ASSESSING THE FACTORS CONTRIBUTING TO RESPONSE TIME OF THE BUREAU OF FIRE PROTECTION IN DAVAO CITY

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Abstract:
Rapid emergency response is critical in mitigating fire-related disasters, reducing property damage, and saving lives. Factors influencing the Bureau of Fire Protection (BFP) 's response time concerning Davao City were studied. More specifically, training and preparedness were analyzed with respect to improving emergency response efficiency. The study employed a quantitative correlational research design, where data from the 239 BFP officers were gathered using validated questionnaires to assess their levels of disaster knowledge, skills, and response efficiency. The statistical analyses of Pearson correlation and multiple regression showed a strong positive relation between training, preparedness, and response time. Firefighters with higher levels of disaster knowledge and skills were found to respond faster. Besides, the study identified some external factors contributing to delayed responses, including road conditions, equipment reliability, and public cooperation. Results further revealed that disaster knowledge and disaster skills correlated strongly with response efficiency, while training and preparedness had a moderate yet significant correlation. The regression model explained 43.5% of the variance in response time, suggesting that improving firefighters' technical and contextual knowledge could improve emergency response performance. Consequently, the study recommends periodic simulation-based training, upgrading firefighting equipment, and enhancing the public awareness campaign to improve response efficiency and reduce damage caused by fires in Davao City.

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1. Introduction

In emergencies, the speed at which emergency services respond is a critical element that influences the effectiveness of their actions and the eventual outcome. Quicker response times generally lead to better results, as they reduce the likelihood of severe injuries and deaths (Wang *et al.*, 2019). Moreover, the response time of the Bureau of Fire Protection (BFP) in the Philippines is crucial, as it affects how swiftly they can control fires to ensure public safety (Santos & Dela Cruz, 2022). Although response time is vital, BFP personnel face numerous challenges when dealing with emergencies. The two main obstacles affecting firefighting efforts are the lack of water supply and heavy traffic caused by poorly maintained roads (Haque, 2019).

Assessing the impact of varying levels of fire brigade training on emergency response speed is critical for operational improvement (Smith & Johnson, 2020). Research has indicated that fire brigades trained through simulation techniques are faster and more effective in responding to emergencies than those who receive standard training (Williams & Brown, 2021). Inadequate training programs can escalate response times because poorly trained responders tend to respond more slowly, increasing the rate of casualties (Nguyen & Patel, 2019). These findings indicate the need for proper training and preparedness to improve the response times of Davao City Bureau of Fire Protection personnel. Several critical bottlenecks hindered the delays in responding by the fire brigade, including slow communication from members of the public and a general lack of awareness regarding the importance of giving the right of way to fire engines.

In addition, the majority of the fire trucks were also old, which impacted their response speed in case of emergencies (Kahanji *et al.*, 2019). In addition, firefighters' frustrations during their work can make them feel that even minor issues are insurmountable, hence experiencing anger, inadequacy, hopelessness, or aggression. Such an environment affects their belief in their capabilities and the efficiency of their tasks (Rusu, 2020). Communication problems and equipment reliability further decrease the overall efficiency of firefighting services.

In the research work by Buffington and Ezekoye (2019), the response time and effectiveness of the fire department within a community were explored, as in the present research. They researched cases of enhanced response effectiveness in their analysis of different indicators of fire severity, like the recorded damage inflicted by fires. An increase in the fire average severity index over a response time of 3-13 minutes is mainly due to increased probabilities of severe fire occurrences when response times are longer. It implies that, according to the case studies, proactive planning and foreknowledge of extreme weather events capable of causing massive damage and loss of lives will give

wildland fire-exposed communities sufficient time for proper fire management during peak-risk situations (Jolly *et al.*, 2019). The research firmly established that the likelihood of developing more intricate fires due to a delay in responding to fire brigades significantly outpaces the likelihood of response delays for the fire rescue service compared to the size of the fire. This evidence supports the quick response presented in this research and validates the avoidance of prolonged periods to avert the amplification of fires (Buffington & Ezekoye, 2019).

