USING JUST-IN-TIME TRAINING TO EVALUATE RETENTION

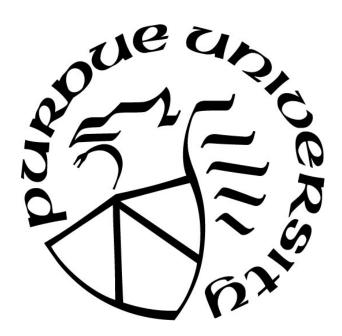by

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GLOSSARY

Active Shooter- a suspect whose activity is immediately causing death and serious bodily injury (Williams, 2015)

Comprehensive Crisis Plan Checklist- is an appropriate tool to help fill the needs in crisis prevention and intervention (Gurdineer, 2013)

National Incident Management System- is a nationally recognized emergency operation plan that is adapted for large crisis incidents (Williams, 2015)

Crisis Leaders- are individuals in charge of or participate in a significant way in crisis prevention and preparedness

LIST OF ABBREVIATIONS

FBI- Federal Bureau of Investigation

JITT- Just-In-Time Training

NIMS- National Incident Management System

POD- Point of Dispensing

SWAT- Special Weapons and Tactics

ADD- AvoidDenyDefend^{TM}

ALERRT- Advanced Law Enforcement Rapid Response Training

RHF- RUN. HIDE. FIGHT. ®

ABSTRACT

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Active Shooter events have been on the rise throughout the United States. My research topic was chosen to better understand Just-In-Time Training to identify how it can assist traditional crisis response training in schools. The work has included investigating the background on what information there is on active shooters, length of training, and the methodology behind this research. There has been little previous research evaluating the retention of training. This work developed a survey to collect quantitative data, will allow for the data to be analyzed for retention. The results after three months show no retention loss was observed in this study, therefore, training once per semester is sufficient to establish and maintain active shooter responses. Just-In-Time Training (JITT) hopes to save schools money and time when training. This knowledge will give schools the approximately they should wait before training is required again.

CHAPTER 1.   INTRODUCTION

1.1   Introduction to Problem

This chapter will provide an overview of the problem and the research questions that come from the problem. This will present the scope, significance, limitation, assumptions, and delimitations of this research. The objective is to provide a brief background into the importance of this work.

1.2   Statement of Purpose

The purpose of this quantitative study is to examine how Just-In-Time Training can assist traditional crisis response training in schools. By researching how Just-In-Time training has assisted other workplace environments, the author looks to establish when schools and workplaces need to receive crisis training again to remain safe. Specifically, the research was used to determine the frequency schools and the workplace should train. If a specific time is found using just-in-time training, then schools and workplaces would know the frequency needed for crisis response training.

1.3   Research Question

The research questions are:

1. Can Just-In-Time Training (JITT) be used to assist traditional crisis training resource allocation for schools?

2. What is the frequency of crisis training needed in schools and the workplace?

1.4   <u>Significance</u>

These finding will be beneficial for all organizations engaged in trainings. The finding may help organizations change the way they train and how long they wait to train again. If the retention levels stay high for a significant length of time then organizations can wait longer before training again, which can save companies time and money. The goal was to show the benefits of JITT and how long it can be retained. If organizations know that the training is being retained, organizations can have the confidence in their employee's knowledge of how to accomplish the task safely and efficiently. The study assists in taking the uncertainty out of when to train again. The method of JITT will allow for more efficient training to occur in organizations.

1.5   <u>Scope</u>

The research is testing the length crisis training is retained before it goes below an acceptable level. The research also addresses how Just-in-Time training could help benefit individuals when sections of the training are not retained.

The study will take place over 4 months. The participants of this research will be crisis leaders. Crisis leaders include: administrators, teachers, school aids, people in the work force, and student teachers in the process of becoming teachers.

This study will test crisis leaders in organizations on their ability to retain training information. This study will assume that each individual has had prior training, but a RUN. HIDE. FIGHT. ® video will be required to watch to assure each participant is trained with the same material, so testing can accurately test the length of crisis training retention over time.

1.6   Assumptions

The following assumptions were used in this study:

1. All crisis leaders have the same amount of previous training.

2. All the crisis leaders have equal learning abilities.

3. All the crisis leaders completed the survey to the best of their ability.

4. The crisis leaders are not watching the RUN. HIDE. FIGHT. ® training video after they watch it once.

5. The quality of training was both rigorous and appropriate to be able to test retention.

1.7   Limitations

The following limitations were used in this study:

1. The research is limited by cooperation and reliability of the volunteers.

2. Statistical significance of the size of the population in the research.

1.8   Delimitations

The following delimitations were used in this study:

1. Crisis leaders drawn from the state of Indiana which includes individuals in college, workforce, and individual employed by K-12 schools.

CHAPTER 2.   LITERATURE REVIEW

2.1   Literature Review

Research has shown that it is common for schools to experience some type of crisis event throughout the school year (Gurdineer, 2013). Thus, it is important to develop a crisis plan to be able to deal with crisis events. Demographics, resources, and amount of training were all evaluated for their effects on school crisis plans. The demographics and amount of training were found to have significant impact on quality plans, but the resources included in the quality plans were found to have a bigger impact on the effects of the school crisis plans (Gurdineer, 2013). The results from the research also showed that crisis team members and schools without written crisis plan were the biggest variables effecting the quality of the crisis plan. The more crisis team members one has working on the crisis plan the better quality of the crisis plan. As a result, the total resources, which would be the police department and other emergency services, accounted for 14.9% of the variability in the crisis plan (Gurdineer, 2013). State funding for schools can affect how many people can be on the crisis team, but funds are essential in order to strengthen a crisis plan.

2.2   School Crisis Management Challenges

Schools require leadership from multiple individuals. including administrators and teachers. Schools have policies, rules, and regulations to follow and the teachers and administrators are the individuals to enforce them. Crisis management training becomes a part of the teacher's role in leadership. The more professionalism and trust teachers provide, the more students will trust and follow them (Tschannen-Moran, 2009). An abundance of leadership can cause students to perceive the teacher as strict and deficient, which can cause a lack of obedience

in students (Tschannen-Moran, 2009). A balance of both is required to effectively manage student impressions.

