6-25-2024

Strategies for Evaluating Training for Field Engineers in the Aerospace and Defense Industry

Nathan D. Johnson
Walden University

Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Nathan D. Johnson

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Kenneth Gossett, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Warren Lesser, Committee Member, Doctor of Business Administration Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

Strategies for Evaluating Training for Field Engineers in the Aerospace and Defense Industry

by

Nathan D. Johnson

MBA, National University, 2019

BS, Lake Sumter State College, 2015

Research Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

June 2024

Abstract

Inefficient training strategies are just one of the many challenges field engineer managers face in the aerospace and defense industry. Aerospace and defense managers and customers are concerned because inefficient training strategies for field engineers impact how well they can effectively contribute to organizational and customer mission success in operations around the globe. Grounded in the Kirkpatrick model, the purpose of this qualitative pragmatic inquiry was to explore strategies aerospace and defense managers use to evaluate field engineer training programs. The participants were five aerospace and defense managers who successfully implemented training evaluation strategies. Data were collected from semistructured interviews and a review of public documents. From thematic analysis, three major themes emerged: (a) feedback-driven assessment and adaptive training, (b) on-the-job training/hands-on learning, and (c) performance reviews and cost-effectiveness. A key recommendation is for aerospace managers to identify and use feedback from peers, customers, and senior engineers to refine training programs to ensure that training investments enhance organizational performance and innovation. The implications for positive social change include the potential to enhance employee engagement, job satisfaction, and retention, leading to broader organizational benefits and retention across the aerospace and defense industry.

Strategies for Evaluating Training for Field Engineers in the Aerospace and Defense Industry

by

Nathan D. Johnson

MS, National University, 2019

BS, Lake Sumter State College, 2015

Research Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

June 2024

Dedication

To my two children, Nickolas and Vi. You are the driving force behind my aspirations. As you grow, I hope this study serves as a reminder of the importance of setting lofty goals and pursuing them with determination. May you always reach for the stars, both in academics and in life, knowing that with hard work and perseverance, anything is possible.

Acknowledgments

I would like to begin by extending my deepest gratitude to my committee members, Dr. Kenneth Gossett and Dr. Warren Lesser. Dr. Gossett, in particular, I wish to express my profound respect and appreciation for your unwavering commitment and generous allocation of time throughout this journey. Your guidance and extensive expertise have been invaluable, and I cannot adequately express my gratitude for the countless hours you dedicated to assisting me. I am also immensely grateful to my wife, Christina, whose unwavering support and encouragement propelled me forward, even amidst the additional responsibilities of caring for our son and newborn daughter during my research and writing endeavors. Furthermore, I wish to acknowledge my mother, whose steadfast encouragement and keen interest in my progress served as a constant source of inspiration. To each of these individuals, I owe a debt of gratitude that words alone cannot sufficiently convey.

Table of Contents

List of Figures

Section 1: Foundation of the Project

Background of the Problem

The Occupational Requirements Survey Summary, a comprehensive study conducted by the Bureau of Labor Statistics, revealed a significant trend that 79% of all workers across various industries require on-the-job training to effectively perform their duties (U.S. Department of Labor, 2022). This statistic underscores the critical role of continuous learning and skill development in today's workforce. Additionally, insights from the training industry report, as referenced in Peterson et al. (2019), shed light on the immense investment organizations make in employee training initiatives. According to this report, companies allocate billions of dollars annually towards training their workforce, highlighting the strategic importance placed on cultivating employee skills and expertise to drive organizational success.

Assessing the effectiveness of training programs is paramount for an organization's success for several reasons. Managers of organizations need to ensure that the significant financial investments made in training initiatives yield tangible results. By evaluating the impact of training on employee performance, productivity, and skill acquisition, managers can determine the return on investment (ROI) of their training efforts. Moreover, assessing training effectiveness provides valuable insights into the alignment between organizational goals and employee development. By measuring the extent to which training programs address specific skill gaps or performance objectives, managers can fine-tune their training strategies to better support overall organizational objectives.