Research shows that simulation-based training allows firefighters to react to emergencies faster and better than other training methods (Williams & Brown, 2021). Nevertheless, most training programs still emphasize older methods that might not prepare individuals well enough for actual situations (Nguyen & Patel, 2019). The success of training is an even bigger threat to emergency services, like the Bureau of Fire Protection in Davao City, where prompt response is key to effective operations. Lack of training can result in outcomes that only occur when challenging situations push a firefighter's advanced training and skills to the limit (Petersen, 2019). Though extensive literature exists to connect injury outcomes with response times, this association has not yet been made between the training provided to fire officers in Davao City. This study attempts to bridge the gap by comparing the training procedures followed by the Bureau of Fire Protection in Davao City and their connection to emergency response times. By identifying training and readiness gaps, the current study endeavors to recommend changes in training programs to enable quicker and more efficient action by fire protection staff. Preparations by firefighters encompass contextual and technical understanding, specialized instruction, and live firefighting exposure (Lagata *et al.*, 2022). The study is grounded in the Protection Motivation Theory (PMT) that was first suggested by Ronald Rogers in 1975, demonstrating that readiness includes a person's perceptions of the effectiveness of readiness behaviors and their capability to perform them (e.g., self-efficacy and coping appraisal), which serve as predictors of readiness, and the acceptance of and emotional involvement with personal risk. PMT also explains how fear affects personal health-related behaviors and is one of the most widely referenced theories attempting to explain personal risk prevention or protection-related behaviors. Protective motivation is people's motivation to avoid possible negative consequences after perceiving a threat (Rogers, 1975). The Protection Motivation Theory (PMT) is a prism that views the relationship between training and readiness on response time, where threat and coping appraisal play an interactive role. Studies in America have established that self-efficacy and response efficacy are significantly and positively related to disaster preparedness avoidance behaviors (Adams *et al.*, 2019). Similarly, when perceived self-efficacy and perceived response efficacy are considered, the benefits of adaptive responses need to outweigh the attendant costs of responses.

Additionally, the Theory of Planned Behavior (TPB) shows that readiness is anticipated to be the outcome of readiness attitudes, social norms regarding readiness, and control beliefs over readiness-related behaviors. Attitudes may broadly be classified into affective and cognitive types, affecting a limited set of time- and place-sensitive

behavioral concepts. It brings about a connection between integrating disaster risk reduction into planning, policy, and programming, highlighting disaster risk reduction as an essential component in strategic sustainable development (United Nations Office for Disaster Risk Reduction, 2020). Risk reduction incorporates the mitigation of human behaviors that reduce human impact and signifies the capacity of a person to withstand the outcomes of adverse effects (Wang & Tsai, 2022). Integrating sustainability into preparedness disaster planning opens up possibilities for reducing the environmental effects of disasters and making systems more resilient (Shirvani Dastgerdi & Kheyroddin, 2022).

Figure 1 shows the conceptual framework that operationalizes the research. This research's most important independent variable is training and readiness, which are components of disaster knowledge and skills. On the other hand, the dependent variable is Response Time, symbolized as Turnout Time. Disaster Knowledge refers to practices that have developed from focusing on emergency management to a general framework called 'disaster risk reduction (DRR)' (Davis, 2019). Disaster skills refer to the abilities and knowledge needed to prepare for and respond to. Recover from disasters, notably where instant professional emergency assistance is lacking or saturated (Integrated Research on Disaster Risk, 2022). By comparison, Turnout Time for emergency response defines the duration from triggering warning systems within the station to the time that the responding unit calls in and reports arrival on the incident scene (Moore-Merrell, 2023). The term involves every aspect of fire officers' training and preparedness, from their knowledge and expertise to how ready they are to handle emergencies. Through investigating this variable, the objective is to shed light on how differences in training and readiness impact response time. The dependent variable for this study is the duration from the activation of the alarm to the arrival of the Bureau of Fire Protection at the emergency scene.
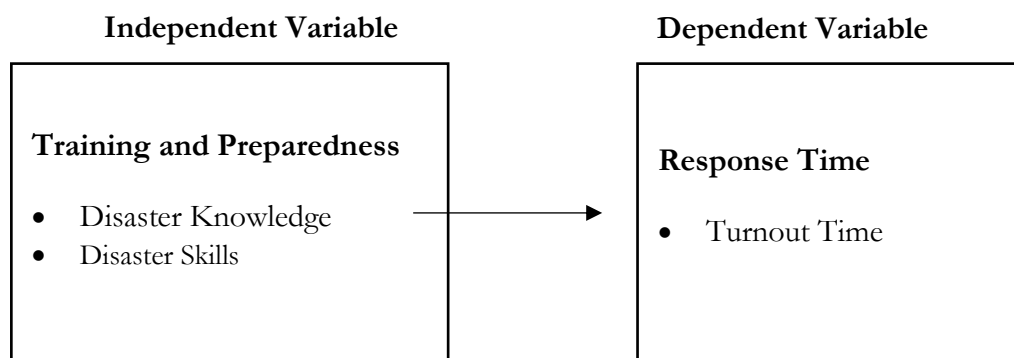
Independent Variable   **Dependent Variable**