In addition to managing leadership, teachers are asked to deal with large classes, training, daily lesson preparedness, and disruptive student behavior (Lee, 2008). What teachers have to deal with currently is causing stress. They turn to administrators to assist with providing necessary training and helping with disruptive student (Lee, 2008). Crisis training is one of the trainings teachers want assistance on, so they can be prepared in a crisis. Lee found that teachers do not perceive themselves as capable to manage a crisis if one occurred because they are not receiving enough practice on safety planning skills and the requirements needed are not being provided (Lee, 2008). Administrators need to be assisting teachers, so in the event of a crisis teachers can know the proper procedure to follow. In a training session one school administrator said, "I'm not worried about having a crisis plan in my school because I have it all in my head" (Lee, 2008, pg. 4). Crisis plans are useless unless the plan is written down and learned. Experts have warned that without training faculty, crisis plans do not work (Lee, 2008). Schools need crisis plans and training to help with crisis prevention and preparation.

Prevention, intervention, and postvention are most likely lacking in the Comprehensive Crisis Plan Checklist (CCPC) (Gurdineer, 2013). In prevention programs, schools can add an anti- drug program, suicide prevention program, and school health programs (Gurdineer, 2013). Intervention programs that can be added to provide better quality are dealing with crowd issues after a crisis, identification of dead and wounded, and victims of violence (Gurdineer, 2013). Additionally, postvention programs can provide better quality to the crisis plan by adding a plan to inform student and families about the crisis and parent-child reunification and sign out

procedures after the crisis event (Gurdineer, 2013). Although these areas require dedicated funds, adding these programs to the crisis plan can provide an elevated quality.

<div align="center">2.3   School Active Shooter Incident Response</div>

Over the past 15 years, school safety has been a focal point in the United States. Over this period, schools have been implementing active shooter policies and trainings. Implementing an active shooter training program can be difficult, as there are no one size fits all approach (Rorie, 2015). A school has many activities occurring throughout the day and evening. During the day, students are in class, and at night, students might be engaging in extracurricular activities. In addition, location impacts the necessary procedures and training for an active shooter. The Denver Department of Health adopted a three-step strategy for staff members to follow in the case of an active shooter situation: RUN. HIDE. FIGHT. ® (Rorie, 2015). The first response during an active shooter situation is to run and leave the area of the active shooter. If victims are unable to run away, they should hide. This includes locking the door, turning off the lights, and blocking the door (Rorie, 2015). At last resort, they should fight. Additionally, the Denver Department of Health published training videos that employees could watch to refresh on their active shooter exercises (Rorie, 2015). Implementing an active shooter training program can keep employees prepared for an active shooter event. Active training videos, three step strategy, and practicing with first responders are three techniques that can assist in the implementation of an active shooter plan.

RUN. HIDE. FIGHT. ® was developed by the city of Houston, Texas to help better prepare for active shooter incidents (Houston, 2002). The goal for this strategy was to lower the casualty rate for an active shooter incident. The first step in the process is to run and get out of

the active shooter area. If running is not an option, the next step is to hide by getting to a place that is out of the shooters point of view. Lastly, if hiding is not an option, then fight by attempting to disarm the shooter. RHF has been implemented in both public and private sectors across the United States.

Another terminology that was developed after the Columbine shooting was AvoidDenyDefend[TM] (Texas State University, 2004). The AvoidDenyDefend[TM] (ADD) is taught in the Advanced Law Enforcement Rapid Response Training (ALERRT) that Texas State University puts on to train emergency responders about active shooter incidents (Texas State University, 2004). ADD and RHF follow the same concepts, but just use different terms to describe them. The first step to proactively use ADD is to "avoid" the area where the shooter is and have an exit plan. If avoiding is not an option, the next proactive step is to "deny" the shooter by creating barricades to protect from the threat in a sheltered place. If avoiding and denying are not an option, then "defend" by being aggressive and committing to how you plan on disarming the shooter.

RUN. HIDE. FIGHT. ® philosophy was tested with the 1999 Columbine High School shooting to see if this philosophy would reduce causality rates (Lee, 2019) This philosophy was not yet created when the shooting took place. RHF was tested by recreating the scenario in AnyLogic of the library shooting. There were three scenarios tested; run, hide, and fight. The study was tested with 56 individuals in the library. In the run scenario, it was found that the survival probability of running is 92.1%, which is 30.4% higher than the Columbine event (Lee, 2019). An important part of surviving during the run scenario was knowing the escape plan and where the active shooter is. The hide scenario resulted in a survival probability of 5.16%, which is 57.1% lower than Columbine event (Lee, 2019). The results show that the survival rate goes

down if you hide instead of run during an active shooter event. By placing locks on doors can help slow down the shooter out of rooms where individuals are hiding. Lastly, the fight scenario resulted in survival probability of 97.6%, which is 35.7% higher than the Columbine event (Lee, 2019). By swarming the shooter, it allowed to block the shooter from there ability to shoot. Hiding is the least effective during an active shooter situation. Overall, depending on the active shooter situation, the RHF philosophy decreases the number of casualties.

An active shooter event can last for different time durations. Getting the police to the school can take time depending on how far away the police station is from the school. Research has been done comparing the number of casualties to the time to engage based on different scenarios. The scenarios are basic (no resource officer or concealed weapons carry), resource officer, 5% of the people with a concealed weapon, 10 % of the people with a concealed weapon, 5% of the people with a concealed weapon and a resource officer, and 10 % of the people with a concealed weapon and a resource officer (Anklam, Kirby, Sharevski, Dietz, 2015). Based on the analysis, it was found that the time to engage and the number of casualties was the lowest in the scenarios: resource officer, 5% of the people with a concealed weapon and a resource officer, and 10 % of the people with a concealed weapon and a resource officer (Anklam et al, 2015). Based on these results, it shows that there are multiple ways to help defend against active shooter events and eliminate casualties.