A critical concern lies in the aerospace and defense industry's widening talent and skills gap (Feeko & Fuller, 2021). Deloitte's researchers published the 2023 Aerospace and Defense Industry Outlook, annotating the concerns of an aging workforce and rapidly evolving technology, attracting and retaining a highly skilled talent pool as paramount (Berckman et al., 2023). The industry must invest in robust training programs, educational partnerships, and outreach initiatives to inspire and equip the next generation of professionals with the specialized expertise required to drive innovation and ensure sustained growth and competitiveness. Managers in the aerospace and defense industry play an integral role in the development and execution of training programs within their organizations to fill this gap.

Based on a review of various field engineer job postings in the aerospace and defense industry, field engineers primarily provide on-site support to product line end-users across the globe. While initial training is often well-structured and conducted in controlled environments, subsequent training present challenges in assessing effectiveness. These training challenges can be due to field engineers being deployed to undisclosed foreign locations, far removed from their initial training settings. In some cases, they might be the sole on-site organizational representative in these areas (Northrop Grumman, 2024; Raytheon Technologies, 2024).

Managers have to develop a training program for their particular product and the different learning styles of the individual field engineers. While initial training can be in a controlled environment, the follow-up training and subsequent deployment training is a more real-world scenario with little or no environmental controls or immediate feedback

available. Given the logistical constraints and sometimes limited internet at some of the forward-deployed locations, managers must find ways to elicit feedback from a customer or alternative sources to assess the effectiveness of initial and on-the-job training. Managers must establish reliable, unbiased sources for field engineer effectiveness feedback to address training concerns and provide training improvement strategies (Kalyanamitra et al., 2020). Understanding how managers conduct training and then evaluating the training's effectiveness is critical to the organization's long-term success (Gultom et al., 2020). Organizational managers should find innovative processes to assess and reevaluate training and seek ways to improve continually. Understanding how managers have negotiated this type of training environment and mitigating the constraints of forward-deployed locations can contribute to new perspectives in training approaches.

Business Problem Focus and Project Purpose

The specific business problem for this study was some aerospace and defense managers lack strategies to evaluate the effectiveness of the training programs for field service engineers. Therefore, the purpose of this qualitative pragmatic inquiry was to explore what strategies aerospace and defense industry managers use to evaluate the effectiveness of the training programs for field service engineers. The targeted population of this study comprised five aerospace and defense managers responsible for overseeing training and development programs for field engineers in the United States. To ensure relevance to the research question, I employed purposeful, nonprobability sampling to select a small sample of five participants possessing a minimum of 2 years of experience managing field engineers and their training programs. Professional networking platforms

like LinkedIn served as the primary access point for recruiting aerospace and defense managers for this research endeavor.

The conceptual framework underpinning this study was the Kirkpatrick model, a renowned four-level training evaluation model pioneered by Donald Kirkpatrick in 1959 (Kirkpatrick & Kirkpatrick, 2006). This model has emerged as a pivotal tool for assessing organizations' training initiatives (Bahadoran et al., 2011). The Kirkpatrick model is used to evaluate training programs based on four levels: reactions to training, learning outcomes, behavioral changes, and training results (Kirkpatrick & Kirkpatrick, 2006).

Research Question

What strategies do aerospace and defense industry managers use to evaluate their training programs' effectiveness for field service engineers?

Assumptions and Limitations

Assumptions

Assumptions are facts the researcher assumes to be true (Marshall & Rossman, 2016). I made three assumptions in this study. The first assumption was that aerospace and defense industry managers would provide adequate and truthful responses during interviews. Another assumption was that the aerospace and defense industry managers would share valuable, rich information regarding their strategies to assess training effectiveness for their field engineers. My final assumption was that a sample size of five aerospace and defense industry managers directly responsible for their department's respective field engineer training programs was enough to provide rich content and allow for data saturation in the study.

Limitations

One of the limitations of this study involved the choice of only a few organizations operating within the aerospace and defense industry located in the United States, which may not be representative of all companies in the aerospace and defense industries. Yin (2017) suggested multiple case studies provide more analytics than single case studies. Furthermore, the study findings may not apply to all U.S. or abroad aerospace and defense industry organizations because of the limited geographical scope of the study.