Figure 1: The conceptual framework of the study

The main objective of this study was to investigate the relationship between the training and readiness of the Bureau of Fire Protection in Davao City and their response times. This study also aims to test the prevailing parameters and offer relevant data about the relationship between training and readiness concerning the response time of the

Bureau of Fire Protection in Davao City. Further, developing a model that illustrates how training level and preparedness influence BFP response times is imperative.

The primary area of focus in this study was to quantify the training level and preparedness of the Bureau of Fire Protection personnel in Davao City regarding their disaster knowledge and skills. It measured the extent to which the fire department personnel had the capabilities and knowledge necessary to handle emergency situations effectively. Secondly, the study sought to analyze the Bureau of Fire Protection's response time in Davao City, specifically regarding turnout time. It gauged the effectiveness of the fire responders in responding to emergency calls and what affects their response times. The third purpose of the research was to determine whether or not a significant relationship existed between training and preparedness and the Bureau of Fire Protection response time in Davao City. The study aimed to determine whether or not training and readiness influenced how quickly firefighters reacted to emergency cases. Lastly, the study also sought to find out if training and preparedness significantly affected the response time of the Bureau of Fire Protection in Davao City. It assisted in evaluating whether enhanced training and preparedness could improve response times and overall effectiveness in fire emergency operations. For hypotheses, the study was proven at a significance level of 0.05 to determine whether there was no statistically significant difference in training readiness and response time. It also checked whether readiness and training were responsible for altering the response time of the Davao City Bureau of Fire Protection.

The main aim of this study was to investigate the relationship between the training and preparedness of the Bureau of Fire Protection in Davao City and their response times. Additionally, the study aims to question current criteria and present relevant information on the role of training and preparedness in affecting the response times of the Bureau of Fire Protection in Davao City. In addition, there is a critical need to form a model showcasing the effects of training and preparation on response time in the BFP. The significance of the research is vital in that it impacts the effectiveness of emergency response programs involving public safety and health. Academic institutions and the University of Mindanao have been lobbying for some improvements in how the Bureau of Fire Protection is operating.

This research reviewed attempts to improve firefighting and safety services by looking at the turnaround times of the services and their corresponding response times, considering road and geographical constraints. After a careful review of the findings, it became the responsibility of researchers to report these findings to concerned stakeholders, such as policymakers and community members, to be aware of how training, preparedness, and response time relate. The study also sought to support creating safe and resilient communities in line with this larger objective. Ultimately, it aspired to enhance the overall performance efficiency of fire protection services in Davao City. It also explored sociocultural impediments to efficient emergency response that hinder effective interventions, thus striving for a more elevated safety standard for

communities in line with Sustainable Development Goal 16, which aims to promote Peace, Justice, and Strong Institutions.

2. Methods

This section presents the study participants, materials and instruments, and design and procedure.

2.1 Study Participant

The main objective of this research is to analyze the relationship between training and readiness of the Bureau of Fire Protection in Davao City and their response times. Also, this research aims to analyze existing parameters and provide relevant data concerning the relationship between training and readiness in response times of the Bureau of Fire Protection in Davao City. Additionally, it is important to establish a framework that illustrates how training and readiness levels affect the response times of the BFP.

