, 229, 151-157. <https://doi.org/10.1016/j.sbspro.2016.07.124>

- Aron, A., Coups, E. J., & Aron, E. (2013). *Statistics for psychology* (6th ed.). Pearson.
- Balasubramaniam, G., & Indhu, K. (2016). A study of learning style preferences among first-year undergraduate medical students using the VARK model. *Education in Medicine Journal*, 8(4), 15–21. <https://doi.org/10.5959/eimj.v8i4.440>
- Balfaqeeh, M., Hassan, A., & Berkett, T. (2017). Emirati engineering students' learning styles: A longitudinal study. *PEOPLE: International Journal of Social Sciences*, 3(2), 533-551. <https://dx.doi.org/10.20319/pijss.2017.32.533551>
- Bărbîntă, A., Dan, I. S., & Mureșan, C. (2017). Bernard Bass-founder of the transformational leadership theory. *Review of Management & Economic Engineering*, 16(4), 758–762. <http://www.rmee.amier.org/>
- Barrow, J. M., Brannan, G. D., & Khandhar, P. B. (2020). Research ethics. *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK459281/>
- Barry, M., & Egan, A. (2018). An adult learner's learning style should inform but not limit educational choices. *International Review of Education*, 64(1), 31-42. <https://doi.org/10.1007/s11159-017-9694-6>
- Bartkowiak-Théron, I. (2019). Research in police education: current trends. *Police Practice & Research*, 20(3), 220–224. <https://doi.org/10.1080/15614263.2019.1598064>
- Bartlett, R., Wright, T., Olarinde, T., Holmes, T., Beamon, E. R., & Wallace, D. (2017). Schools as sites for recruiting participants and implementing research. *Journal of Community Health Nursing*, 34(2), 80–88. <https://doi.org/10.1080/07370016.2017.1304146>

Beary, R. (2018, November 7). Strengthening the foundation: How new trends in training can improve officers' safety and effectiveness.

<https://www.policechiefmagazine.org/strengthening-the-foundation-new-trends-training/>

Benmarrakchi, F., El Kafi, J., Elhore, A., & Haie, S. (2017). Exploring the use of the ICT in supporting dyslexic students' preferred learning styles: A preliminary evaluation. *Education and Information Technologies*, 22(6), 2939–2957.

<http://dx.doi.org/10.1007/s10639-016-9551-4>

Berkovich, I. (2016). School leaders and transformational leadership theory: Time to part ways? *Journal of Educational Administration*, 54(5), 609–622.

<https://doi.org/10.1108/jea-11-2015-0100>

Bernard, H. R. (2018). *Research methods in anthropology qualitative and quantitative approaches*. Lanham, MD: Rowman & Littlefield.

Bernard, J., Chang, T. W., Popescu, E., & Graf, S. (2017). Learning style identifier: Improving the precision of learning style identification through computational intelligence algorithms. *Expert Systems with Applications*, 75, 94-108.

<https://doi.org/10.1016/j.eswa.2017.01.021>

Bhagat, A., Vyas, R., & Singh, T. (2015). Students awareness of learning styles and their perceptions to a mixed method approach for learning. *International journal of applied & basic medical research*, 5(Suppl 1), S58–S65. <https://doi.org/10.4103/2229-516X.162281>

Bhandari, P. (2020, July 03). Internal validity: Definition, threats and examples.

<https://www.scribbr.com/methodology/internal-validity/>

- Birzer, M. L. (2003). The theory of andragogy applied to police training. *Policing: An international journal of police strategies & management*.
<https://doi.org/10.1108/13639510310460288>
- Birzer, M. L., & Nolan, R. E. (2002). Learning strategies of selected urban police related to community policing. *Policing: An International Journal of Police Strategies & Management*. <https://doi.org/10.1108/13639510210429356>
- Blumberg, D. M., Giromini, L., & Jacobson, L. B. (2016). Impact of police academy training on recruits' integrity. *Police Quarterly*, 19(1), 63-86.
<https://doi.org/10.1177/1098611115608322>
- Blumberg, D. M., Schlosser, M. D., Papazoglou, K., Creighton, S., & Kaye, C. C. (2019). New directions in police academy training: A call to action. *International Journal of Environmental Research and Public Health*, 16(24),
<https://doi.org/10.3390/ijerph16244941>
- Booth, A., Scantlebury, A., Hughes-Morley, A., Mitchell, N., Wright, K., Scott, W., & McDaid, C. (2017). Mental health training programmes for non-mental health trained professionals coming into contact with people with mental ill health: a systematic review of effectiveness. *BMC Psychiatry*, 17(1), 196. <https://doi.org/10.1186/s12888-017-1356-5>
- Bosman, A., & Schulze, S. (2018). Learning style preferences and mathematics achievement of secondary school learners. *South African Journal of Education*, 38(1).
<https://doi.org/10.15700/saje.v38n1a1440>
- Brown, M., Brown, R. S., & Nandedkar, A. (2019). Transformational leadership theory and exploring the perceptions of diversity management in higher education. *Journal of*

Higher Education Theory & Practice, 19(7), 11–21.

<https://doi.org/10.33423/jhetp.v19i7.2527>

Burton, W. N., Chen, C. Y., Li, X., & Schultz, A. B. (2017). The association of employee engagement at work with health risks and presenteeism. *Journal of occupational and environmental medicine*, 59(10), 988-992.

<https://doi.org/10.1097/JOM.0000000000001108>

Canadian Institutes of Health Research. (2020, April 28). *What is gender? What is sex?* CIHR.

<https://cihr-irsc.gc.ca/e/48642.html>.

Carlson, N. (2010). Accounting for the participant dropout in clinical studies. *Science*

Translation Medicine, 2(16), 16-17. <https://doi.org/10.1126/scitranslmed.3000856>

Çekmecelioğlu, H. G., & Özbağ, G. K. (2016). Leadership and creativity: The impact of transformational leadership on individual creativity. *Procedia - Social and Behavioral Sciences*, 235, 243–249. <https://doi.org/10.1016/j.sbspro.2016.11.020>

Celli, L. M., & Young, N. D. (2017). Contemporary pedagogy for the adult learning. *PUPIL: International Journal of Teaching, Education and Learning*, 1(1), 86–96.

<https://doi.org/10.20319/pijtel.2017.11.8696>

Chandler, R., Grote, L., & Reynolds, L. (2020). Making moves: Engaging students in information literacy instruction with kinesthetic activities. *Kentucky Libraries*, 84(3), 11–

15. <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?vid=6&sid=a16b8ba8-1ee4-47af-a6f4-162ef92cf027%40pdc-v-sessmgr01>

- Chandrasekera, T., & Yoon, S.-Y. (2018). Augmented reality, virtual reality and their effect on learning style in the creative design process. *Design and Technology Education*, 23(1).
<https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1171588>
- Change, D., Linge, T. K., & Sikalieh, D. (2019). Influence of idealized influence on employee engagement in parastatals in the energy sector in Kenya. *International Journal of Research in Business and Social Science* (2147-4478), 8(5), 123-135.
<https://www.ssbfnnet.com/ojs/index.php/ijrbs>
- Cherry, K. (2018). Are you a visual, auditory, reading/writing, or tactile learner?
<https://www.verywellmind.com/vark-learning-styles-2795156>
- Cherry, K. (2020a, March 5). *How do transformational leaders inspire and motivate followers?*
<https://www.verywellmind.com/what-is-transformational-leadership-2795313>.
- Cherry, K. (2020b, May 1). *How a learning style inventory can help your student find strengths.*
<https://www.verywellmind.com/what-is-a-learning-style-inventory-2795159>.
- Chu, X., Ilyas, I. F., Krishnan, S., & Wang, J. (2016, June). Data cleaning: Overview and emerging challenges. In *Proceedings of the 2016 International Conference on Management of Data* (pp. 2201-2206). <http://dx.doi.org/10.1145/2882903.2912574>
- Cleveland, M., Papadopoulos, N., & Laroche, M. (2011). Identity, demographics, and consumer behaviors. *International Marketing Review*, 28(3), 244-266.
<http://dx.doi.org.proxy1.ncu.edu/10.1108/02651331111132848>
- Coenen, P., Mathiassen, S., van der Beek, A. J., & Hallman, D. M. (2020). Correction of bias in self-reported sitting time among office workers - a study based on compositional data