Another limitation of this study was the participant sample size because I interviewed a small number of aerospace and defense industry managers with direct reporting field engineers. The study's final limitation involved using semistructured interviews as the primary data collection method. Bloomberg and Volpe (2019) suggested that not all participants share the same level of cooperation, perception, and ability to articulate. Many studies have limitations, so the investigators need to be transparent regarding the limitations of their findings.

Transition

In Section 1. I opened by sharing some results of the Occupational Requirements Survey Summary highlighting the need for on-the-job training across industries and emphasizing the importance of continuous learning and skill development in the modern workforce. This necessity is further highlighted by the substantial investment companies make in training initiatives (Peterson et al., 2019). However, amidst these broader trends, the aerospace and defense industry faces unique challenges. Concerns regarding talent

and skills gaps, outlined in Deloitte's 2023 Aerospace and Defense Industry Outlook, necessitate a focused approach to training and development (Berckman et al., 2023). Specifically, managers in this industry must grapple with the complexities of training field engineers, particularly in dynamic, real-world scenarios where traditional assessment methods may be impractical. Understanding the strategies employed by these managers to evaluate training effectiveness is vital for addressing the industry's evolving needs; therefore, the purpose of this study was to explore such strategies, leveraging the Kirkpatrick model as a conceptual framework, within the context of certain assumptions and limitations.

In this section, I provided the problem statement, purpose of this study, research question, conceptual framework, assumptions, and limitations of this study. In Sections 2 and 3 of this study, I will discuss the review of the literature and research project methodology before transitioning to Section 4 where I will present the conclusions, findings, and recommendations of this study.

Section 2: The Literature Review

A Review of the Professional and Academic Literature

In this qualitative pragmatic inquiry study, the focus was on assessing the strategies used by managers to evaluate the effectiveness of their training programs for field service engineers. Through this investigation, I successfully identified knowledge gaps, laid a groundwork for comprehending the research question, and provided justification for the study's objectives. The study was guided by the following research question: What strategies do aerospace and defense managers employ to evaluate the effectiveness of their training programs for field service engineers? I conducted this study to delve into the practices and approaches used within this specific professional domain.

The literature review encompassed a broad spectrum of topics, ranging from the conceptual framework to training strategies, employer-employee dynamics in training, evolving training program methodologies, methods for measuring training effectiveness, the influence of management on training, training environments, and training culture. To gather pertinent information, I searched various academic research databases and search engines accessible through the Walden University Online Library, including ProQuest, Google Scholar, and Emerald Management Journals. The following key terms were used: *employee training*, *employee job training, employer training, training effectiveness, Kirkpatrick's four levels*, and *the resource-based view*. Additionally, I employed Ulrich's Global Series Directory to ensure the peer-reviewed status of each reference. Throughout the literature review, three primary themes emerged as pivotal in evaluating the

effectiveness of training programs for field service engineers: loyalty to the organization, risk factors inherent in training processes, and the significance of feedback loops.

The literature review involved 71 peer-reviewed references. Of these, 11 references (15%) were published before 2019, while the remaining 60 references (85%) were published between 2019 and 2023.

I accessed peer-reviewed scholarly articles primarily published between 2019 and 2023 through the Walden University Library, ensuring their relevance to this study. I did not find any articles that specifically focused on field engineers; therefore, I expanded the search criteria to encompass a variety of specialized fields.

Conceptual Framework

Academia in some fields has witnessed a resurgence in the use of the Kirkpatrick model from the early 2000s to the present (Allen et al., 2022). Some detractors have advocated against certain aspects of the Kirkpatrick model; however, the use of the model remains a broadly accepted framework for evaluating training programs in various fields, including the health profession (Allen et al., 2022). Researchers use the Kirkpatrick model to evaluate business training across four distinct levels (Kirkpatrick & Kirkpatrick, 2006). The first level of the Kirkpatrick model is used to assess the participants' reactions to the training. In the second level, the learning that took place is evaluated. For example, participants take a test before learning and then take another test following the completion of the learning. In the third level, the participants' behavior is assessed to determine if they have applied what they learned in their workplace. At the final level, an

evaluation of whether the stakeholders' expectations, referred to as the return on expectations, have been met takes place.