The research participants were Bureau of Fire Protection (BFP) officers in Davao City. Because these officers engage in fire response operations, they can provide the required data about the relationship between training preparedness and response times. The research involved 239 fire officers from 13 stations. The Bureau of Fire Officers varies from non-commissioned officers, namely Fire Officer 1 to Senior Fire Officer 4, in different fire stations in Davao City to provide variability in training and experience in handling fire incident responses. This research utilized a two-level sampling approach, using probability sampling to obtain a representative sample population.

Probability sampling gives each member of the entire sample an equal opportunity to be chosen (Iliyasu & Etikan, 2021). The technique ensures all eligible members have a known probability of being selected and that the probability is the same for all members, ensuring minimal risk of bias and establishing a strong foundation for an intensive study of sample errors. In this case, simple random sampling was used, which gave each BFP officer in the target population a fair chance to be sampled. Simple random sampling is a technique that ensures every member of a population has an equal chance of being selected as a respondent (Thomas, 2020). A clearly defined sampling frame was created at the initial stages, with all male and female BFP officers serving more than a year and actively serving at the fire station unit. Following the outlined criteria, the researcher could achieve consistent and valid results regarding training preparedness and response times among Bureau of Fire Protection Officers. In addition, this study employs probability sampling methods with stratified random methods for sample size determination.

2.2 Materials and Instrument

In this study, the adapted questionnaires were completed using Google Forms to collect the desired data. Two sets of questionnaires were used to collect the data for this study, which seeks to quantify Training, Preparedness, and Response Time. Training and

preparedness were the independent variables. It was assessed with the Disaster Preparedness Evaluation Tool (DPET), which was originally developed by Bond and Tichy (2007) and has been used by several researchers to study and determine the level of perception during training and preparedness. The DPET assessed disaster preparedness, response procedures, recovery procedures, and overall preparedness (Arcipowski, 2020). The investigator modified 23 items containing two categories: Disaster skills and Disaster knowledge. Hence, the dependent variable was Response Time. It was measured using an adapted questionnaire from FEMA's Emergency Fire Officer Program (EFO). It was selected because it contains an extensive and validated method of determining emergency response efficiency. The questionnaire has 18 - an 18-item tool that quantifies the duration between the initial call and the responders' response at the scene, providing data on determinants of response speed and readiness for action. The researchers followed the research's data collection protocol. The researchers used the Likert scale to measure the correlation between training, preparedness, and response time. A 5 - Very High to 1 – Very Low rating system was used to grade each of the following indicators. The assessment scale is 1 to 5, matching descriptive ratings and interpretations. 4.51 to 5.00 falls in Very Strong, a Very High level. 3.51 to 4.50 is Strong, which is a high level. A Moderate is 2.51 to 3.50, which is a Moderately High level. The Weak rating is Low for scores of 1.51 to 2.50. Next, for 1.00 to 1.50, the Very Weak classification falls under the Very Low level. This scale provides a systematic assessment and evaluation process of different variables without any vagueness in the interpretation.

2.3 Design and Procedure

The current study employs a correlational quantitative design that is non-experimental, seeking to determine the effect of training and readiness of firefighters on Bureau of Fire Protection responders' response time in Davao City. Although this design permits an examination of the relationships between variables, it inherently restricts the evidential value concerning causal relationships. Non-experimental research designs watch social phenomena by studying subjects in their natural context without intervening or allocating random groups, which inherently compromises the evidence for cause-and-effect relationships (Salmons, 2023). The research also has some limitations since it was based on responses from BFP officers using self-reported data, which might introduce bias in their answers. However, the study deliberately centered on BFP personnel, namely officers in 13 fire stations in Davao City, discussing the relationship between training, preparedness, and response time; therefore, other related variables were not taken into consideration. This omission has contributed to the Bureau of Fire Protection officers' longer response time to fire incidents in Davao City. In addition, reports from the Fire Bureau document a high occurrence of fire cases during this month (Philippine Information Agency, 2019). Based on this, the performance of BFP personnel was assessed based on how well they had been trained and prepared to face fire emergencies. Moreover, the present study theorizes that the training undertaken by BFP officers directly influences their reaction time to fire incidents and investigates their readiness to

deal with fire outbreaks in the community. In this way, different groups of quantitative data are gathered and tested statistically to conclude. Subsequently, all data collected are compared and contrasted to explain the meaning obtained from the data.