- analysis. *Scandinavian Journal of Work, Environment & Health*, 46(1), 32–42.
<https://doi.org/10.5271/sjweh.3827>
- Cook, B. G., & Cook, L. (2016). Research designs and special education research: Different designs address different questions. *Learning Disabilities Research & Practice*, 31(4), 190-198. <https://doi.org/10.1111/ldrp.12110>
- Cooper, C., Dawson, S., Peters, J., Varley-Campbell, J., Cockcroft, E., Hendon, J., & Churchill, R. (2018). Revisiting the need for a literature search narrative: A brief methodological note. *Research Synthesis Methods*, 9(3), 361–365. <http://dx.doi.org/10.1002/jrsm.1315>
- Costa, R. D., Souza, G. F., Valentim, R. A. M., & Castro, T. B. (2020). The theory of learning styles applied to distance learning. *Cognitive Systems Research*, 64, 134–145.
<https://doi.org/10.1016/j.cogsys.2020.08.004>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. (4th ed.). SAGE Publications.
- Cuncic, A. (2020, September 17). *Understanding internal and external validity*. Verywell Mind.
<https://www.verywellmind.com/internal-and-external-validity-4584479>.
- Damrongpanit, S., & Reungtragul, A. (2013). Matching of learning styles and teaching styles: Advantage and disadvantage on ninth-grade students academic achievements. *Educational Research and Reviews*, 8(20), 1937-1947.
<http://doi.org/10.5897/ERR2013.1583>
- Daniel, J. (2020). Education and the COVID-19 pandemic. *Prospects*, 49(1), 91-96.
<https://doi.org/10.1007/s11125-020-09464-3>

- Daoruang, B., Mingkhwan, A., & Sanrach, C. (2019, September). The learning material classified model using VARK learning style. In *International Conference on Interactive Collaborative Learning* (pp. 505-513). https://doi.org/10.1007/978-3-030-47271-6_50
- Dartey-Baah, K. (2016). Goal integration through transformational leadership. *Journal of Global Responsibility*, 7(1), 4-25. <http://dx.doi.org/10.1108/JGR-09-2015-0019>
- De Houwer, J., Barnes-Holmes, D., & Moors, A. (2013). What is learning? On the nature and merits of a functional definition of learning. *Psychon Bull Rev* 20, 631–642. <https://doi.org/10.3758/s13423-013-0386-3>
- Department of Justice (DOJ). (2019, April 17). *Department of Justice releases reports focused on improving safety and wellness of the nation's 800,000 law enforcement officers*. <https://www.justice.gov/opa/pr/departments-justice-releases-reports-focused-improving-safety-and-wellness-nation-s-800000-law>.
- Deshpande, S. B., & Mangalwede, S. R. (2019). The effect of contexts on learning styles in M-Learning environment using chi-square test. *International Journal of Recent Technology and Engineering*, 8(3), 359-364. <https://doi.org/10.35940/ijrte.C4173.098319>
- Desmond, J. S., Reyns, B. W., Frank, J., Klahm, C. F., & Henson, B. (2020). Police productivity and performance over the career course: A latent class growth analysis of the first 10 years of law enforcement. *Police Quarterly*, 23(3), 333. <https://doi.org/10.1177/1098611120907555>
- DHS. (2020, September 25). *Federal Law Enforcement Training Center (FLETC)*. Department of Homeland Security. <https://www.dhs.gov/employee-resources/federal-law-enforcement-training-center-fletc>.

- Dos Santos, L. M. (2018). The cultural cognitive development of personal beliefs and classroom behaviours of adult language instructors: A qualitative inquiry. *Brain sciences*, 8(12), 220. <https://doi.org/10.3390/brainsci8120220>
- Drago, W. A., & Wagner, R. J. (2004). Vark preferred learning styles and online education. *Management Research News*, 27(7), 1-13. <http://dx.doi.org/10.1108/01409170410784211>
- Dumitrasciuc, L. F. (2019). How important is education in creating successful entrepreneurs? *Journal of Public Administration, Finance & Law*, 16, 88–96. <http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=a9h&AN=142780702&site=eds-live&scope=site>.
- Dwyer, R. G., & Laufersweiler-Dwyer, D. L. (2004). The need for change: A call for action in community-oriented police training. *FBI Law Enforcement Bulletin*, 73(11), 18–24. <https://www.ojp.gov/ncjrs/virtual-library/abstracts/need-change-call-action-community-oriented-police-training>
- Ebrahimi, P., Chamanzamin, M. R., Roohbakhsh, N., & Shaygan, J. (2017). Transformational and transactional leadership: Which one is more effective in the education of employees' creativity? Considering the moderating role of learning orientation and leader gender. *International Journal of Organizational Leadership*, 1, 137. https://ijol.cikd.ca/article_60196_06804ad229e94b23704f7ee8702dc413.pdf
- Espinoza-Poves, J. L., Miranda-Vílchez, W. A., & Chafloque-Céspedes, R. (2019). The VARK learning styles among university students of business schools. *Journal of Educational Psychology-Propósitos y Representaciones*, 7(2), 384-414. <https://doi.org/10.20511/pyr2019.v7n2.254>

- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4. <https://doi.org/10.11648/Jj.ajtas.20160501.11>
- Etter, G. W., & Griffin, R. (2011). In-service training of older law enforcement officers: An andragogical argument. *Policing*, 34(2), 233-245. <http://dx.doi.org.proxy1.ncu.edu/10.1108/13639511111148861>
- Etz, A. (2018). Introduction to the concept of likelihood and its applications. *Advances in Methods and Practices in Psychological Science*, 1(1), 60–69. <https://doi.org/10.1177/2515245917744314>
- Faber, J., & Fonseca, L. M. (2014). How sample size influences research outcomes. *Dental press journal of orthodontics*, 19(4), 27–29. <https://doi.org/10.1590/2176-9451.19.4.027-029.ebo>
- Falasca, M. (2011). Barriers to adult learning: Bridging the gap. *Australian Journal of Adult Learning*, 51(3), 583–590. <https://doi.org/10.3316/jelapa.798380847429578>
- Farkas, G. J., Mazurek, E., & Marone, J. R. (2016). Learning style versus time spent studying and career choice: Which is associated with success in a combined undergraduate anatomy and physiology course? *Anatomical Sciences Education*, 9(2), 121–131. <https://doi.org/10.1002/ase.1563>
- Feldman, J., Monteserin, A., & Amandi, A. (2015). Automatic detection of learning styles: State of the art. *Artificial Intelligence Review*, 44(2), 157-186. <https://doi.org/10.1007/s10462-014-9422-6>

- Fitkov-Norris, E. D., & Yeghiazarian, A. (2015). Validation of VARK learning modalities questionnaire using Rasch analysis. In *Journal of Physics: Conference Series*, 588(1), 1-6. <https://doi.org/10.1088/1742-6596/588/1/012048>
- Fleming, N., & Baume, D. (2006). Learning styles again: VARKing up the right tree! *Educational developments*, 7(4), 4. <https://www.vark-learn.com/wp-content/uploads/2014/08/Educational-Developments.pdf>
- Florida Department of Law Enforcement. (n.d.-a). FDLE - Criminal justice agency profile report 2016. <https://www.fdle.state.fl.us/CJSTC/Publications/CJAP/CJAP-2016/Statewide-Ratios.aspx>
- Florida Department of Law Enforcement. (n.d.-b). FDLE - Mandatory Retraining. <http://www.fdle.state.fl.us/CJSTC/Officer-Requirements/Mandatory-Retraining.aspx>
- Follett, T. (2020, August 17). *Law enforcement certification and discipline*. <https://www.ncsl.org/research/labor-and-employment/policing-oversight-and-new-legislation.aspx>.
- Fowler, S. B., & Lapp, V. (2019). Sample size in quantitative research: Sample size will affect the significance of your research. *American Nurse Today*, 14(5), 61–62. <http://americannursetoday.com>
- French, G. (2019). Key elements of good practice to support the learning and development of children from birth to three. <http://doras.dcu.ie/24276/1/key-elements-of-good-practice-to-support-the-learning-and-development-of-children-birth-three-drgfrench.pdf>
- Frimodig, B. (2020, October 20). *Chi-square test*. Simply Psychology. <https://www.simplypsychology.org/chi-square.html>

- Fugard, A. J. B., & Potts, H. W. W. (2015). Supporting thinking on sample sizes for thematic analyses: a quantitative tool. *International Journal of Social Research Methodology*, 18(6), 669–684. <https://doi.org/10.1080/13645579.2015.1005453>
- Gardiner, C. (2018, April 6). *How educated should police be?* National Police Foundation. <https://www.policefoundation.org/study-examines-higher-education-in-policing/>.
- Gradl-Dietsch, G., Korden, T., Modabber, A., Sönmez, T. T., Stromps, J.-P., Ganse, B., Pape, H.-C., & Knobe, M. (2016). Multidimensional approach to teaching anatomy—Do gender and learning style matter? *Annals of Anatomy – Anatomischer Anzeiger*, 208, 158–164. <https://doi.org/10.1016/j.aanat.2016.03.002>
- Greenaway, K. H., & Cruwys, T. (2019). The Source Model of Group Threat: Responding to Internal and External Threats. *American Psychologist*, 2, 218. <http://doi.org/10.1037/amp0000321>
- Grove, S. K., & Gray, J. (2019). *Understanding nursing research: Building an evidence-based practice* (7th ed.). Elsevier.
- Gusenbauer, M. (2019). Google Scholar to overshadow them all? Comparing the sizes of 12 academic search engines and bibliographic databases. *Scientometrics*, 118(1), 177–214. <https://doi.org/10.1007/s11192-018-2958-5>
- Hasibuan, M. S., Nugroho, L. E., Santosa, P. I., & Kusumawardani, S. S. (2016). A proposed model for detecting learning styles based on agent learning. *International Journal of Emerging Technologies in Learning*, 11(10), 65–69. <https://doi.org/10.3991/ijet.v11i10.5781>

Hassanzadeh, S., Moonaghi, H. K., Derakhshan, A., Hosseini, S. M., & Taghipour, A. (2019).