Current Kirkpatrick Model Utilization

Buriak and Ayars (2019) evaluated the impact of educational video interventions on Designated Employer Representatives within the aviation industry and identified best practices to enhance compliance with federal drug and alcohol testing regulations. The authors employed an interrupted time series analysis to gather data at regular intervals over time and determined the effectiveness of the intervention using the Kirkpatrick framework. They observed a decrease in counts of violations and subsequent fines after the intervention and implementation period. The researchers concluded that investing $1 in training development helped avoid $357 in penalties.

Bahadoran et al. (2011) surveyed 667 university staff members from various departments within the university, with over two-thirds of the participants being female. Their results indicated that following the Kirkpatrick model impacted reflection, learning, and behavior in a positive direction. There was no meaningful difference between married and single participants; however, there was a stronger belief that the training was helpful among the male participants. Additionally, the authors found significant differences between reflection, learning, and efficiency at different ages.

Various researchers have utilized the Kirkpatrick model differently, focusing on only a few levels in some instances. Sahni (2020) chose this different approach for their study, utilizing the first two levels of the Kirkpatrick model to evaluate training using six variables: training environment, training components, training usefulness, training

orientation, practical orientation, and the role of the trainer to assess training effectiveness. The author found that training success was mainly associated with four factors: practical orientation, training environment, the role of the trainer, and training usefulness. In the conclusion, Sahni emphasized the need for managers to devote time and resources to training as well as the need to share the results of training effectiveness to motivate employees about the usefulness of the training.

Shinohara et al. (2020) determined the validity and usefulness of scales and training programs for clinical staff to evaluate nerve signs as an initial response to stroke. The authors designed a stroke workshop to enhance the basic first-aid skills of clinical staff and wanted to determine how the stroke workshop influenced the knowledge and behaviors of clinical faculty. They employed three levels of the Kirkpatrick model: Level 1 covered whether the participants liked the workshop, Level 2 evaluated whether participants learned the material and Level 3 evaluated whether participants applied the new information. A limitation of their study was the exclusion of Level 4 of the model; nonetheless, the authors intended the study to focus solely on the first three levels. In this context, the Kirkpatrick model effectively fulfilled its purpose for evaluation.

Using the Kirkpatrick-Phillips training evaluation tool for assessment, Mehale et al. (2021) sought to establish whether training evaluations conducted following training have a measurable impact on employee performance in South Africa. The researchers found that the success of the training management system interrelates with the training efforts. The benefits of improving employee performance are lost when training and development interventions are not measured and managed well because of complexities

and challenges encountered during evaluation. Managers must be able to properly assess whether the training has the positive impacts desired following the training.

Jones et al. (2018) used all four levels of the Kirkpatrick model to evaluate the training effectiveness of a nursing service. The authors assessed various aspects during the learning process, such as the nurses' reaction to the training and the training's added value. They conducted a test to evaluate the acquired knowledge posttraining and observed the nurses' behavior to assess confidence and learning. The evaluation of nurses' knowledge and skills positively influenced their behavior. The surveys also provided data on the family's perceptions of the nurses, forming the basis of the results.

Gultom et al. (2020) evaluated and confirmed the training effectiveness of the initial flight training program for 741 cabin crew graduates. by completing assessments at all four levels of the Kirkpatrick model. The researchers raised concerns in certain areas based on feedback and training environment observations. One highlighted aspect was ensuring a conducive training environment for effective learning.

In a mixed-method, cross-sectional study, Legesse et al. (2020) evaluated training program effectiveness among 107 laboratory professionals in Ethiopia. The authors used the Kirkpatrick model of training evaluation with one exception: The results level of the Kirkpatrick model, which investigates the training cost against the benefits, was not evaluated. Legesse et al. employed the remaining levels of the Kirkpatrick model to assess the training's effectiveness, and the results demonstrated its success. An important takeaway from their results was the necessity for ongoing monitoring and evaluation to maintain the training's effectiveness.