In this research, descriptive statistics were first used to examine the data to develop participant profiles and describe trends. This entailed specifying and interpreting parts of the dataset, such as computations of the mean, median, mode, and standard deviation, among other quantities. Such computations enabled understanding data trends and variability, which is necessary for interpreting trends and distributions (Bland, 2015). Then, correlational analysis was conducted to examine the correlation between the variables: the training and readiness of BFP officers in responding to fire incidents in Davao City. According to McCombes (2019), correlational research design quantifies the relationship between two variables without the researcher manipulating either variable. The study was conducted systematically within ethical standards as needed. The participants were required to give informed consent and were informed of the purpose of the study and their right to withdraw at will. All names and other identifiable information were replaced with codes. In addition, the ethical review board's approval was obtained to maintain ethical standards and avoid any harm to the participants.

Pearson's r index is among the measures used in data interpretation and analysis of results. It is used in graphing and determining linear relationships among variables. More commonly known as the Pearson correlation coefficient, this scalar measurement takes a value of -1 to 1 and is widely applied as a parameter for assessing the strength and direction of linear relationships between two variables as a credible indicator of their association type (Turney, 2024). This technique can be used when comparing two data sets regarding linearity, with the correlation value being between -1 and 1, representing the extent and direction of their relationship. The mean is also crucial, particularly when determining the central tendency of data. It is calculated by summing all values within a data set and then dividing that by the number of values contained. When comparing a series of data sets, the mean is particularly convenient. Standard deviation is a measure of the dispersion of numerical data and measures the extent to which data departs from the mean.

The first step is acquiring a review by the university's academic and ethics committee to ensure that the proposed research meets the institution's guidelines and ethics standards. After that, a letter will be written to the Office of the Bureau of Fire Protection asking permission to interview BFP officers and undertake the research. This letter will state the study's purpose, importance, and methodology. At the same time, a letter will be written to the Dean of the College stating the purpose of the study and asking for his assistance and support in carrying out the study. The team followed ethical practices during the research process at every stage.

The participants were free to take part in the study or not and were under no obligation to respond or fill out the research questionnaire. They could refuse to participate or refuse to respond. All subjects were fully notified of the research and its

associated potential health hazards, and their anonymity regarding personal information, such as names, ages, and course of study, was ensured, among other things. It should be emphasized that no aspects of this research posed critical threats to a person's physical, psychological, or socioeconomic health. In addition, this research was unique because it was completely original and free of plagiarism.

3. Results and Discussions

Results and Interpretations of data obtained from quantitative analysis are shown in this section. Once the results have been tabulated, conclusions are drawn.

3.1 The Level of Training and Preparedness

Table 1 illustrates the training and readiness levels of personnel in the Bureau of Fire Protection (BFP). The results indicate that disaster knowledge received the highest mean score of 4.46, categorized as "very high," which suggests that the respondents have a strong theoretical understanding of disaster-related topics. Disaster skills, while slightly lower at 4.38, also fall within the "very high" range, reflecting the high practical abilities of the personnel. The overall mean of 4.25, accompanied by a standard deviation of 0.68, confirms that BFP staff members perceive themselves as well-prepared, although some variability in the responses is apparent.

Table 1: The level of Training and Preparedness

Training and Preparedness	Mean	SD	Interpretation
Disaster Knowledge	4.46	4.41	**Very High**
Disasters Skills	4.38	0.48	**Very High**
Overall Mean	**4.25**	**0.68**	**Very High**

As shown in Table 1, the training and preparedness assessment outcomes consistently reveal elevated levels of significance across all evaluated areas. In particular, the respondents demonstrated a very high level of engagement with a mean score of 4.46 in "Disaster Knowledge," signifying a solid understanding of various disaster-related concepts. Meanwhile, the mean score for "Disaster Skills" similarly indicates a very high level of engagement at 4.38, albeit slightly lower than that of "Disaster Knowledge." Nevertheless, both categories reflect substantial training and readiness among the respondents, with an overall mean of 4.25, which is also classified as 'Very High.' The results suggest that staff have undergone comprehensive training, equipping them with essential knowledge and practical skills for emergency response. However, the higher standard deviation of 0.68 in the overall preparedness score indicates minor discrepancies in perceived readiness, which may result from differences in experience, training frequency, or resource availability.