Preferred learning styles among ophthalmology residents: An Iranian sample. *Journal of Ophthalmic & Vision Research*, 14(4), 483–490.

<https://doi.org/10.18502/jovr.v14i4.5457>

Hayes, A. (2020, February 19). Null hypothesis definition.

https://www.investopedia.com/terms/n/null_hypothesis.asp

Held, L., & Ott, M. (2018). On p-values and Bayes factors. *Annual Review of Statistics and its Application*, 5, 393–419. <https://doi.org/10.1146/annurev-statistics-031017-100307>

Hossain, M. M., Abdullah, A. B. M., Prybutok, V. R., & Talukder, M. (2009). The impact of learning style on web shopper electronic catalog feature preference. *Journal of Electronic Commerce Research*, 10(1), 1–12.

<http://www.csulb.edu/journals/jecr/issues/20091/Paper1.pdf>

Hughes, J. L., Camden, A. A., & Yangchen, T. (2016). Rethinking and updating demographic questions: Guidance to improve descriptions of research samples. *Psi Chi Journal of Psychological Research*, 21(3), 138-151. <https://doi.org/10.24839/b21.3.138>

Ihsani, S., Inderawati, R., & Vianty, M. (2020). The transformational leadership behavior of school principals of vocational high schools in Palembang. *Tadbir: Jurnal Studi Manajemen Pendidikan*, 4(1), 117-132. <https://doi.org/10.29240/jsmp.v4i1.1203>

İlçin, N., Tomruk, M., Yeşilyaprak, S. S., Karadibak, D., & Savcı, S. (2018). The relationship between learning styles and academic performance in Turkish physiotherapy students. *BMC Medical Education*, 18(1), 291. [https://doi.org/10.1186/s12909-018-1400-](https://doi.org/10.1186/s12909-018-1400-2)

Illeris, K. (2018). Contemporary theories of learning: learning theorists... in their own words.

Routledge.

İnankul, H. (2016). Behavioral learning theories and a review for police basic training. *Journal of International Social Research*, 9(42). <https://doi.org/10.17719/jisr.20164216263>

Jawed, S., Amin, H. U., Malik, A. S., & Faye, I. (2019). Classification of visual and non-visual learners using electroencephalographic alpha and gamma activities. *Frontiers in behavioral neuroscience*, 13, 86. <https://doi.org/10.3389/fnbeh.2019.00086>

Johnsen, B. H., Espevik, R., Saus, E. R., Sanden, S., & Olsen, O. K. (2016). Note on a training program for brief decision making for frontline police officers. *Journal of Police and Criminal Psychology*, 31(3), 182-188. <https://doi.org/10.1007/s11896-015-9180-7>

Johnson, R. B., & Christensen, L. (2019). *Educational research: Quantitative, qualitative, and mixed approaches*. SAGE Publications, Incorporated.

Jones, J. A. (2017). The value and potential of forensic models. *Stevenson University Forensics Journal*, 8(7), 58-65.

<http://www.stevenson.edu/online/publications/forensics/documents/forensic-journal-2017.pdf>

Jovanovica, D., & Ciricb, M. (2016). Benefits of transformational leadership in the context of education. *The European Proceedings of Social & Behavioural Sciences EpSBS*.

<http://dx.doi.org/10.15405/epsbs.2016.09.64>

Junior, F. A. C., Rêgo, M. C., de Melo, M. C., Fogaça, N., da Silva, A. R., de Hollanda, P. P. T.

M., de Hollanda, C. F., & Ramos, W. M. (2016). Motivation to learn and distance

- learning programs: What Brazilian workers about? *Creative Education*, 7(17), 2576-2596. <https://doi.org/10.2436/ce.2016.717243>
- Kaplan, D. E. (2018). Behaviorism in online teacher training. *Psychology*, 9(04), 570. <http://DOI:10.4236/psych.2018.94035>
- Kelleher, K. (2014, April 28). *Learning preferences in field training*. Field Training Solutions. <https://ftosolutions.com/learning-preferences-in-field-training/>
- Kentnor, H. E. (2015). Distance Education and the Evolution of Online Learning in the United States. *Curriculum and Teaching Dialogue*, 17(1–2), 21–34. <https://www.infoagepub.com/products/Curriculum-and-Teaching-Dialogue-Vol-17>
- Kezar, A. J., & Holcombe, E. M. (2017). Shared leadership in higher education. *Washington, DC: American Council on Education*. <https://www.vumc.org/faculty/sites/default/files/Shared-Leadership-in-Higher-Education.pdf>
- Khan, S. A., Arif, M. H., & Yousuf, M. I. (2019). A study of relationship between learning preferences and academic achievement. *Bulletin of Education and Research*, 41(1), 17–32. <https://files.eric.ed.gov/fulltext/EJ1217902.pdf>
- Khanal, L., Giri, J., Shah, S., Koirala, S., & Rimal, J. (2019). Influence of learning-style preferences in academic performance in the subject of human anatomy: an institution-based study among preclinical medical students. *Advances in Medical Education and Practice*, 10, 343–355. <https://doi.org/10.2147/AMEP.S198878>

- Khongpit, V., Sintanakul, K., & Nomphonkrang, T. (2018). The VARK learning style of the university student in computer course. *International Journal of Learning and Teaching*, 4(2), 102-106. <https://doi.org/10.18178/ijlt.4.2.102-106>
- Kılınç, H., & Fırat, M. (2017). Opinions of expert academicians on online data collection and voluntary participation in social sciences research. *Educational Sciences: Theory & Practice*, 17(5), 1461–1486. <https://doi.org/10.12738/estp.2017.5.0261>
- Kim, H. Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative Dentistry & Endodontics*, 42(2), 152–155. <https://doi.org/10.5395/rde.2017.42.2.152>
- Kirschner, P. A. (2017). Stop propagating the learning styles myth. *Computers & Education*, 106, 166-171. <https://doi.org/10.1016/j.compedu.2016.12.006>
- Kolb, A., & Kolb, D. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193. <http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=11&sid=69f4133c-5cd0-4bf6-816c-69190c364e89%40sessionmgr4007>
- Kolluri, B., Panik, M. J., & Singamsetti, R. N. (2016). *Introduction to quantitative methods in business: With applications using Microsoft Office Excel*. Wiley.
- Konopka, K., Prusik, M., & Szulawski, M. (2020). Two sexes, two genders only: Measuring attitudes toward transgender individuals in Poland. *Sex Roles*, 82(9/10), 600–621. <https://doi.org/10.1007/s11199-019-01071-7>

- Kormos, C., & Gifford, R. (2014). The validity of self-report measures of proenvironmental behavior: A meta-analytic review. *Journal of Environmental Psychology*, 40, 359-371. <http://dx.doi.org/10.1016/j.jenvp.2014.09.003>
- Kumar, R. (2019, June). Introduction to statistical tool: SPSS. *Hands-on Training on "Statistical Tools and Database Management in Agriculture,"* 15-41. <https://nahep.icar.gov.in/API/Content/Uploads/84463b2f-f3e3-4baf-bb64-eae3d2496019/847ae7ac-d669-46e4-94a1-e7d31e5190a4.pdf>
- Kung, J. Y. C., & Campbell, S. (2016). What not to keep: Not all data have future research Value. *Journal of the Canadian Health Libraries Association (JCHLA)*, 37(2), 53–57. <https://doi.org/10.5596/c16-013>
- Kurgun, H., & Isildar, P. (2016). Investigation of the learning styles of tourism and hospitality students using Kolb and VARK learning style models. *Journal of QafQaz University*, 4(2), 130-141. <https://doi.org/10.20429/ijstol.2019.130211>
- Laerd Statistics. (2017). *Statistical tutorials and software guides*. <https://statistics.laerd.com/>
- Landreneau, K. J., & Creek, W. (2009). Sampling strategies. <http://www.natcol.org/research/files/SamplingStrategies.pdf>
- Landry, J. M. (2015). *Learning styles of law enforcement officers*. Scholars' Press.
- Lauritz, L. E., Astrom, E., Nyman, C., & Klingvall, M. (2013). Police students' learning preferences, suitable responses from the learning environment. *POLICING*, 7(2), 193-201. <http://doi:10.1093/police/pas009>

- Leasa, M., Batlolona, J. R., Enriquez, J. J., & Kurnaz, M. A. (2018). Determination of elementary students' learning styles reviewed from gender aspects. *Journal of Education and Learning (EduLearn)*, 12(3), 478. <https://doi:10.11591/edulearn.v12i3.8978>
- Leasa, M., & Corebima, A. D. (2017). Emotional intelligence among auditory, reading, and kinesthetic learning styles of elementary school students in Ambon-Indonesia. *International Electronic Journal of Elementary Education*, 10(1), 83-91. <https://doi:10.26822/iejee.2017131889>
- Leite, W. L., Svinicki, M., & Shi, Y. (2010). Attempted validation of the scores of the VARK: Learning styles inventory with multitrait-multimethod confirmatory factor analysis models. *Educational and Psychological Measurement*, 70(2), 323-339. <http://dx.doi.org/10.1177/0013164409344507>
- Li, Y., Medwell, J., Wray, D., Wang, L., & Liu, X. (2016). Learning styles: A review of validity and usefulness. *Journal of Education and Training Studies*, 4(10), 90–94. <http://dx.doi.org/10.11114/jets.v4i10.1680>
- Lim, H., & Lee, H. (2015). The effects of supervisor education and training on police use of force. *Criminal Justice Studies*, 28(4), 444-463. <http://doi.org/10.1080/1478601X.2015.1077831>
- Logsdon, A. (2021, February 18). *How children learn through the bodily kinesthetic style*. Bodily Kinesthetic Learning Style and Characteristics. <https://www.verywellfamily.com/kinesthetic-learner-characteristics-2162776>

Mahdy, M. A. (2020). The impact of COVID-19 pandemic on the academic performance of veterinary medical students. *Frontiers in veterinary science*, 7, 594261.