Kutlay and Safakli (2019) evaluated the impact of training and development on Asbank employees in Northern Cyprus by applying an adapted version of the Kirkpatrick model to measure employee effectiveness. The authors found that the training and development activities lacked a structured and systematic approach. The absence of structure resulted in an ineffective transfer of skills and knowledge acquired during training to the job. This instance is an example of a training program that necessitates reflecting on the results and implementing significant changes.

Ghasemi et al. (2020) evaluated the effectiveness of scientific paper study workshops for medical students based on the Kirkpatrick model. Unlike a few previous studies, the authors used all four levels of the Kirkpatrick model to evaluate the training workshop. The Level 1 evaluation showed all participants were satisfied with the workshop, while Level 2 showed the participants had all increased their knowledge of research and writing scientific papers. Level 3 and 4 evaluations occurred 6 months following the workshop and indicated 129 participants had started their first research project and 15 had published their first article.

Alsalamah and Callinan (2021) applied the Kirkpatrick four-level model to assess the training program aimed at head teachers. Each level of the model was evaluated by using distinct methods in line with the Kirkpatrick model. For the behavior level, qualitative and quantitative data were employed, complemented by both open- and closed-ended questions to deepen the understanding of intricate human behavior dynamics. The effectiveness of the training program was gauged at the results level, considering the perspectives of both trainees and supervisors. The study sample

comprised 250 trainees and 12 supervisors from Saudi Arabia, specifically focusing on female head teachers due to the gender-segregated nature of educational settings in the region. While the findings indicated satisfactory education levels among the sampled head teachers, the authors also identified several barriers that require attention to improve the program's efficacy.

Nagata et al. (2021) utilized the Kirkpatrick model to evaluate a training program that supports community-based service staff implementing aging-in-place and end-of-life care programs in Japan. Fifty-three community-based service staff members participated in the training program from September 2017 to September 2019. The authors noted that prior knowledge was not a relevant factor for the program. They found the training program effective and emphasized the importance of developing individualized action plans and implementing a 3-month posttraining timeline to accommodate staff behavioral changes.

Lee and Song (2021) evaluated accelerated second-degree baccalaureate and Master of Nursing programs using the Kirkpatrick four-level model. Accelerated nursing programs have gained interest due to an aging population, and global infectious diseases have increased demands for nurses. The solution to address the nursing demand was to accelerate their training. The study involved reviewing 15 other studies to compare the educational outcomes of accelerated Bachelor of Science in Nursing (BSN) and Master of Science in Nursing (MSN) programs and determine the levels of the Kirkpatrick model used for evaluation. The first three levels of the Kirkpatrick model provided varying positive results of the training. One concerning result was clinical preparedness, in which

30% of the studies indicated a difficult role transition and unpreparedness for clinical roles. The authors suggested that this is due in part to the accelerated nature of the programs. Addressing this critical area will undoubtedly aid future nursing students in their transition. Interestingly, none of the studies evaluated Level 4. Considering Level 4's focus on patient outcomes, this emphasizes the need to assess this significant area for the training program.

Contrasting Theories (Success Case Method, Phillips ROI, and Transactional Distance Theory)

Brinkerhoff (2003) developed and published the book, *Success Case Method*. as an alternative to traditional evaluation methods that primarily focused on collecting aggregate data and general trends. Brinkerhoff realized that such approaches often failed to explain how and why training programs succeeded or failed to produce desired outcomes. The success case method (SCM) stemmed from the idea that valuable insights can be gained to enhance program effectiveness by identifying and studying successful cases within a larger population. The method involves two key steps: identifying and analyzing success cases. Identifying success cases begins by identifying individuals or cases within the selected group or population who have achieved exceptional results or outcomes. These successful cases will then become the focus of analysis. Analyzing successful cases entails a rigorous examination to understand the factors contributing to their success. This analysis involves collecting qualitative and quantitative data, conducting interviews, and using various evaluation techniques to identify common patterns, strategies, or critical success factors.

In the SCM, the examination of successful and unsuccessful cases to gain a holistic view of program effectiveness is emphasized. By concentrating on success cases, researchers can discover valuable insights, lessons, and actionable recommendations to improve training programs and replicate success in the future (Brinkerhoff, 2005). The SCM has been widely adopted by organizations and practitioners involved in training and program evaluation (Moon et al., 2019). The SCM provides a practical and systematic framework to assess the impact of training interventions and drive continuous improvement.