These results align with previous research emphasizing the benefits of ongoing training and readiness for enhanced emergency response efficiency. Smith & Johnson (2020) document that comprehensive training programs greatly enhance firefighters'

capacity to respond quickly and smartly. Williams and Brown (2021) also proved that simulation training improves competency and knowledge retention, which results in faster and better responses. In addition, by highlighting that poor training could lead to slow responses and higher risks, Nguyen and Patel (2019) affirm the importance of disaster preparedness programs.

The findings of this research affirm that having a very successful emergency response team demands constant training and competence building.

3.2 The Level of Response Time

Table 2 shows the levels of response time of Bureau of Fire Protection (BFP) personnel. The average response time score is 4.40, which is considered "Very High" and indicates that personnel generally find their response efficiency very effective.

Table 2: The Level of Response

Item Statement	Mean	SD	Interpretation
1. I am familiar with the current response standard of my station.	4.57	0.60	Very High
2. I am aware of my turnout time for my station response.	4.55	0.58	Very High
3. I believe the current dispatch notification and information affect my turnout time.	4.43	0.72	Very High
4. The current technology utilized by dispatch and in the station affects my turnout time.	4.35	0.74	Very High
5. I find that my familiarity with the response area affects my turnout time.	4.36	0.72	Very High
6. I find that the time of day affects my turnout time.	4.35	0.73	Very High
7. I believe that transportation infrastructure affects my turnout time.	4.34	0.71	Very High
8. The type of call affects my turnout time.	4.29	0.83	Very High
9. Being assigned to a specific station affects my turnout time.	4.30	0.82	Very High
10. The personal satisfaction motivates my turnout time performance.	4.37	0.75	Very High
11. Competition between individuals and/or fire stations motivates my turnout time performance.	4.29	0.82	Very High
12. I find efficient call processing important in our station.	4.46	0.65	Very High
13. Call processing, turnout, and response times are important to the overall effectiveness of our station.	4.53	0.60	Very High
14. Public opinion influences my motivation to respond to calls quickly.	4.29	0.80	Very High
15. Training and awareness programs are effective in preparing me for quick turnouts.	4.54	0.61	Very High
16. Arriving on the scene quickly is important in our station.	4.63	0.55	Very High
17. The expectations of others affect my turnout time performance.	4.27	0.87	Very High
18. The proximity of my home to my assigned fire station affects my turnout time.	4.34	0.85	Very High
Overall Mean	**4.40**	**0.52**	**Very High**

Among the factors that were assessed, the assertion "Fast arrival at the scene is important to our station" was rated with the highest mean value of 4.63 (SD=0.55), indicating high significance attached to the speedy response. In contrast, "The expectations of others

affect my performance in terms of turnout time" had the lowest mean value of 4.27 (SD = 0.87), although this is still within the "Very High" category. These findings suggest that although firefighters highly appreciate efficient responses, external expectations have a relatively lower influence on their performance.

The uniformly high scores on all the items indicate that BFP staff are adequately trained, know what they do, and are highly motivated to reply efficiently. The results bring to light that crucial variables like exposure to response guidelines, training programs, and technology implementation lead to their very high efficiency in reply. The significant mean scores concerning station procedures and successful call treatment are such that systematic procedures and communication networks all positively impact turnaround times. However, the minor response variation, evidenced by the standard deviations, is such that personal, environmental, and logistical considerations would somewhat impact individual performance.

This study is consistent with previous research on the effectiveness of emergency responses. Topolsky *et al.* (2022) indicate that the preparedness of fire department subsystems is crucial in attaining overall emergency response effectiveness, with adaptable decision-making frameworks increasing operational capacity (Topolsky *et al.*, 2022). Aminigbo and Omogunloye (2022) note the significance of geoinformatics in the optimization of the placement of fire stations and response times, showing that strategic positioning can improve emergency service coverage by up to 95% (Aminigbo & Omogunloye, 2022). In addition, Kozhevnikov and Rudakova (2022) stress the significance of mathematical modeling for fire truck deployment, ensuring that resources are appropriately allocated during urban fire emergencies (Kozhevnikov & Rudakova, 2022). The results of the present study vindicate the usefulness of systematic instruction, strategic locational placement, and procedural optimality in delivering the best response times by BFP responders.