<https://doi.org/10.3389/fvets.2020.594261>

Malik, W. U., Javed, M., & Hassan, S. T. (2017). Influence of transformational leadership components on job satisfaction and organizational commitment. *Pakistan Journal of Commerce & Social Sciences*, 11(1), 146–165.

<http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=2&sid=e28d1ea2-58ea-4518-b108-05c060f46523%40sdc-v-sessmgr02>

Mašić, A., Polz, E., & Bećirović, S. (2020). The relationship between learning styles, GPA, school level and gender. *European Researcher*, 11(1), 51–60.

<https://doi.org/10.13187/er.2020.1.51>

Massoni, M. (2009). Field training programs: Understanding adult learning styles. *FBI L. Enforcement Bull.*, 78, 1.

<http://www.ncjrs.gov/App/publications/abstract.aspx?ID=248210>

McHenry, M. K. (n.d.). A need for change: The importance of continued training and education for modern-day police officers.

<https://www.cji.edu/site/assets/files/1921/aneedforchange.pdf>

McHugh, M. L. (2013). The Chi-square test of independence. *Biochemia Medica*, 23(2), 143–149. <https://doi.org/10.11613/BM.2013.018>

McLeod, G. (2003). Learning theory and instructional design. *Learning Matters*, 2(3), 35-43.

<https://www.semanticscholar.org/paper/Learning-Theory-and-Instructional-Design-McLeod/0f2069063f35553917aca882cddfb6cd6e361c3f> doi.org/10.11613/BM.2013.018

- McNeish, D. M., & Stapleton, L. M. (2016). The effect of small sample size on two-level model estimates: A review and illustration. *Educational Psychology Review*, 28(2), 295-314.
<https://doi.org/10.1007/s10648-014-9287-x>
- Mets, D. G., & Brainard, M. S. (2019). Learning is enhanced by tailoring instruction to individual genetic differences. *ELife*. <https://doi.org/10.7554/eLife.47216>
- Meyer, A. (2016). Heterogeneity in the preferences and pro-environmental behavior of college students: the effects of years on campus, demographics, and external factors. *Journal of Cleaner Production*, 112(Part 4), 3451–3463.
<https://doi.org/10.1016/j.jclepro.2015.10.133>
- Miller, J. G., Goyal, N., & Wice, M. (2015). Ethical considerations in research on human development and culture. *The Oxford handbook of human development and culture*, 14-27. <https://doi.org/10.1093/oxfordhb/9780199948550.013.2>
- Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University. Economic Series*, 17(4), 59-82.
<https://doi.org/10.26458/1746>
- Mohamad, A. M., Salleh, A. S. M., & Hassan, R. A. (2019). “We hear you, we understand you”- using VARK survey to understand first year law learners. *International Journal*, 1(1), 75-85. <https://doi.org/10.35631/ijmoe.11007>
- Mohd, A. H., & Mohd Arshad, K. N. (2019). The implications of transformational leadership styles, organizational commitments, and teamwork performance among law enforcement in Malaysia. *KnE Social Sciences*, 2019, 1130. <https://10.18502/kss.v3i22.5116>

- Moletsane, M., Tefera, O., & Migiro, S. (2019). The Relationship between employee engagement and organisational productivity of sugar industry in South Africa: The employees' perspective. *African Journal of Business & Economic Research*, 14(1), 113–134. <https://doi.org/10.31920/1750-4562/2019/v14n1a6>
- Momeni, A., Pincus, M., & Libien, J. (2018). Cross tabulation and categorical data analysis. *An Introduction to Statistical Methods in Pathology*, 93-120. https://doi.org/10.1007/978-3-319-60543-2_5
- Mozaffari, H. R., Janatolmakan, M., Sharifi, R., Ghandinejad, F., Andayeshgar, B., & Khatony, A. (2020). The relationship between the VARK learning styles and academic achievement in dental students. *Advances in Medical Education and Practice*, 11, 15-19. <https://doi.org/10.2147/AMEP.S235002>
- Mpwanya, M. F., & Dockrat, S. (2020). Assessing learning styles of undergraduate logistics students using Kolb's Learning Style Inventory: A cross-sectional survey. *South African Journal of Higher Education*, 34(3), 210–228. <https://doi.org/10.20853/34-3-3338>
- Muhlhausen, D. B. (2018). Law enforcement advancing data and science (LEADS) initiative strategic plan, 2018-2023. <https://nij.ojp.gov/topics/articles/law-enforcement-advancing-data-and-science-leads-initiative-strategic-plan-2018>
- Munro, E., & Hardie, J. (2019). Why we should stop talking about objectivity and subjectivity in social work. *The British Journal of Social Work*, 49(2), 411-427. <https://doi.org/10.1093/bjsw/bcy054>

- Murphy, K. (2017). Community engagement: Considering adult-learning and problem-solving methodologies for police training. *European Police Science and Research Bulletin*, 16, 87–98. <http://91.82.159.234/index.php/bulletin/article/view/246>
- Naresh, B., Sree Reddy, D. B., & Pricilda, U. (2016). A study on the relationship between demographic factor and e-Learning readiness among students in higher education. *Global Management Review*, 10(4), 1–11.
<https://www.sonamgmt.org/journal/>
- Naseri, M. B., & Elliott, G. (2011). Role of demographics, social connectedness and prior internet experience in adoption of online shopping: Applications for direct marketing. *Journal of Targeting, Measurement & Analysis for Marketing*, 19(2), 69–84.
<https://doi.org/10.1057/jt.2011.9>
- National Center for Educational Statistics. (n.d.). *Fast Facts*. <https://nces.ed.gov/fastfacts/>
- National Institutes of Health. (2016). Clearly communicating research results across the clinical trials continuum. <https://www.nih.gov/health-information/nih-clinical-research-trials-you/clearly-communicating-research-results-across-clinical-trials-continuum>
- National Law Enforcement Officers Memorial Fund (NLEOMF). (2020, April 30). *Law Enforcement Facts*. <https://nleomf.org/facts-figures/law-enforcement-tfacts#:~:text=There%20are%20more%20than%20800%2C000,percent%20of%20those%20are%20female>
- Navarro, O., Sanchez-Verdejo, F. J., Anguita, J. M., & Gonzalez, A. L. (2020). Motivation of university students towards the use of information and communication technologies and

- their relation to learning styles. *International Journal of Emerging Technologies in Learning*, 15, 202–218. <https://doi.org/10.3991/ijet.v15i15.14347>
- Newington, L., & Metcalfe, A. (2014). Factors influencing recruitment to research: qualitative study of the experiences and perceptions of research teams. *BMC Medical Research Methodology*, 14, 10. <https://doi.org/10.1186/1471-2288-14-10>
- Newton, P. M., & Miah, M. (2017). Evidence-based higher education—is the learning styles ‘myth’ important? *Frontiers in psychology*, 8, 44. <https://doi.org/10.3389/fpsyg.2017.00444>
- Ngaihe, L. N., K’Aol, G. O., Lewa, P., & Ndwiga, M. (2016). Effect of idealized influence and inspirational motivation on staff performance in state owned enterprises in Kenya. *European Journal of Business and Management*, 8(30), 6–13. <https://www.iiste.org/Journals/index.php/EJBM/article/view/33833/34779>
- Niemczyk, E. K. (2018). Developing globally competent researchers: An international perspective. *South African Journal of Higher Education*, 32(4), 171-185. <https://doi.org/10.20853/32-4-1602>
- Nkwake, A. M. (2013). Why are assumptions important? In *Working with assumptions in international development program evaluation* (pp. 93-111). Springer.
- Ojeh, N., Sobers-Grannum, N., Gaur, U., Udupa, A., & Majumder, M. A. A. (2017). Learning style preferences: A study of pre-clinical medical students in Barbados. *Journal of Advances in Medical Education & Professionalism*, 5(4), 185-194. <https://doaj.org/article/5954152736ff43fcab65fd82b360ed87>