Active shooters have become an issue in current crisis management. An active shooter is a suspect whose activity is immediately causing death and serious bodily injury (Williams, 2015, pg. 4). The problem with active shooter events is that they are spontaneous and unpredictable (Williams, 2015). National Incident Management System (NIMS) is a nationally recognized emergency operation plan that is adapted for large crisis incidents (Williams, 2015). NIMS

becomes important to follow because it allows local law enforcement and the cooperation efficient use of resources and information in the case of a crisis. Training becomes important with local law enforcement to practice the crisis management plan set by the cooperation, so both sides are ready in case of a crisis incident.

For an active shooter situation, shelter-in-place and lockdown are two terms that can be misused in a crisis management plans for safety The difference between shelter in place and lockdown is based on the type of emergency. One is used regarding natural or technological events and the other typically concerns human led incidents, commonly an active shooter or civil disturbance. For example, a lockdown often occurs as a result of an active shooter situation. During a lockdown people are asked to remain in place and barricade the doors. The purpose of a lockdown is to prevent the shooter from entering rooms to cause harm to individuals and to make sure individuals do not wander into the "hot" zone (Worsham, 2017). An example of a shelter in place scenario is an outcome of severe weather or chemical disturbance (Worsham, 2017). While sheltering in place individuals are instructed to go to a chosen room, noted in a crisis plan, and to remain away from danger. Training for both situations is essential once both crisis plans are established.

Shelter in place, over time, has been a safer approach than trying to evacuate students into a potential contaminated or dangerous environment (White, 2018). While sheltering in place is in effect, no one can leave until the situation is contained or safe. Most lockdowns occurring in schools are from police related activity unrelated to the schools, but close to them (White, 2018). For a lockout scenario, just the school is locked, and no one can leave or enter, but school still runs normally (White, 2018). For a lockdown scenario students are supposed to hide in rooms

(White, 2018). Lockdown would occur during the hide part of the RUN. HIDE. FIGHT. ®
philosophy.

Revisiting active shooter policies and protocols is essential to help create a quality crisis
management plan. Most active-shooter protocols contain the same advice: implement lockdown
procedure, minimize the target profile, and wait for the police to neutralize the situation (Buerger
& Buerger, 2010). Essentially, the policies in place are to hide in place and hope the active
shooter does not find individuals. The problems with these procedures is that they do not account
for crowded classrooms or rooms that are locked when the student arrives. A crisis may occur
during lunch time or during passing periods when many students are not in a classroom. Cell
phones can compromise victims hiding in place if a phone rings and the shooter locates the
victims. Since active shooters are commonly first identified by students, communication is
important to enable response teams to act quickly and effectively (Buerger & Buerger, 2010).
Without quick and effective communication, an effective crisis plan will not work.

In unique situations, there can be critical issues that occur when following active shooter
policies. A critical issue is the breaching capabilities for first responders when they arrive. As a
part of school's active shooter policy, majority of school's policies are to lock down the school
in the case of an active shooter. However, this practice locks out the first responders coming to
help. Special Weapons and Tactics (SWAT) team members have advanced training in breaching,
but local police are not trained extensively on breaching (Nichols, 2010). Issues with breaching
may occur in a rural area where SWAT is not present. Critically evaluating and updating active
shooter policy and training is essential to finding critical issues. By focusing on what can be

learned from other active shooter tragedies, they can benefit the current active shooter policies and training in the schools.

2.4   School Active Shooter Drills

School shooting drills are now being substituted for fire and tornado drills given the frequency and popularity in the United States (Shah, 2013). States are currently looking into making laws about different type of safety drills. The executive director of the National School Safety Center said, "whether the additional practice and paperwork will actually improve schools' defense against shooters and intruders is hard to say" (Shah, 2013). Crisis management training is always going to be changing because of the events occurring. Having a ones size fits all training is difficult (Shah, 2013). Multiple trainings occur at schools because it is difficult to have a singular uniform training as the training takes time away from education. Drills can take 15-45 minutes long depending on the drill (Shah, 2013). A fire drill can take 15-30 minutes depending on the building size, speed of evacuation, and if the drill is coordinated with emergency first responders (Weill, 2018). An active shooter drill can take the same amount of time. The average length of an active shooter event is 10 minutes (Destein, 2016). It also takes on average 12-15 minutes before law enforcement can arrive to the scene (Destein, 2016). Often, when the drill is over, students lose focus, teachers lose preparation time, and school administrators have to complete written safety plans and audits (Shah, 2013). Crisis management training is critical and worth doing because it a lifesaving training. The training is only effective if the schools complete the crisis response training as it is written in the crisis management plan. Crisis training need to be efficient and effective because a crisis can happen at any moment and individuals need to be prepared to react.

2.5   Active Shooter Incident Case Studies

Traditionally, training is necessary to prepare, avoid, or mitigate a crisis that may occur in the future. Training techniques have been changing over the course of time because of past events and lessons learned from the events. For example, the Sandy Hook school shooting was once such event where existing training and crisis response procedures were changed due to an unfortunate outcome of outdated or obsolete practices. The Sandy Hook final report, published by the Federal Bureau of Investigation (FBI), provides recommendations on ways to improve training for active shooter events and calls for a revisit of the policies they currently have in practice (Malloy, 2015). Some of these recommendations included procedures to provide full perimeter lockdown capabilities, establish safe havens where building occupants can only lock the door from the inside, and including school custodians as a part of school security and safety committees (Malloy, 2015). Because of the Sandy Hook incident, these recommendations for training and safety have begun to be implemented.