The results mentioned above are supported by data from Buffington and Ezekoye (2019), which indicates that a delay in response times increases the likelihood of extensive fire damage that could have adverse economic impacts or even fatalities. Delays can be reduced, and effectiveness in emergency response can be optimized by enhancing dispatch systems, cutting down communication delays, and implementing training requirements (Buffington & Ezekoye, 2019). As noted by Iksan (2023), response time is a very important part of effective fire management, especially in the first interval between notice and deployment. Delayed arrival at the site can inflict severe damage. By evidence proving that an increase in resources and training will maximize response efficacy, Laoli *et al.* (2022) emphasize the importance of adequate firefighting infrastructure and trained staff to allow a timely reaction.

3.3 Test of Significant Relationship Between Training and Preparedness and Response Time

Table 3 shows that statistical analysis confirms that preparedness and training affect response time. In particular, disaster skills (r = .585, p = 0.00) and disaster knowledge (r =

.607, p = 0.00) have a robust positive correlation with response time, suggesting that greater skills and knowledge bring about quicker and better emergency responses. However, the correlation between preparedness and training (r =.182, p = 0.01) indicates a significant relationship, though not as strong as the first two variables. As all p-values are <.05, the null hypothesis (Ho) has been rejected, ensuring the results are statistically significant.

Table 3: Test of the Significant Relationship Between
Training and Preparedness and Response Time

	Response Time		Decision	Interpretation
	r-value	p-value		
Disaster Knowledge	.607**	0.00	Reject Ho	**Significant**
Disasters Skills	.585**	0.00	Reject Ho	**Significant**
Training and Preparedness	.182**	0.01	Reject Ho	**Significant**

The value of training, preparedness, and skill enhancement in response to emergencies is highlighted by this research. Catastrophe knowledge and skills, including first aid and firefighting, facilitate faster and better responses. Readiness, response time, and training share a relatively lower relationship. The efficiency of response also depends on infrastructure support, team coordination, and experience. Emergency response competence can be enhanced by integrating these capacities through field training, scenario practice, and lifelong learning. A study by Li, Tseng, and Huang (2022) indicated that self-efficacy was significantly related to awareness of fire prevention and emergency response, such that increased awareness equates to improved emergency responses. In the same vein, Monteiro, Ferraz, and Rodrigues (2021) noted that training significantly impacts knowledge and self-efficacy and promotes continuous improvement in emergency preparedness skills.

Good emergency response, which considers factors such as trip time and velocity, is vital for firefighting and rescue efforts, writes He, Ding, and Yang (2025). However, as Sarker and Ghosh (2021) note, effective emergency management and response depend on effortless access to critical information in the shortest possible time to safeguard individuals and assets in case of fire. Correct information should move smoothly, reach the relevant individuals, and arrive at the right moment to make well-informed decisions.

3.4 Multiple Regression Analysis of Response Time as Predicted by Training and Preparedness

The outcomes of multiple regression presented in Table 4 indicated highly significant predictions (p < .0001) for response time based on the levels of disaster knowledge and disaster skills. The intercept value of 0.595 indicates the baseline response time when disaster knowledge and skills are zero. Disaster knowledge has a greater effect on response time than disaster skills, with a B-value of 0.500 versus 0.359 for skills. Both variables show a positive correlation with response time, meaning that increased knowledge and skills generally result in quicker responses. The R-squared value of the

model, which is 0.435, suggests that the two predictors account for about 43.5% of the variance in response time, and the overall significance of the model is confirmed by an F-value of 90.979 and a p-value of 0.00.