- Oleson, A., & Hora, M. T. (2014). Teaching the way they were taught? Revisiting the sources of teaching knowledge and the role of prior experience in shaping faculty teaching practices. *Higher Education*, 68(1), 29–45. <https://doi.org/10.1007/s10734-013-9678-9>
- Oliva, J. R., & Compton, M. T. (2010). What do police officers value in the classroom? A qualitative study of the classroom social environment in law enforcement education. *Policing: An International Journal of Police Strategies & Management*, 33(2), 321-338.
<https://dx.doi.org.proxy1.ncu.edu/10.1108/13639511011044911>
- O'Toole, E., Feeney, E., Heard, K., & Naimpally, R. (2018). Data security procedures for researchers. *J-PAL North America*. <https://www.povertyactionlab.org/data-security-procedures>
- Owens, E., Weisburd, D., Amendola, K. L., & Alpert, G. P. (2018). Can you build a better cop? *Criminology & Public Policy*, 17(1), 41-87.
<http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=edb&AN=128090795&site=eds-live&scope=site>
- Özdemir, T., & Eydurhan, E. (2005). Comparison of chi-square and likelihood ratio chi-square tests: Power of test. *Journal of Applied Sciences Research*, 1(2), 242-244.
<http://www.aensiweb.com/old/jasr/jasr/242-244.pdf>
- Özonur, M., Kamışlı, H., & Solmaz, M. İ. (2020). Identifying distance learners' learning styles. *Ilkogretim Online*, 19(3), 1858–1863.
<https://doi.org/10.17051/ilkonline.2020.735341>

Pantoja, E. (2016, March 21). Better officer training would prevent excessive use of force. *USA*

Today. <https://www.usatoday.com/story/opinion/policing/spotlight/2016/03/21/police-training-use-of-force/82102286/>

Papadatou-Pastou, M., Gritzali, M., & Barrable, A. (2018). The learning styles educational

neuromyth: Lack of agreement between teachers' judgments, self-assessment, and students' intelligence. <https://doi.org/10.3389/feduc.2018.00105>

Parmar, A. S., Balsara, P. H., & Jaywant, S. S. (2020). Difference between learning style

preferences among second-year MBBS and second-year engineering students from

Metropolitan City. *Indian Journal of Physiotherapy & Occupational Therapy*, 14(1), 1–6.

<https://doi.org/10.5958/0973-5674.2020.00001.5>

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and

evidence. *Psychological science in the public interest*, 9(3), 105-119.

<https://doi.org/10.1111/j.1539-6053.2009.01038.x>

Patil, P., Peng, R. D., & Leek, J. T. (2016). What should researchers expect when they replicate

studies? A statistical view of replicability in psychological science. *Perspectives on*

Psychological Science: A Journal of the Association for Psychological Science, 11(4),

539–544. <https://doi.org/10.1177/1745691616646366>

Patino, C. M., & Ferreira, J. C. (2018a). Inclusion and exclusion criteria in research studies:

definitions and why they matter. *Jornal Brasileiro de Pneumologia: Publicacao Oficial*

da Sociedade Brasileira de Pneumologia e Tisiologia, 44(2), 84.

<https://doi.org/10.1590/s1806-37562018000000088>

- Patino, C. M., & Ferreira, J. C. (2018b). Internal and external validity: can you apply research study results to your patients? *Jornal Brasileiro de Pneumologia*, 44(3), 183-183.
<https://doi.org/10.1590/S1806-37562018000000164>
- Pauluzzo, R. (2020). Applying yin yang wisdom in western organizational settings: Using interviews, documents, and field observations for cross-cultural research. *SAGE Research Methods Cases*. <https://doi.org/10.4135/9781529704136>
- Peer, E., & Gamliel, E. (2011). Too reliable to be true? Response bias as a potential source of inflation in paper-and-pencil questionnaire reliability. *Practical Assessment, Research & Evaluation*, 16(9), 1-8. <https://doi.org/10.7275/e482-n724>
- Peyman, H., Sadeghifar, J., Khajavikhan, J., Yasemi, M., Rasool, M., Yaghoubi, Y. M., Mohammad, M., Nahal, H., & Karim, H. (2014). Using VARK approach for assessing preferred learning styles of first year medical sciences students: a survey from Iran. *Journal of clinical and diagnostic research: JCDR*, 8(8), GC01.
<https://doi.org/10.7860/jcdr/2014/8089.4667>
- Phillips, M. S., Abdelghany, O., Johnston, S., Rarus, R., Austin-Szwak, J., & Kirkwood, C. (2017). Navigating the Institutional Review Board (IRB) process for pharmacy-related research. *Hospital Pharmacy*, 52(2), 105-116. <https://doi.org/10.1310/hpj5202-105>
- Ponto, J. (2015). Understanding and Evaluating Survey Research. *Journal of the Advanced Practitioner in Oncology*, 6(2), 168–171.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4601897/>

Pooley, C. (2017). *Differences in Learning Style Preference of Key Stage 1 and Key Stage 2*

Pupils in Primary School, using the VARK Model.

<http://e-space.mmu.ac.uk/619191>

Potter, G. (2013, May 28). *The organization of policing: Police studies online.*

<https://plsonline.eku.edu/insidelook/organization-policing>

Pritchard, A. (2009). *Ways of learning: Learning theories and learning styles in the classroom:*

Vol. 2nd ed. Taylor & Francis [CAM].

Prithishkumar, I. J., & Michael, S. A. (2014). Understanding your student: Using the VARK

model. *Journal of Postgraduate Medicine*, 60(2), 183–186. [https://doi.org/10.4103/0022-](https://doi.org/10.4103/0022-3859.132337)

[3859.132337](https://doi.org/10.4103/0022-3859.132337)

Pyle, B. S., & Cangemi, J. (2019). Organizational change in law enforcement: Community-

oriented policing as transformational leadership. *Organization Development*

Journal, 37(4), 81–88.

[http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=bth&AN=13988](http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=bth&AN=139880365&site=eds-live&scope=site)

[0365&site=eds-live&scope=site](http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=bth&AN=139880365&site=eds-live&scope=site)

Quibol-Catabay, M. (2016). The learning styles of the marketing management students of

Cagayan State University. *International Journal of Advanced Research in Management*

and Social Sciences, 5(3), 371-383.

[http://www.globalscientificjournal.com/researchpaper/Language_Learning_Strategies_an](http://www.globalscientificjournal.com/researchpaper/Language_Learning_Strategies_and_Learning_Styles_among_First_Year_Students_of_Cagayan_State_University.pdf)

[d_Learning_Styles_among_First_Year_Students_of_Cagayan_State_University.pdf](http://www.globalscientificjournal.com/researchpaper/Language_Learning_Strategies_and_Learning_Styles_among_First_Year_Students_of_Cagayan_State_University.pdf)

Radwan, A. A. (2014). Gender and learning style preferences of EFL learner. *Arab World*

English Journal, 5(1), 21–32.

<https://www.awej.org/images/AllIssues/Volume5/Volume5Number1March2014/2.pdf>

Rijal, S. (2017, August). Using VARK to increase student's structure ability at English

Education Department Madura Islamic University. In *International Conference on*

English Language Teaching (ICONELT 2017). Atlantis Press.

<https://doi.org/10.2991/iconelt-17.2018.44>

Roberts, M. (2018, November 12). Everything you need to know about being a cop.

<https://www.thebalancecareers.com/government-job-profile-police-officer-1669698>

Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2015). Matching learning style to instructional

method: Effects on comprehension. *Journal of Educational Psychology*, 107(1), 64–

78. <https://doi.org/10.1037/a0037478>

Ross, D. L., & Bodapati, M. R. (2006). A risk management analysis of the claimed, litigation,

and losses of Michigan law enforcement agencies: 1985-1999. *Policing*, 29(1), 38-57.

<http://dx.doi.org/10.1108/13639510610648476>

Ross, P. T., & Bibler-Zaidi, N. L. (2019). Limited by our limitations. *Perspectives on Medical*

Education, 8(4), 261–264. <https://doi.org/10.1007/s40037-019-00530-x>

Russo, C., & Duffy, K. (2017, September 07). Do cops need a college education?

<https://inpublicsafety.com/2017/04/do-cops-need-a-college-education/>

Sarabi-Asiabar, A., Jafari, M., Sadeghifar, J., Tofighi, S., Zaboli, R., Peyman, H., Salimi, M., &

Shams, L. (2015). The relationship between learning style preferences and gender,

educational major, and status in first-year medical students: A survey study from

Iran. *Iranian Red Crescent Medical Journal*, 17(1), 1-6.

<https://doi.org/10.5812/ircmj.18250>

Şener, S., & Çokçalışkan, A. (2018). An investigation between multiple intelligences and learning styles. *Journal of Education and Training Studies*, 6(2), 125-132.