As a result of previous school shootings, current practice is that each school has their own active shooter policy (Wisconsin, 2016). Due to the current epidemic of active shootings occurring across the country, it is imperative that training is conducted with the effort to increase the current effectiveness of the active shooter plan. The University of Wisconsin published a crisis communication case study for the shooting at Antigo High School during their prom. The active shooter did not make it into the building before the police took control of the situation (Wisconsin, 2016). The active shooter policy that Antigo High School currently had in place was correctly followed by the prom staff. Since the active shooter situation happened during the prom, there were more chaperones than school workers (Wisconsin, 2016). The chaperones need to be provided with proper training to be able to respond correctly to the current crisis plan. Not

only do these active shooter case studies provide acceptable recommendations and lessons, but this also provides other schools around the country with issues that could happen at their schools, and improve their crisis plans based on past events.

<div align="center">2.6   Crisis Response Training in Schools</div>

School leaders have a large influence on efficiency and frequency of training. Government agencies cannot mandate every school's crisis training policy and procedure, which makes it necessary that schools themselves taking charge on its policies and procedures for training. Based upon the importance of school leaders in crisis training a study was conducted to see the perceptions school leaders had on active shooter training. Ryals sent out a survey to 228 parochial and public-school leaders across six school districts in Louisiana and of those 228, 93 school leaders responded to the survey (Ryals, 2014, pg. 64). Of the 93 respondents, 60 were parochial school leaders and 33 were public school leaders (Ryals, 2014, pg. 64). With this result, the researcher found out that the biggest problem that school leaders were having was the anxiety an active shooter drill may cause on the students, staff, and parents. Anxiety is a difficult emotion to control when doing a training. The results also showed that the school leaders' favorite component was to bring in law enforcement to help with the training (Ryals, 2014). Including law enforcement in the school trainings can aid both the school's and the officers' training. Also, it provides more of a real life crisis event when one includes the law enforcement. In a time where the frequency of shootings may be increasing, it is more important to implement successful training to make sure the faculty, students, and staff know how to effectively respond to a crisis. Ultimately, this responsibility falls onto the school executive.

As in all states, the Indiana Department of Education provides standards on training required for schools inside their jurisdiction. Although each school may have different protocols

and procedures based on location and resources, they are still required to meet the Indiana

Department of Education standards. The schools are required by the state to do two manmade

trainings per year and one of those trainings must be a lockdown/lockout drill (McCormick,

2018). Lack of or bad quality training becomes apparent when a crisis happens. One of the

recommendations that the State of Indiana has for schools is to incorporate school safety and risk

recognition training into new teachers training programs (McCormick, 2018). The benefit of

training teachers would help with crisis prevention. Government agencies mandate general

guidelines for schools inside their jurisdiction, but schools have leeway regarding some aspects

of implementation. It is important to revisit the policies and procedures for crisis training to

make sure they continue to be as effective as they were 10 years ago.

For example, the Indiana Department of Education is responsible to assist and help

prevent future crises in schools (McCormick, 2018). To help better prepare teachers to handle a

complex environment and continue a commitment to school safety, the Security School Safety

Board has given $14.2 million to 388 school corporations for additional safety equipment and

threat assessment (McCormick, 2018). The Security School Safety Board has given $53 million

to schools since 2014 (McCormick, 2018, pg. 4). The money that was given to the schools has

helped to support the training at schools. A study was done to see how many schools in the State

of Indiana hold joint training exercises to stay current and prepared for an emergency and 71%

either do not or are not sure (McCormick, 2018, pg. 18).

2.7   Traditional Training Cost

Organizations in the United States alone spend a total of $135 billion on training

individuals each year (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). Training can assist

in reducing errors in high risk situations. Decisions on what to train, how to train, and how to evaluate the training are important when implementing training (Salas et al., 2012). It is important to invest in training because it allows individuals to learn information. There are two reasons to train, safety and general learning. Practice of training is important in establishing and learning essential procedures to help protect against crisis situations. Training can either be to build individual/team skills or to prepare for a high-risk crisis (Salas et al., 2012). Management and leadership people become important in crisis situations. Being prepared for the training and preparing individuals before the training is important. Motivation and promotion of the training can help assist the learning of the training. After the training is over, it is key to evaluate how the training went and make changes that assist in correcting the problems in the training.

There are multiple approaches to the practice of training; two approaches are asynchronous and synchronous training. Asynchronous training consists of trainings that are administered individually and synchronous training consists of trainings that occur at the same time (Craig, 2016). These two training approaches are important to understand and test to improve the training's specific outcome. Improved understanding of situational training will also improve the trainings effectiveness and thereby, positively affecting the trainees and their knowledge. Behavioral modeling is used to teach through demonstration and one of the important factors in behavioral modeling is knowledge transfer. Knowledge transfer is the application of acquired skills and knowledge into different situations (Craig, 2016). This factor was used to help establish if online training (synchronous or asynchronous) would be more effective than traditional, face-to-face training. The results determined that, during the short term, face-to-face training is more effective in a behavioral modeling approach (Craig,2016).

Asynchronous online courses provide a flexible and self- paced learning environment for individuals to learn. In synchronous online courses, the instructor of the course and the learners are participating simultaneously (Skylar, 2009). A synchronous online course is more similar to traditional learning than an asynchronous online course. A study was conducted using the Likert scale to test if students learned more through synchronous online learning or asynchronous online learning. The result of the study showed no significant difference between whether students learned more through synchronous and asynchronous online learning (Skylar, 2009).

However, switching from a traditional learning to an asynchronous online learning can be difficult for students. Traditional learning follows a brick in mortar setting. A brick in mortar setting allows students to communicate in person and have a structured class time (Glenn, 2018). Asynchronous online learning normally requires more time, more writing, and less direct contact with other students or professors. Asynchronous online learning can be overwhelmed since it is accelerated, but by incorporating traditional learning styles and methodologies into asynchronous online learning will assist in helping students adjust to the different learning styles. Like in a traditional classroom, creating an open, respectful, and collaborative asynchronous learning environment is possible (Glenn, 2018).