The Phillips ROI method and the Kirkpatrick model are both frameworks used to evaluate the effectiveness and impact of training and development initiatives. While they have similarities in assessing training outcomes, they differ in focus and evaluation approach. The Phillips ROI method, developed by Jack Phillips (1996), extended beyond the Kirkpatrick model by explicitly emphasizing the measurement of return on investment. The Phillips method aimed to quantify the financial impact of training initiatives and determine whether the benefits outweighed the costs. The Phillips ROI method builds upon the four levels of the Kirkpatrick model but adds a fifth level for ROI. The ROI level quantifies the ROI by comparing the monetary benefits of the training to the costs incurred. The Phillips ROI method emphasizes the financial aspect and employs a more rigorous approach to measurement. The measurement involves isolating the effects of training, calculating costs and benefits, assigning a monetary value to the outcomes, and determining the ROI, thus determining whether it brings value

(Phillips & Phillips, 2019). The organization refused to provide the financial information for Phillips ROI, so I did not use it.

Transactional distance theory (TDT) seeks to understand and reduce the psychological and communication space between learners and instructors. The theory has been used by researchers to enhance learner autonomy, interaction, and engagement; thereby, improving the quality of learning experiences. TDT employs a qualitative research approach to understand the learner-instructor relationship, perceived separation, and the impact on learning experiences. TDT typically involves interviews, observations, and reflective analysis to explore the transactional distance and its implications. Because the research question focuses on managers' strategies, examining the trainer and trainee space would yield interesting details but would not ultimately answer the question. For this reason, I did not use TDT.

Themes Identified in the Literature Review

Theme 1: Loyalty to the Organization

According to Yahya and Tan (2017), employees who perceive training and development programs as less applicable to real-world scenarios are more likely to exhibit reduced career commitment. The disconnect between training offerings and practical application contributes to this phenomenon. The authors emphasize the necessity of tailoring training initiatives to address employees' specific requirements and provide tangible value. In essence, organizational managers are urged to craft training and development strategies that resonate with employees' needs to bolster their commitment and loyalty to the organization's objectives.

Boțoc et al. (2019) conducted a survey, and the results indicated that 69% considered training and development very important. One interesting note was that very few considered the training useless or unimportant. The employee's perception means current training and historical training have provided value for the trainee. Additionally, 95% of the participants in top management positions participated in training and development. Participation from top management and the overwhelming perception of value to the trainees themselves, it would appear the culture within the organization has nurtured an appreciation for the training and development programs. Almost all the respondents (97.6%) perceived employee training and development courses as important and very important for the company's development. Of particular interest is how the respondents perceived the training as important for the company's development. Most trainees found the training beneficial to themselves and the organization's development. There is a level of alignment within the organization from the top down promoting training and development. Almost all the respondents recognized the value of the training programs and considered them beneficial to the company.

Kaźmierczyk et al. (2020) conducted a survey involving 2,200 bank employees to explore the impact of employee training. The study revealed that training has several positive effects, notably enhancing organizational commitment and fostering loyalty among employees. The level of loyalty demonstrated by employees was closely linked to the training they received, suggesting a direct correlation between training initiatives and employee loyalty levels. Furthermore, the authors suggested that these findings could

potentially mitigate employee turnover rates, as increased loyalty to the organization tends to reduce turnover.

Nadeak and Naibaho (2020) examined the role of education and training, internal communication, organizational culture, and employee motivation on employee loyalty. The authors received 387 questionnaires for their analysis. Hypothesis 2 was that education, training, and motivation are significantly related. The results indicated that education, training, and motivation are statistically significant and support the hypothesis. Additional studies by Alvi et al. (2020) support these findings, and Ju and Li (2020) further emphasized motivation as a contributing factor to lower turnover intention.