<https://doi.org/https://doi.org/10.11114/jets.v6i2.2643>

Sereni-Massinger, C., & Wood, N. (2016). Improving law enforcement cross cultural competencies through continued education. *Journal of Education and Learning*, 5(2), 258–264. <https://files.eric.ed.gov/fulltext/EJ1097444.pdf>

Setia, M. S. (2016). Methodology series module 5: Sampling strategies. *Indian Journal of Dermatology*, 61(5), 505–509. <https://doi.org/10.4103/0019-5154.190118>

Sharpe, D. (2015). Your chi-square test is statistically significant: Now what? *Practical Assessment, Research & Evaluation*, 20(8), 1–10. <https://doi.org/10.7275/tbfa-x148>

Shjarback, J. A., & White, M. D. (2016). Departmental professionalism and its impact on indicators of violence in police–citizen encounters. *Police Quarterly*, 19(1), 32–62. <https://doi.org/10.1177/1098611115604449>

Sifers, S. K., Puddy, R. W., Warren, J. S., & Roberts, M. C. (2002). Reporting of demographics, methodology, and ethical procedures in journals in pediatric and child psychology. *Journal of Pediatric Psychology*, 27(1), 19–25. <https://doi.org/10.1093/jpepsy/27.1.19>

Stephens, G. F. (2015). *Learning styles of millennial law enforcement officers*. Grand Canyon University.

- Stickle, B. (2016). A national examination of the effect of education, training, and pre-employment screening on law enforcement use of force. *Justice Policy Journal*, 13(1), 1-15. https://www.cjcj.org/uploads/cjcj/documents/jpj_education_use_of_force.pdf
- Stirling, B. V., & Alquraini, W. A. (2017). Using VARK to assess Saudi nursing students' learning style preferences: Do they differ from other health professionals? *Journal of Taibah University Medical Sciences*, 12(2), 125–130. <https://doi.org/10.1016/j.jtumed.2016.10.011>
- Strukan, E., Nikolić, M., & Sefić, S. (2017). Impact of transformational leadership on business performance. *Tehnicki vjesnik/Technical Gazette*, 24. <https://doi.org/10.17559/TV-20150324082830>
- Subia, G. S., Trinidad, C. L., Pascual, R. R., Medrano, H. B., & Manuzon, E. P. (2019). Learning styles and preferred teaching styles of Master of Arts in Teaching (MAT), major in Vocational Technological Education (VTE) generation Y learners. *International Journal of English Literature and Social Sciences (IJELS)*, 4(2). <https://dx.doi.org/10.22161/ijels.4.2.35>
- Sun, J., Chen, X., & Zhang, S. (2017). A review of research evidence on the antecedents of transformational leadership. *Education Sciences*, 7(1), 15. <https://doi.org/10.3390/educsci7010015>
- Taheri, S. A. (2016). Do crisis intervention teams reduce arrests and improve officer safety? A systematic review and meta-analysis. *Criminal Justice Policy Review*, 27(1), 76-96. <https://doi:10.1177/0887403414556289>

- Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative nursing*, 7(3), 155-163. <https://DOI:10.5281/zenodo.2552022>
- Thuan, N. H., Drechsler, A., & Antunes, P. (2019). Construction of design science research questions. *Communications of the Association for Information Systems*, 44, 332–363. <https://doi.org/10.17705/1CAIS.04420>
- Towler, A. (2019, June 30). The qualities of transformational leaders and what distinguishes them from transactional leaders. <https://www.ckju.net/en/dossier/qualities-transformational-leaders-and-what-distinguishes-them-transactional-leaders>
- UCLA. (n.d.). Institute for digital research & education. <https://stats.idre.ucla.edu/>
- U.S. Census Bureau. (2020, December 15). *Educational Attainment*. The United States Census Bureau. <https://www.census.gov/topics/education/educational-attainment.html>
- U.S. Department of Health and Human Services. (2018a, July 19). Electronic code of federal regulations. <https://www.ecfr.gov/cgi-bin/text-idx?m=07>
- U.S. Department of Health and Human Services. (2018b, January 15). The Belmont Report. <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/read-the-belmont-report/index.html>
- U.S. Department of Justice. (2016, October 04). National sources of law enforcement employment data. <https://www.bjs.gov/content/pub/pdf/nsleed.pdf>
- U.S. Department of State. (2015, December 11). *What is a graduate student?* EducationUSA. <https://educationusa.state.gov/your-5-steps-us-study/research-your-options/graduate/what-graduate-student>
- VARK. (2020). *VARK research statistics*. <https://vark-learn.com/research-statistics/>.

- Vaseghi, R., Ramezani, A. E., & Gholami, R. (2012). Language learning style preferences: A theoretical and empirical study. *Advances in Asian Social Science*, 2(2), 441-451.
<https://www.worldsciencepublisher.org>
- Vasileva-Stojanovska, T., Malinovski, T., Vasileva, M., Jovevski, D., & Trajkovik, V. (2015). Impact of satisfaction, personality and learning style on educational outcomes in a blended learning environment. *Learning and Individual Differences*, 38, 127-135.
<https://doi.org/10.1016/j.lindif.2015.01.018>
- Villanueva, F. (2020). The use of Kolb's Learning Styles Inventory (LSI) in school settings. *BU Journal of Graduate Studies in Education*, 12(1), 42–45.
<https://www.brandonu.ca/master-education/journal/>
- Wahyudin, A. Y., & Rido, A. (2020). Perceptuals learning styles preferences of international Master's students in Malaysia. *BAHTERA: Jurnal Pendidikan Bahasa Dan Sastra*, 19(1), 169-183. <http://journal.unj.ac.id/unj/index.php/bahtera>
- Washburne, J. N. (1936). The definition of learning. *Journal of Educational Psychology*, 27(8), 603–611. <https://doi.org/10.1037/h0060154>
- Weichselbaum, S., & Schwartzapfel, B. (2017, March 30). *When warriors put on the badge*. The Marshall Project. <https://www.themarshallproject.org/2017/03/30/when-warriors-put-on-the-badge>
- Weijters, B., Geuens, M., & Schillewaert, N. (2010). The individual consistency of acquiescence and extreme response style in self-report questionnaires. *Applied Psychological Measurement*, 34(2), 105–121. <https://doi.org/10.1177/0146621609338593>

- White, R. (2016). Learning style preferences of law enforcement officers: A Quantitative, NonExperimental Study. Northcentral University.
- Widmer, M., Bonet, M., & Betrán, A. P. (2020). Would you like to participate in this trial? The practice of informed consent in intrapartum research in the last 30 years. *PloS One*, 15(1), 1-10. <https://doi.org/10.1371/journal.pone.0228063>
- Willingham, D. T., Hughes, E. M., & Dobolyi, D. G. (2015). The scientific status of learning styles theories. *Teaching of Psychology*, 42(3), 266-271. <https://doi.org/10.1177/0098628315589505>
- Wolfe, S. E., McLean, K., Rojek, J., Alpert, G. P., & Smith, M. R. (2019). Advancing a theory of police officer training motivation and receptivity. *Justice Quarterly*, 1-23. <https://doi.org/10.1080.07418825.2019.1703027>
- Wong, J. S., & Chin, K. C. (2018). Reliability of the VARK questionnaire in Chinese nursing undergraduates. *US-China Education Review*, 8(8), 332-340. <https://doi.org/10.17265/2161-623X/2018.08.002>
- Xenikou, A., & Simosi, M. (2006). Organizational culture and transformational leadership as predictors of business unit performance. *Journal of managerial psychology*. <https://www.emeraldinsight.com/0268-3946.htm>
- Yin, G., & Jin, H. (2020). Comparison of transmissibility of Coronavirus between symptomatic and asymptomatic patients: Reanalysis of the Ningbo COVID-19 data. *JMIR Public Health and Surveillance*, 6(2), e19464. <https://doi.org/10.2196/19464>

- Yormaz, S., & Sünbül, Ö. (2017). Determination of Type I error rates and power of answer copying indices under various conditions. *Educational Sciences: Theory & Practice*, 17(1), 5–26. <https://doi.org/10.12738/estp.2017.1.0105>
- Yousef, D. A. (2018). Learning style preferences of undergraduate students: The case of the American University of Ras Al Khaimah, the United Arab Emirates. *Education & Training*, 60(9), 971–991. <https://doi.org/10.1108/ET-08-2017-0126>
- Yu, E. (2020). Student-inspired optimal design of online learning for generation Z. *Journal of Educators Online*, 17(1). <https://www.semanticscholar.org/paper/Student-Inspired-Optimal-Design-of-Online-Learning-Yu/e4ccea1379e6bf4e871c439abec6211c8781e90f>
- Zhu, H. R., Zeng, H., Zhang, H., Zhang, H. Y., Wan, F. J., Guo, H. H., & Zhang, C. H. (2018). The preferred learning styles utilizing VARK among nursing students with bachelor's degrees and associate degrees in China. *Acta Paulista de Enfermagem*, 31(2), 162-169. <https://doi.org/10.1590/1982-0194201800024>

Appendix A: Sample Size

Sample Size Calculator

Confidence Level (α):

95% ▾

Margin of Error (e):

5 %

Population Proportion (p):

50 %

Population Size (N) (optional)

55000

Calculate

Reset

Results

Your recommended sample size is: **382**

The sample size (n) is calculated according to the formula: $n = \frac{z^2 * p * (1 - p) / e^2}{1 + (z^2 * p * (1 - p) / (e^2 * N))}$

Where: $z = 1.96$ for a confidence level (α) of 95%, p = proportion (expressed as a decimal), N = population size, e = margin of error.