Nevertheless, converging both learning styles causes challenges. Motivation of the students and pace of the class are two key problems that commonly occur (Glenn, 2018). Since the learning is not traditional, students have a difficult time adjusting the lack of structure. In turn, the disorganized approach can cause students to become overwhelmed and less motivated. By developing a successful, communicative culture and addressing students' needs and concerns early, improvements can be made to asynchronous online learning (Glenn, 2018).

Though initial trainings are necessities that can be conducted without affecting productivity, retraining within companies or educational facilities can be difficult to schedule and implement. Asynchronous online training is used to assist with the retraining process and avoid time constraints associated with traditional trainings. When retraining senior employees, the training is built to retrain on current training and expand skills. Research suggests that experienced workers reach a performance plateau that is difficult to overcome (McEdwards, 2014). A study (2014) was done to test if asynchronous training can retrain senior officials and assist in learning new skills (McEdwards). The study found that senior officials can continue to improve their skills. Additionally, asynchronous training can be retained longer than traditional training (McEdwards, 2014). Asynchronous training allows for individuals to seek repeated assistance if needed.

2.8   Training Retention in Crisis Response

One of the biggest problems in training is knowing how long the people receiving the training can retain the information. Interpreting the success or failure of a training can be difficult because as an instructor and leader they cannot see everything happening in the training (Miller, Coyle, and Slawinski, 1997). As an instructor and leader, they need to see if the training was completed, how the training was written, and if the people receiving the training will remember what to do in a crisis (Miller et al., 1997). Evaluating training can be difficult, but is necessary for the completion of the training. One of the most effective tools for helping people remember the training are picture or word reminders (Miller et al., 1997). Pictures or word reminders of crisis training are commonly being put up at facilities to increase retention of the training that occurred.

Besides traditional and online training, "Just-in-time Training" offers another approach to learning that can determine how long trainees can retain the information and skills associated with training (Craig, 2016). Though people and situations differ, this type of training can be valuable for efficiency. Just-in-time training (JITT) is one of the training strategies that are currently being evaluated for crisis training. JITT is becoming an important tool for performance improvement in the global-changing workforce (Vico, Canteli, Lobo, Fernández, Bandera, García-Linares, & Schlegel, 2007). JITT is being tested on health training to give first responders a quick refresher on immediate tasks that they need to be preform. The JITT can be done through smartphone, which can cause problems with content constraints. The JITT lasts no more than five minutes and can be translated into several other languages (Vico et al., 2007). JITT allows health training to become mobile and when needed, instead of waiting on the next instructor lead training.

Just-in-Time Teaching has been incorporated into higher educational schools to assist in advanced foreign language (Abreu & Knouse, 2014). Just-in-Time Teaching was first implemented in an introductory physics course to address nontraditional students' needs (Abreu & Knouse, 2014). Professors are beginning to notice that certain key concepts in courses are being forgotten and Just-in-Time Teaching allows for students to go back and refresh their memory later in the coarse. Just-in-Time Teaching allows for technology to be able to be used in the classroom to help assist individuals. Just-in-Time Teaching has created more opportunity for student learning (Abreu & Knouse, 2014).

Additionally, JITT is being used to train nonmedical hospital staff on workforce requirements (Spitzer, Hupert, Duckart, & Xiong, 2007). JITT was tested with only a small

number of individuals using it at hospitals. Two point of dispensing (POD) exercises was created to test the efficiencies of JITT. One POD exercise was designed to test the duration of the exercise individuals participated in, and the other POD exercise was used to approximate the waiting time at the station (Spitzer et al., 2007). The results showed that JITT can be used by individuals in a high-throughput. Thus, JITT can be used in schools to save time on training, since one can complete the training with a high-throughput of individuals on the system.

Schools perform trainings for crisis response where instructors physically assist in training. Instead of performing instructor training, computer training may be a viable alternative. Computer training might include watching a training video for the crisis that one needs training for. The computers allow for flexible crisis training, instead of planned personnel-led training (Harrington & Walker, 2003). The computer-based training allows one to complete the training whenever possible, while instructor-led training requires someone to lead the training in person. A review of studies between computer-based training and instructor-led training shows that the people prefer computer-based training, but there was no significant difference between the two trainings regarding post-training information retention (Harrington & Walker, 2003). Thus, schools should consider this a viable alternative to the costs associated with traditional active shooter training. Additionally, this training could be overseen and approved by local law enforcement, keeping up best practices associated with traditional active shooter training.

CHAPTER 3.   METHODOLOGY

3.1   Framework

There have been many studies regarding school crisis training. These studies focus mainly on the effectiveness and quality of the process. However, there is limited research on crisis training retention amongst classroom leader's. This limited research has led the researcher to the purpose of this study. The purpose of this quantitative study is to examine Just-In-Time Training to evaluate how it can assist traditional crisis-response training in schools. Specifically, the research was used to determine the frequency at which schools and workplaces should train in order to prevent and respond to crisis. The researcher hypothesizes that they will provide when Just-In-Time crisis training will be needed to be completed again based upon retention. This research will be able to provide schools and workplaces information regarding how long individuals will retain crisis training. Further detail of the process of this study is described in more detail below.

3.2   Research Type

The research will be conducted in the form of a survey. This study will be exploring the retention rate based on time for Just-In-Time crisis training. The study hopes to show where the decline trend of training retention, so-as to predict when training is needed again.

3.3   Sampling Approach

Convenience sampling will be used in the study. Convenience sampling was chosen because the volunteers were accessible based on the purpose of the study. To connect with the

volunteers, the researcher will send out an email. The email list will be taken for the department of education data base and from crisis leaders from the area.

3.4   Sampling Size

The sample size will be 20 crisis leaders, based on the number of crisis leaders (college student from Purdue University because of access, workforce, and K-12 teachers) that volunteer for this survey.

3.5   Population

The population of this study will be a group of crisis leaders in Indiana. There will be no stratification of the population because the characteristics of the population do not matter for the purpose of this study. For the purpose of the study, all classroom leaders are considered equal.