Table 4: Multiple Regression Analysis of Response
Time as Predicted by Training and Preparedness

	B	SE	Beta	t	Sig.
(Constant)	0.595	0.287		2.075	0.039
Disaster knowledge	0.500	0.080	0.395	6.226	0.00
Disasters Skills	0.359	0.069	0.333	5.244	0.00
r2= 0.435					
F-value= 90.979					
p-value= 0.00					

With disaster knowledge and competencies as predictors, the model successfully predicts response time, having a statistically significant relationship (p-value < 0.0001). The positive relationship indicates that increased levels of disaster competencies and knowledge are linked with quicker response times, and the B-values confirm the significant influence of disaster knowledge. With knowledge of catastrophe and skills being responsible for 43.5% of the variance in the reaction time, the model accounts for a moderate level of variation. The significance of the F-value endorses the relevance of the model. Empinado *et al.* (2023) highlight the urgent need for more robust training programs to equip the personnel with the proper aptitude to tackle new challenges. The courses should emphasize safety, health procedures, and traditional firefighting practices. Training enhances an individual's ability to respond quickly and automatically in a crisis. Such training has been proven to enhance decision-making skills, muscle memory, and situation awareness (Anderson & Miller, 2018). First responders who were more trained responded much faster than less-trained responders, a Thompson *et al.* (2021) study found. Based on Spell (2021), firefighters require better training, skills, knowledge, and competencies to overcome these challenges.

4. Conclusion and Recommendations

This section summarized the study findings and makes recommendations based on available information.

The findings of this research emphasize the critical significance of training and preparedness in affecting the response time of the Davao City Bureau of Fire Protection (BFP). From the analysis of data gathered and the study's findings, the researcher concluded that firemen in Davao City with higher knowledge and skills in disasters can respond faster and more efficiently. Whereas training and readiness greatly influence efficiency in response, other factors influence overall response time, like infrastructure, the condition of roads, and external expectations. The research supports the argument that there must be a systemic strategy to complement effectiveness by bringing together

systemic and human factors, including the factors that influence effectiveness and individual expertise. Moreover, the research reveals a significant relationship between training and readiness with the response time of Davao City's Bureau of Fire Protection. This established relationship indicates that appropriate knowledge and skills empower firefighters to address disaster emergencies more confidently. In turn, this results in greater predictions of response time based on disaster-related knowledge and skills. According to the research findings, the researchers propose the following recommendations.

4.1 To the Bureau of Fire Protection Personnel

The research findings can inform the BFP in resource allocation for routine training sessions involving simulation drills to enhance situational awareness and hands-on knowledge. They can urge fire volunteers to participate in drill exercises simulating actual situations to enhance their decision-making skills and response speed during emergencies. A funding mechanism to acquire sophisticated firefighting equipment and two-way communication devices can enhance response effectiveness and dependability. More resources placed at fire substations in hazardous areas will decrease response times and increase service coverage. BFP staff need to develop a good rapport with their communities. Finally, an integrated strategy should be taken where investment is made in real-time traffic observation and predictive analytics to make the most efficient dispatch routes and deal with externalities like traffic jams, causing delays in response times.

4.2 To the Community

Community members will get important knowledge from this study regarding how they may speed up BFP personnel's response times to fire occurrences. The community should cooperate to make sure that roads are accessible and clear so that BFP workers can get to fire locations quickly, reducing property damage and preventing fatalities. In order to create a safer environment, the community should also participate in BFP activities and projects. Residents must notify the closest fire station as soon as possible in the event of a fire. To make sure they know how to respond to fire crises, they should also teach their kids about fire safety and preventive techniques.

4.3 For Future Researchers

This is to engage future researchers in more detailed determinants. It may entail a geospatial application to identify hotspot areas and identify how traffic distribution and response path affect results. Research must qualitatively describe the experiences and lives of BFP officers in terms of their experiences as firefighters and their work roles in Davao City. They should assess the impact of stress related to their work and, more significantly, how it impacts their families when responding to fire emergencies. Moreover, through predictive modeling, researchers can predict fire incidents and determine which equipment needs improvement, as well as the things BFP officers need

to consider when dealing with emergencies. Lastly, researchers need to design studies that measure the effect of outside influences on BFP personnel, which may be beneficial in preventing fire incidents.

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Conflict of Interest Statement

We have no personal, financial, or other interest that could or could be seen to, influence the decisions or actions we are taking or the advice we are giving during my research for this.

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