Theme 2: Risk Factors in Training

Nelissen et al. (2017) evaluated whether employee training may increase their chances of leaving for other employment opportunities. The authors viewed the notion of treating training as a stepping stone for employees to move on after completion as a paradox. They proceeded to evaluate the validity of this concept. The results indicate that upward transition influenced turnover, providing a certain amount of validity to the paradox. However, individuals contradicted this paradox by linking the training with internal employability rather than perceiving it as an enhancement of external employability.

Zweni (2023) explored the managerial responsibilities in fostering employee engagement within training and development programs within a municipality, driven by the vital connection between a competent workforce and economic advancement. Employing a qualitative methodology, the research utilizes semi-structured

questionnaires distributed among administrative staff to gather data, uncovering deficiencies in communication and managerial practices that impede employee involvement and comprehension. The author recommended addressing issues like role clarity and change management to enhance engagement levels and job satisfaction. It emphasizes the pivotal role of management in facilitating effective communication and understanding of diversity training initiatives, advocating for the establishment of a supportive environment conducive to employees expressing their perspectives and attitudes regarding training and development interventions.

Steil et al. (2020) surveyed 440 employees of a technological organization to learn what impact learning opportunities have on employees' intent to leave. Interestingly, the authors of this study concluded that perceived learning opportunities and retention presented a near-zero correlation between management and technician groups. The weak correlation seemed to contradict the finding that there is a relation between perceived learning opportunities and the intention to stay. The authors concluded that the retention measure and the average length of service were important factors contributing to the results.

Custers (2012) reviewed the global survey conducted by NorthgateArinso. The author did not state how many individuals or organizations participated in the survey. Of interest to me and my study were the noncash employee benefits. Surprisingly, 73.3% of the U.S. respondents said their businesses had not increased these noncash benefits. Employees are continually seeking ways to improve their professional performance and career prospects. Investing in employee training and education is one such way to

provide these benefits. Investing in training and education also contributes to more innovative, more engaged employees.

Yahya and Tan (2017) surveyed 253 employees of a multinational company in Malaysia to discover the relationship between training and development, compensation, and promotion with career commitment. There are various sources on the benefits of employee training on organizational commitment. The author's results indicated that employees with a higher perception of training and development are likely to express lower levels of career commitment. The low levels of commitment were due to the lack of transferability of the training programs offered to real-world practice. The lack of transferability emphasizes the need for training relevant to the employees' needs, so the organization needs to develop a training and development program that caters to the needs of the employees to garner their commitment.

Hajjar and Alkhanaizi (2018) investigated the determinants influencing the efficacy of training initiatives in the Kingdom of Bahrain, focusing specifically on the perspectives of trainees. Their study evaluated various factors including training content, environment, facilities, schedule, and presentation style through a quantitative methodology, formulating hypotheses based on these variables. The findings revealed a neutral perception among trainees regarding all examined factors, suggesting a lack of effectiveness and failure to meet trainees' expectations in the training programs.

Urbancová et al. (2021) investigated the determinants influencing the assessment of employee training effectiveness. The study involved 207 organizations in the Czech Republic, which responded to a questionnaire. The findings underscored the importance

of organization managers in identifying observable variables crucial for evaluating training outcomes effectively. Moreover, aligning training and development initiatives with the organization's specific needs emerged as a pivotal factor. However, the authors noted a significant gap in evaluations, highlighting the necessity for further research into employees' career aspirations. Interestingly, the study emphasized a prevailing focus on organizational benefits rather than considering how training programs could also enhance employees' individual growth and development.

Noe et al. (2017) adopted a distinctive angle in examining learning dynamics by centering on informal learning. In contrast to the conventional formal learning typically implemented by organizations, the authors highlighted the prevalence of informal learning within organizational settings. The study primarily delved into the mechanisms underlying individual learning processes, revealing a substantial positive correlation between informal learning and factors such as goal orientation, training climate, and job autonomy.