$z = 1.96$, $p = 0.5$, $N = 55000$, $e = 0.05$

$n = \frac{1.96^2 * 0.5 * (1 - 0.5) / 0.05^2}{1 + (1.96^2 * 0.5 * (1 - 0.5) / (0.05^2 * 55000))}$

$n = 384.16 / 1.007 = 381.495$

$n \approx 382$

The sample size (with finite population correction) is equal to 382

Note. Sample size calculator. Good Calculators. (2020). Sample Size Calculator. <https://goodcalculators.com/>

Appendix B: Informed Consent

Prospective Research Participant: Read this consent form carefully and ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Project Information

Project Title: The Preferred Learning Style of Law Enforcement Officers: A Relational, Quantitative Study

Researcher: Angel Diaz

Organization: American College of Education (ACE)

Email: [REDACTED] **Telephone:** [REDACTED]

Researcher's Faculty Member: Dr. Matt Smalley

Organization and Position: American College of Education (ACE), Dissertation Chair

Email: [REDACTED]

Introduction

I am Angel Diaz, and I am a doctoral candidate student at the American College of Education. I am doing research under the guidance and supervision of my Chair, Dr. Smalley. I will give you some information about the project and invite you to be part of this research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words you do not understand. Please ask me to stop as we go through the information, and I will explain. If you have questions later, you can ask them then.

Purpose of the Research

You are being asked to participate in this quantitative relational study is to determine if a relationship exists between the preferred learning styles of law enforcement officers based on gender and education level of officers attending a law enforcement training facility located in Central Florida. The research is necessary to assist in determining how better to instruct law enforcement officers in the United States. If this proposed study is not conducted, the impact of how to better train officers in the officers' preferred learning styles could remain undetermined.

Research Design and Procedures

The study will use a quantitative methodology and relational research design. Questionnaires will be disseminated to specific participants attending courses at the OTECH law enforcement training facility. The study will comprise of approximately 400 participants using a convenience sample, who will participate in research. The study will involve questionnaires to be conducted at the site most convenient for participants

Participant selection

You are being invited to take part in this research because of your experience as a certified law enforcement officer who can contribute much to the data, which meets the criteria for this study. Participant selection criteria: Certified law enforcement officers in the state of Florida.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate. If you choose not to participate, there will be no punitive repercussions, and you do not have to participate. If you select to participate in this study, you may change your mind later and stop participating even if you agreed earlier.

Procedures

We are inviting you to participate in this research study. If you agree, you will be asked to complete a questionnaire. The type of questions asked will range from a demographical perspective to direct inquiries about the topic of learning preferences using the visual, aural, read/write, and kinesthetic (VARK) learning styles.

Duration

The questionnaire portion of the research study will require approximately 15 minutes to complete. If you are selected to participate in the study, the time expected will be a maximum of 30 minutes. If you are chosen to be a participant, the time allotted for the study will be 30 minutes at a location and time convenient for the participant.

Risks

The researcher will ask you to share personal and confidential information, and you may feel uncomfortable talking about some of the topics. You do not have to answer any question or take part in the discussion if you don't wish to do so. You do not have to give any reason for not responding to any question.

Benefits

While there will be no direct financial benefit to you, your participation is likely to help us find out more about the learning preferences of law enforcement officers. The potential benefits of this study will aid how courses are taught in law enforcement-related courses.

Reimbursement

There will be no payment or gratuity for taking part in this study.

Confidentiality

I will not share information about you or anything you say to anyone outside of the researcher. During the defense of the doctoral dissertation, data collected will be presented to the dissertation committee. The data collected will be kept in a locked file cabinet or encrypted computer file. Any information about you will be coded and will not have a direct correlation, which directly identifies you as the participant. Only I will know what your number is, and I will secure your information.

Sharing the Results

At the end of the research study, the results will be available for each participant. It is anticipated to publish the results so other interested people may learn from the research.

Right to Refuse or Withdraw

Participation is voluntary. At any time, if you wish to end your participation in the research study, you may do so without repercussions.

Questions About the Study

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact me at the number or email listed above. This research plan has been reviewed and approved by the Institutional Review Board of the American College of Education. This is a committee whose role is to make sure research participants are protected from harm. If you wish to ask questions of this group, email IRB@ace.edu.

Certificate of Consent

I have read the information about this study, or it has been read to me. I acknowledge why I have been asked to be a participant in the research study. I have been provided the opportunity to ask questions about the study, and any questions have been answered to my satisfaction. I certify I am at least 18 years of age. I consent voluntarily to be a participant in this study.

Print or Type Name of Participant: _____

Signature of Participant: _____

Date: _____

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this Consent Form has been provided to the participant.

Print or type name of lead researcher: Angel Diaz

Signature of lead researcher: _____

I have accurately read or witnessed the accurate reading of the assent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm the individual has freely given assent.

Print or type name of lead researcher: Angel Diaz

Signature of lead researcher: _____

Date: _____

Signature of faculty member: _____

Date: _____

PLEASE KEEP THIS INFORMED CONSENT FORM FOR YOUR RECORDS.

Appendix C: Site Permission

Criminal Justice Academy of Osceola

Board of Trustees

Chief Peter Gaurlett • St. Cloud Police Department
Sheriff Russell Gibson • Osceola Sheriff's Office
Chief Bryan Holt • Osceola County Corrections
Chief Jeffrey O'Dell • Kissimmee Police Department
Superintendent Dr. Debra P. Pace • Osceola District Schools



Guy Samuelson, Director

Date: May 5, 2020

Dear Director Samuelson,

My name is Angel Diaz and I am a doctoral candidate at American College of Education (ACE) writing to request permission to have certified officers attending courses at your training facility to complete the VARK learning assessment questionnaire. This information will be used for my dissertation research related to The Preferred Learning Style of Law Enforcement Officers: A Relational, Quantitative Study. The purpose of this quantitative relational study is to determine if a relationship exists between the preferred learning styles of law enforcement officers based on jurisdiction, gender, age, education level, and years of service of officers attending a law enforcement training facility located in Central Florida.

Important Contacts for this study include:

Principal Investigator: Angel Diaz

E-mail: [REDACTED]

Phone: [REDACTED]

Dissertation Chair: Dr. Matt Smalley

E-mail: [REDACTED]

Phone: [REDACTED]

Thank you for your attention to this issue and prompt response. I appreciate your time and consideration of my request.

Regards,

Angel Diaz

Angel Diaz

I, Director Guy Samuelson, give permission to Angel Diaz to use the OTECH Law Enforcement Training Facility as the site location for his research.

Date: 5/6/2020

Guy Samuelson, OTECH Director



Appendix D: VARK Copyright Permission

Heather Lander [REDACTED]

Mon 4/27/2020 4:48 PM

Dear Angel,

Your request to use VARK copyright materials (specifically, paper copies of the VARK questionnaire and help sheets) in your research is approved.

Approval is conditional on the following:

1. Your published research report is limited to the description you have provided in your copyright permission application - should you wish to alter your hypothesis or methodology; you will need to reapply for copyright permission.
2. You must find out the VARK preference for each student and share that information with them. When you use paper copies of the questionnaire, you will be able to work out the total scores for Visual, Aural, Read-Write, and Kinesthetic, but you will not be able to find out the resulting VARK preference. It is not appropriate to just choose the modality with the highest score, as a majority of people have a multimodal learning preference. Your options for finding out the VARK preferences are to either:
 - a) purchase a VARK result analysis from us (<http://vark-learn.com/product/vark-result-analysis-for-researchers/>). You will then be able to send us a spreadsheet containing the total scores for V, A, R, and K for each student, and we will analyze their scores and return the spreadsheet to you with an additional column showing the VARK preferences. There is a cost of NZ\$30 for this service. *OR*
 - b) direct the students to fill in the VARK questionnaire online at the <http://vark-learn.com> website. They will then automatically find out their VARK preference when they have completed the questionnaire. If you then need their results, you will need to ask them to report their preference back to you. There is no fee for using the online version of the VARK questionnaire.

Please note that you may not place VARK copyright materials online or on another website, whether password protected or not, or on any electronic survey instrument (QUALTRICS, SURVEY MONKEY, MOODLE, YouTube, APPs, SMS, social media, LMS GOOGLE Forms, PDF...).

For legitimate use, we ask that you provide this acknowledgement:

© Copyright Version 8.01 (2019) held by VARK Learn Limited, Christchurch, New Zealand.

Best wishes for your research project.

Regards,
Heather

Heather Lander
VARK LEARN Limited



Appendix E: Demographic Questions

1. What is your gender?
 - a. Male
 - b. Female
2. What is the highest level of your education?
 - a. High School Diploma/GED
 - b. Some college, no degree
 - c. Associate Degree
 - d. Bachelor's Degree
 - e. Master's Degree
 - f. Doctorate Degree

Appendix F: VARK Questionnaire

The VARK Questionnaire (Version 8.01)

© Copyright Version 8.01 (2019) held by VARK Learn Limited, Christchurch, New Zealand.

How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it.

Please circle more than one if a single answer does not match your perception. Leave blank any question that does not apply.