3.6   Units of Measurement

Retention results will be collected for individuals that are currently in classroom crisis leadership opportunities. The unit which will be measured will be retention based on time. Every month, the volunteers will be given the same survey to see if the retention has declined.

3.7   Variables

The variables that will be observed relate to the JITT video that all the volunteers will watch at the beginning of the study. The independent variable will be time and the dependent variable will be the amount of information retained.

3.8 Assessment Instruments

The researcher will develop a survey based on the Just-In-Time crisis video that is required to watch at the beginning of the study. The volunteers must watch the active shooter training video before the first survey in order to get a baseline for the training. The survey is created based on current active shooter procedures and will be revised by subject matter experts.

3.9 Data Collection Methods

The data will be collected through an online survey. The survey will be given every month. The crisis leaders will start in July 2019 and finish in October of 2019. The survey will be complete once a month. The researcher will send an email out to the participants where they can watch the RUN. HIDE. FIGHT. ® crisis training video and a hyperlink to the qualtrics survey. The online survey will allow for faster response times and allow the volunteer to complete the survey on their own time. The researcher will also send out reminder emails to the volunteers to complete the survey each month. The anonymity of the responses will be protected.

3.10 Analysis

Qualtrics will be used to analyze the data from the study. The data will be downloaded for formatting to Excel. Missing values and uncompleted surveys will be removed from the analysis before it is analyzed in SPSS.

3.11 Summary

This section talked about the methods and analysis that the researcher will be using for this study. The validity of this research will be acceptable because individuals will be able to repeat this experiment, but at the same time, the researcher, does not know if the volunteers are looking

up the answers to the survey, which could effect the validity of the experiment. This methodology provides insight into the variables that will be analyzed in the study.

3.12 Conclusion

In conclusion, the purpose of this study is is to examine how Just-In-Time Training can assist traditional crisis response training in schools. While doing this research it is important to keep the research within the scope of the project. The scope of this project is 4 months, with a survey being taken each month to measure retention. The methodology will assist in how the results are planned to be obtained in this research. This research will provide insight on training retention and when retraining is approximately required.

CHAPTER 4.   PRESENTATION OF DATA

4.1   Observation of Training

The Just-In-Time Training data gathered will help the researcher be able to see if there was a decrease in retention rate over time. Each survey was separated by a month. Each graph shows a different demographic of the results and different ways the data can be interpreted. The study was sent to the same individuals over the coarse of the four months, but there was a different total number of individuals who participated in the study each month. The research was then cleaned to get rid of non-completed survey, checked to assure that each individual who took it the first time were the only participants allowed in the following three months of data, and made the data useable in SPSS.

4.2   Analysis of Data

Once the data was collected, cleaned, and analyzed, the data was then used to produce four graphs. Figure 4.1 shows the difference between score by time for gender, Figure 4.2 shows the difference between score by time for employment, Figure 4.3 shows the difference between score by time for training, and Figure 4.4 shows the overall difference between score by time.
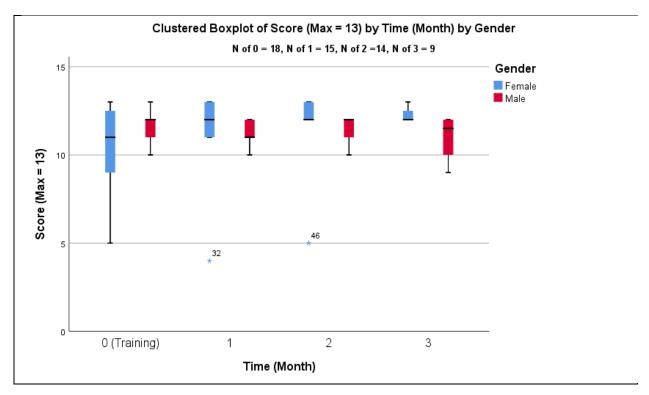
Figure 4.1 Using JITT to Evaluate Retention based on Score by Time for Gender (Time 0- Male: 11, Female: 7; Time 1- Male: 10, Female: 5; Time 2- Male: 9, Female: 5; Time 3- Male: 6, Female: 3)

Table 4.1 Statistical Analysis of the Retention based on Score by Time for Gender

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	11.467341	.550187	15.933	20.843	.000	10.300600	12.634082
[Gender=Female]	-1.023733	.889114	16.346	-1.151	.266	-2.905336	.857869
[Gender=Male]	0[b]	0	.	.	.	.	.

a. Dependent Variable: Score (Max = 13).

b. This parameter is set to zero because it is redundant.

Figure 4.1 above shows that there is no statistical significant difference for retention difference between females and males. In time 0 (Training), there were eleven males and seven female participants. In time 1, there were ten males and five female participants. In time 2, there were nine males and five female participants. In time 3, there were six males and three females.

There are a couple outliers in the months 1 and 2 for the females that can be pulling the average score down, but overall the scores based on time for genders are close to a straight line. Table 4.1 shows that there is no significant difference based on gender because the confidence interval contains zero between the upper and lower bounds.
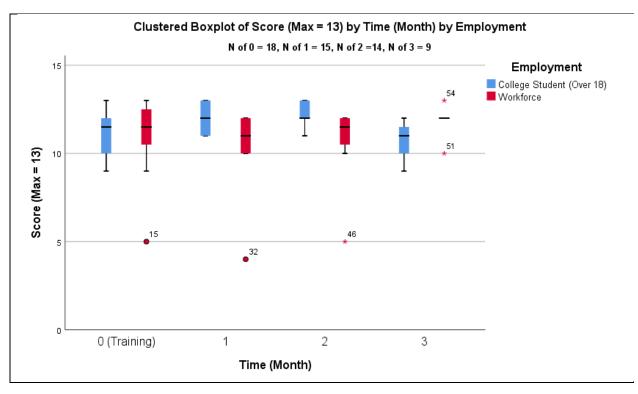

Figure 4.2 Using JITT to Evaluate Retention based on Score by Time for Employment (Time 0- College Student: 6, Workforce: 12; Time 1- College Student: 5, Workforce: 10; Time 2- College Student: 5, Workforce: 9; Time 3- College Student: 3, Workforce: 6)

Table 4.2 Statistical Analysis of the Retention based on Score by Time for Employment

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	11.157471	.482070	20.782	23.145	.000	10.154309	12.160632
[Employment=College Student (Over 18)]	-.244478	.577947	53.715	-.423	.674	-1.403333	.914376
[Employment=Workforce]	0[b]	0	.	.	.	.	.

a. Dependent Variable: Score (Max = 13).

b. This parameter is set to zero because it is redundant.