1. I need to find the way to a shop that a friend has recommended. I would:

- a. find out where the shop is in relation to somewhere I know.
- b. ask my friend to tell me the directions.
- c. write down the street directions I need to remember.
- d. use a map.

2. A website has a video showing how to make a special graph or chart. There is a person speaking, some lists and words describing what to do and some diagrams. I would learn most from:

- a. seeing the diagrams.
- b. listening.
- c. reading the words.
- d. watching the actions.

3. I want to find out more about a tour that I am going on. I would:

- a. look at details about the highlights and activities on the tour.
- b. use a map and see where the places are.
- c. read about the tour on the itinerary.
- d. talk with the person who planned the tour or others who are going on the tour.

4. When choosing a career or area of study, these are important for me:
 - a. Applying my knowledge in real situations.
 - b. Communicating with others through discussion.
 - c. Working with designs, maps, or charts.
 - d. Using words well in written communications.
5. When I am learning I:
 - a. like to talk things through.
 - b. see patterns in things.
 - c. use examples and applications.
 - d. read books, articles, and handouts.
6. I want to save more money and to decide between a range of options. I would:
 - a. consider examples of each option using my financial information.
 - b. read a print brochure that describes the options in detail.
 - c. use graphs showing different options for different time periods.
 - d. talk with an expert about the options.
7. I want to learn how to play a new board game or card game. I would:
 - a. watch others play the game before joining in.
 - b. listen to somebody explaining it and ask questions.
 - c. use the diagrams that explain the various stages, moves, and strategies in the game.
 - d. read the instructions.
8. I have a problem with my heart. I would prefer that the doctor:
 - a. gave me something to read to explain what was wrong.
 - b. used a plastic model to show me what was wrong.
 - c. described what was wrong.

d. showed me a diagram of what was wrong.

9. I want to learn to do something new on a computer. I would:

a. read the written instructions that came with the program.

b. talk with people who know about the program.

c. start using it and learn by trial and error.

d. follow the diagrams in a book.

10. When learning from the Internet, I like:

a. videos showing how to do or make things.

b. interesting design and visual features.

c. interesting written descriptions, lists, and explanations.

d. audio channels where I can listen to podcasts or interviews.

11. I want to learn about a new project. I would ask for:

a. diagrams to show the project stages with charts of benefits and costs.

b. a written report describing the main features of the project.

c. an opportunity to discuss the project.

d. examples where the project has been used successfully.

12. I want to learn how to take better photos. I would:

a. ask questions and talk about the camera and its features.

b. use the written instructions about what to do.

c. use diagrams showing the camera and what each part does.

d. use examples of good and poor photos showing how to improve them.

13. I prefer a presenter or a teacher who uses:

a. demonstrations, models, or practical sessions.

b. question and answer, talk, group discussion, or guest speakers.

c. handouts, books, or readings.

d. diagrams, charts, maps, or graphs.

14. I have finished a competition or test, and I would like some feedback. I would like to have feedback:

a. using examples from what I have done.

b. using a written description of my results.

c. from somebody who talks it through with me.

d. using graphs showing what I achieved.

15. I want to find out about a house or an apartment. Before visiting it, I would want:

a. to view a video of the property.

b. a discussion with the owner.

c. a printed description of the rooms and features.

d. a plan showing the rooms and a map of the area.

16. I want to assemble a wooden table that came in parts (kitset). I would learn best from:

a. diagrams showing each stage of the assembly.

b. advice from someone who has done it before.

c. written instructions that came with the parts for the table.

d. watching a video of a person assembling a similar table.

Appendix G: VARK Questionnaire Scoring Chart

© Copyright Version 8.01 (2019) held by VARK Learn Limited, Christchurch, New Zealand.

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers. For example, if you answered b and c for question 3, circle V and R in the question 3 row.

| Question | a category | b category | c category | d category |
|----------|------------|------------|------------|------------|
| 3 | K | V | R | A |

Scoring Chart

| Question | a category | b category | c category | d category |
|----------|------------|------------|------------|------------|
| 1 | K | A | R | V |
| 2 | V | A | R | K |
| 3 | K | V | R | A |
| 4 | K | A | V | R |
| 5 | A | V | K | R |
| 6 | K | R | V | A |
| 7 | K | A | V | R |
| 8 | R | K | A | V |
| 9 | R | A | K | V |
| 10 | K | V | R | A |
| 11 | V | R | A | K |
| 12 | A | R | V | K |
| 13 | K | A | R | V |
| 14 | K | R | A | V |
| 15 | K | A | R | V |
| 16 | V | A | R | K |

Calculating Your Scores

Count the number of each of the VARK letters you have circled to get your score for each category:

Total number of Vs circled =

Total number of As circled =

Total number of Rs circled =

Total number of Ks circled =

| |
|--|
| |
| |
| |
| |

Appendix H: Sample Size

Online Sample Size Calculator

Confidence Level (**α**): 80% ▾
Margin of Error (**e**): 5 %
Population Proportion (**p**): 50 %
Population Size (**N**) (optional): 55000

Results

Your recommended sample size is: **164**

The sample size (n) is calculated according to the formula: $n = [z^2 * p * (1 - p) / e^2] / [1 + (z^2 * p * (1 - p) / (e^2 * N))]$

Where: $z = 1.28$ for a confidence level (α) of 80%, p = proportion (expressed as a decimal), N = population size, e = margin of error.

$z = 1.28$, $p = 0.5$, $N = 55000$, $e = 0.05$

$n = [1.28^2 * 0.5 * (1 - 0.5) / 0.05^2] / [1 + (1.28^2 * 0.5 * (1 - 0.5) / (0.05^2 * 55000))]$

$n = 163.84 / 1.003 = 163.353$

$n \approx 164$

The sample size (with finite population correction) is equal to 164

Note. Sample size calculator. Good Calculators, 2020. (<https://goodcalculators.com/sample-size-calculator/>). In the public domain.

Appendix I: SPSS Output Gender and Learning Style Preference

| Gender * Learning Preference Crosstabulation | | | | | | | | | |
|---|--------|------------------------------|--------|-----------------|-------------|-------------------|--------|-----------------|--------|
| | | Learning Preference | | | | | | | |
| | | | Aural | Two Preferences | Kinesthetic | Three Preferences | Visual | All Preferences | Total |
| Gender | Female | Count | 4 | 8 | 12 | 3 | 1 | 2 | 30 |
| | | Expected Count | 1.6 | 6.1 | 16.0 | 2.5 | .5 | 3.2 | 30.0 |
| | | % within Gender | 13.3% | 26.7% | 40.0% | 10.0% | 3.3% | 6.7% | 100.0% |
| | | % within Learning Preference | 44.4% | 23.5% | 13.5% | 21.4% | 33.3% | 11.1% | 18.0% |
| | | Adjusted Residual | 2.1 | .9 | -1.6 | .4 | .7 | -.8 | |
| | Male | Count | 5 | 26 | 77 | 11 | 2 | 16 | 137 |
| | | Expected Count | 7.4 | 27.9 | 73.0 | 11.5 | 2.5 | 14.8 | 137.0 |
| | | % within Gender | 3.6% | 19.0% | 56.2% | 8.0% | 1.5% | 11.7% | 100.0% |
| | | % within Learning Preference | 55.6% | 76.5% | 86.5% | 78.6% | 66.7% | 88.9% | 82.0% |
| | | Adjusted Residual | -2.1 | -.9 | 1.6 | -.4 | -.7 | .8 | |
| Total | | Count | 9 | 34 | 89 | 14 | 3 | 18 | 167 |
| | | Expected Count | 9.0 | 34.0 | 89.0 | 14.0 | 3.0 | 18.0 | 167.0 |
| | | % within Gender | 5.4% | 20.4% | 53.3% | 8.4% | 1.8% | 10.8% | 100.0% |
| | | % within Learning Preference | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | | Adjusted Residual | | | | | | | |

Chi-Square Tests

| | Value | df | Asymptotic Significance (2-sided) |
|--------------------|--------------------|----|-----------------------------------|
| Pearson Chi-Square | 7.378 ^a | 5 | .194 |
| Likelihood Ratio | 6.479 | 5 | .262 |
| N of Valid Cases | 167 | | |

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is .54.

Symmetric Measures

| | | Value | Approximate Significance |
|--------------------|------------|-------|--------------------------|
| Nominal by Nominal | Phi | .210 | .194 |
| | Cramer's V | .210 | .194 |
| N of Valid Cases | | 167 | |

Chi-Square Tests

| | Value | df | Asymptotic Significance (2-sided) |
|--------------------|---------------------|----|---|
| Pearson Chi-Square | 78.028 ^a | 25 | <.001 |
| Likelihood Ratio | 34.610 | 25 | .096 |
| N of Valid Cases | 167 | | |

a. 27 cells (75.0%) have expected count less than 5. The minimum expected count is .02.

Symmetric Measures

| | | Value | Approximate Significance |
|--------------------|------------|-------|-----------------------------|
| Nominal by Nominal | Phi | .684 | <.001 |
| | Cramer's V | .306 | <.001 |
| N of Valid Cases | | 167 | |