Figure 4.2 shows no statistical significant difference for retention loss based on employment. In time 0 (Training), there were six college students (over 18) and twelve individuals from the workforce. In time 1, there were five college students (over 18) and ten individuals from the workforce. In time 2, there were five college students (over 18) and nine individuals from the workforce. In time 3, there were three college students (over 18) and six individuals from the workforce. The researcher found five outliers for participants in the workforce. The outliers in the months 0, 1, and 2 can be pulling down the average scoring for the workforce. The outliers in month 3 is rare, everyone got the same score except for two participants, which made them outliers. Overall, when the outliers are taken out, the scores based on time for employment are close to a straight line. Table 4.2 shows that there are no significant differences based on employment because the upper and lower bounds contain zero.

Figure 4.3 Using JITT to Evaluate Retention based on Score by Time for Training (Time 0-Previous Training: 5, No Previous Training: 13; Time 1- Previous Training: 5, No Previous Training: 10; Time 2- Previous Training: 4, No Previous Training: 10; Time 3- Previous Training: 2, No Previous Training: 7)

Table 4.3 Statistical Analysis of the Retention based on Score by Time for Training

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	11.904188	.683477	32.965	17.417	.000	10.513588	13.294788
[Training=No Previous Training]	-1.099412	.711890	47.095	-1.544	.129	-2.531473	.332650
[Training=Previous Training]	0[b]	0	.	.	.	.	.

a. Dependent Variable: Score (Max = 13).

b. This parameter is set to zero because it is redundant.

Figure 4.3 no statistical significant difference for retention loss based on Previous Training. In time 0 (Training), there were five participants with previous training and thirteen with no previous training. In time 1, there were five participants with previous training and ten with no previous training. In time 2, there were four participants with previous training and ten with no previous training. In time 3, there were two participants with previous training and seven with no previous training. There are three outliers with no previous training and one outlier with previous training, and they all are pulling the averages down. Overall, the scores over time for training are close to a straight line and show no real reduction in retention. Table 4.3 shows that there is no significant difference between the previous training or no previous training because between the lower bounds and upper bounds contains zero.
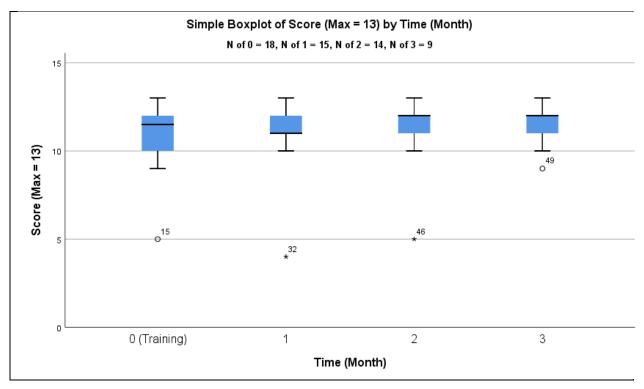

Figure 4.4 Using JITT to Evaluate Retention based on Score by Time (Time 0- N = 18; Time 1- N = 15; Time 2- N = 14; Time 3- N = 9)

Figure 4.4 show the score by time not based on any demographics. There are four

outliers, one in each month. There are little differences between each month, but between where

the average started and where it ended up, there is no real difference between the four months.

Overall, there is no statistical significant difference for retention, but more of a straight line.

Table 4.4 shows how close the means are over the coarse of four months.

Figure 4.5 Using JITT to Evaluate Retention based on Score by Time for the 9 Individuals who
Participated in Every Survey

Figure 4.5 shows the score by time based on the nine individuals who participated in

every survey. There is one outlier in month three. This outlier brought the mean down in month

3. The means of each month were: 0 (Training) = 11.44, 1 = 11.22, 2 = 11.67, 3 = 11.44, and the

average of those is 11.44. Based on these means, interpretation can be made that the mean scores

do not change from month 0 (Training) to month 3. Overall, there is no statistical significant

difference for retention because the average of the means is 11.44, which is the same as month 0 (Training).

Table 4.4 Descriptive Statistic of the Overall Score per Time

Report

Score (Max = 13)

Time (Month)	Mean	N	Std. Deviation
0 (Training)	11.06	18	1.984
1	11.00	15	2.138
2	11.29	14	1.978
3	11.44	9	1.236
Total	11.16	56	1.886

Table 4.4 shows that the average from one month to the next. The averages could be changing based on the number of people participating going down each month. Since all the standard deviations are low, this means all scores are close to the means and not spread out.

Table 4.5 Percentage of Questions Answered Correctly

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
0 (Training) (N=18)	83%	89%	89%	100%	78%	78%	100%	94%	94%	89%	39%	78%	94%
1 Month (N=15)	80%	87%	87%	100%	93%	73%	100%	100%	80%	93%	33%	80%	93%
2 Month (N=14)	86%	93%	79%	100%	93%	79%	93%	93%	86%	93%	36%	93%	100%
3 Month (N=9)	89%	89%	100%	100%	89%	78%	100%	89%	100%	100%	33%	78%	100%

Table 4.5 shows the percentage of questions answered correctly for each month. The goal is to show the questions the participants struggled on. Highlighted in red is any question that is lower than 75%. Table 4.5 shows that the participants struggled on question eleven. The participants also got below 75% on question 6 during the second time taking the survey. Further analysis will be discussed in another part of this paper.

4.3   Conclusion of Results

Figure 4.1, 4.2, and 4.3 are showing the different demographics and the effects of them. Figure 4.1 shows how gender effects the scores over time. Figure 4.2 shows how employment effects score over time. Figure 4.3 shows how previous training effects score over time. All of these outcomes show that the retention level is flat and does not show a curve of drop off based on the demographics. Figure 4.4 shows the score based on time, not based on any demographics. Overall, figure 4.5 had a high retention rate and there was no drop off in retention based on time. The average mean score goes from 11.06 in month zero, then the training occurred to 11.44 in month 3, which is the fourth time the participants took the survey. This increase was not predicted. This research shows that three months after the training occurred, there is no retention loss. This research also shows that JITT can be used to help assist traditional active shooter training because there was no retention loss after JITT. The researcher would recommend that the retention rate needs to stay above 70% based on the results of the survey. That 70% comes from the standard way we look at a passing grade. Once the retention rate goes below 70%, JITT can be used to refresh and raze the retention back about the 70% level. The researcher, based on the results of the data, would still recommend doing an active shooter training every semester as stated in Indiana Department of Education standards. The researcher believes that training for an active shooter situation once per semester would be sufficient enough to keep the retention rate high.

4.4   Implications

Throughout this research, it shows the possibility of using JITT to assist with active shooter training. Since there was no retention loss during the coarse of the research, the study may need to be continued a longer time period to see when the retention curve starts to fall.

Some reasons why the retention rate could have stayed high are because some questions were common sense, the recent active shootings happening in the world, the participants learning from the news about what to do when they occur, and the length of the research was not long enough to see a retention curve.

All the outliers in Figure 4.1 and in Figure 4.2, 4.3, and 4.4 just in time (0 (Training), 1, and 2) was the same participant. These low scores could be due to the participants not taking the survey serious and just guessing on the questions instead of thinking about the correct answer. The participant could of also not have watch the training video and just took the survey. This is an issue with having an online survey is you cannot monitor the participants. Another problem was the researcher sent the survey and training video to a group of teachers that was taking from the Indiana teachers association website and none of them participated in the study.

Table 4.5 shows the percentage of questions answered correctly for each month. Based on the analysis, question eleven participants could not figure out the correct answer consistantly over the coarse of the research. The question was a tough question and you had to pay close attention to the training video to be able to get this question correct. Question eleven should be looked over and possibly changed.

After completing the research, it is important to identify findings and improvements. Those improvements are to expand the questions to fifteen instead of thirteen to help with analysis, expand sample size participation, refine current survey questions, and expand time frame of study to be able to see a retention curve.

The researcher found that the RUN. HIDE. FIGHT. ® video that was built for active shooter training was a sufficient video for training for individuals trying to survive an active shooter situation. This video does not show what police or first responders should do in an active

shooter situation. The RUN. HIDE. FIGHT. ® video can be created at each school to show what individuals should do in an active shooter situation at their school. Instead of the video being general, it could be specific for their school to make the training more effective.

Evaluating retention based on active shooter situations is important. There have been many active shooter situations that have occurred. It is important to learn from what has happened in previous active shooter cases. Since more active shootings are occuring, there are more case studies out there to learn from. Learning where crisis plans and active shooter preparedness are flawed from previous active shooter cases can help potentially save lives and protect against that active shooter situation from happening.

Since the researcher's population size was small, it does not reflect the population size of schools or big venues where active shooter situations normally occur. Schools generally have big populations; a lower retention rate might be sufficient enough since many students will retain proper response activities who could act as crisis leaders. With students becoming crisis leaders on active shooter situations, it will allow for administrators and teachers feel more prepared in an active shooter situation.

Additional research can be created based on the results of this research. One question that can come out of this research is, do males retain less than females? This comes from figure 4.1. This figure shows that the female average ends up higher than the male average of retention.

Overall, JITT can help assist with active shooter training. JITT can help keep the retention rate above the 70% level recommended by the researcher.

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APPENDIX A. THESIS SURVEY QUESTIONS

Thesis Questions for Survey

1. What is the best and most common strategy to use during an active shooter event?
   a) Avoid/Deny/Defend
   b) RUN. HIDE. FIGHT.
   c) Awareness, Preparation, Activate
   d) Call 911
   e) All of the above

2. Individuals should always try and escape and evacuate even when others insist on staying.
   a   True
   b   False

3. Individuals should let others slow them down when trying to escape
   a) True
   b) False

4. Should you grab your belongings before you run?
   a) Yes
   b) No

5. Individuals should not help other individuals avoid the area where the active shooter is.
   a) True
   b) False

6. Of the six objectives to do during the RUN part, what is the last thing you should do?
   a) Leave your belongings behind
   b) Help others escape if possible
   c) Call 911 when you are safe
   d) If there is an escape path, attempt to evacuate

7. When individuals are hiding, should they barricade and lock the door?
   a) Yes
   b) No

8. It is important to not turn off the lights and to not silence your cell phone because it will let the shooter know something is not right with that room and someone maybe in there.
    a) True
    b) <mark>False</mark>

9. When hiding, individuals should not trap or restrict your options for movement.
    a) <mark>True</mark>

    b) False

10. When fighting individuals should act with aggression using improvised weapons to disarm the active shooter.
    a) <mark>True</mark>
    b) False

11. Of the four objectives for the fighting part, what is the last thing you should do?
    a) Act with physical aggression
    b) <mark>Commit to your actions</mark>
    c) Improvise weapons
    d) Attempt to incapacitate the shooter

12. The first responders that are first on the scene are not there to evacuate or take care of the injured, but are there to take down the active shooter.
    a) <mark>True</mark>
    b) False

13. What is true when the law enforcement arrives?
    a) Remain calm and follow instructions
    b) Keep your hands visible at all times
    c) Avoid pointing or yelling
    d) Know that help for the injured is on its way
    e) All of the above