Rogers and Burke (2021) conducted an assessment aimed at enhancing the nursing orientation process through the implementation of novel approaches. They identified a gap in the evidence base concerning the orientation of experienced registered nurses, which could potentially affect learning outcomes, staff retention, and job satisfaction. In response, five hospitals in the Midwest modified their orientation procedures, transitioning from monthly to biweekly sessions to offer greater flexibility in start dates. The revised orientation program comprised a 12-hour interactive seminar supplemented by simulations, problem-based learning activities, case studies, visual aids,

group exercises, and role-playing, all followed by immediate feedback from both learners and facilitators. Feedback on the new approach was overwhelmingly positive, underscoring the importance of adapting training initiatives to align with both employee needs and organizational objectives.

Dietrich et al. (2021) assessed the conventional "one size fits all" learning approach, highlighting its failure to accommodate individualized learning needs. Introducing a tailored learning design aimed at addressing this diversity among learners, the authors investigated its effects on motivation, performance, and professional growth. The findings revealed a favorable impact, particularly among students prone to avoiding effort, with noticeable improvements observed in attitudes and self-efficacy during the intervention period.

Philpot and Aguilar (2021) looked at the training needs of employees returning from leave. Many employees struggle with orienting and integrating back into the work environment following leave. Leave can be maternity, injury, or simply vacation. Depending on the duration, employee integration into the work environment is an important, often overlooked, aspect of organizational efficiency. The authors discussed ways to mitigate the potential struggles when returning to work. Some solutions are employee/situation specific, but ultimately, the culture needs to nurture the understanding and well-being of the employees.

Spreen et al. (2020) studied the impact of training on a new fiscal benchmarking tool on the attendees compared to those who did not attend the training. Specifically, the authors considered two groups: North Carolina local government employees who

attended the training and employees of peer governments who did not attend the training. The results showed few improvements in financial performance across a subset of the 14 financial ratios tracked by the fiscal benchmarking tool. What did occur was the dispersion of the majority of the benchmarked financial ratios (10 of the 14) declined by 10% among the municipalities that participated in the training. Additionally, there was little difference in attendees of a 1-hour session compared to the 4-hour session. A takeaway from their results was more extended training is not necessarily more productive than shorter training sessions.

Pagnoccolo and Bertone (2021) explored the training experiences of Australian apprentices in the workplace. A qualitative design using 20 apprentices from various industries provided the data to be analyzed. The weakness in their study comes from only having 20 participants. The findings reveal some common themes emphasizing the importance of communication, emotional direct cognition, self-awareness, and teamwork during job training. The findings indicated the need for greater emphasis on developing interpersonal attributes in training both on the job and within their training packages. Interpersonal attributes are significant to apprentices' learning and completion behaviors. The absence of interpersonal attributes could be considered a risk factor in current training approaches.

Van Assen (2021) studied training and common improvement methods to assess what contributed to employee involvement and participation, which ultimately increases continuous improvement. The author surveyed 208 respondents from various organizations. The results support a positive correlation between training and using a

common improvement method, contributing to employee involvement and continuous improvement. Interestingly, if the common improvement method is too rigid, it can detract from employee engagement and discourage them instead. Thus, having a common improvement method can benefit but also become a liability if it does not allow flexibility.

Yuk et al. (2020) evaluated the differences in the mediating roles of trust and knowledge sharing in the process by which training, and incentives influence organizational performance. The authors surveyed 119 senior managers in Hong Kong's clothing industry. We can summarize training as sharing knowledge from one person to another. Trust plays a stronger mediating role in formal and informal knowledge sharing. Moreover, informal knowledge sharing demonstrated a stronger mediating impact than formal knowledge sharing. An environment and work climate of trust will encourage employees to be less reluctant to share knowledge. Learning and training are significant determinants of an organization's effectiveness. Despite the ongoing emphasis on organizations promoting and developing learning and training programs, many factors still inhibit learning and training.

Anlesinya (2018) found four barriers that hindered adult learning. First, the organization's culture does not encourage employees to participate in management decision-making. While this instance appears to be more of a problem in this specific case within the study, culture plays a vital role in perceiving the value learning and training can bring to an organization. Second, there is a lack of commitment from top management to allocate resources for training. Top management should develop and

promote the culture of an organization. If there is no understanding or perception of value derived from employee training, the organization's culture will understandably devalue it. Third, the lack of promotional opportunities detracts from a desire to learn. If an employee sees no short- or long-term benefit from training and learning, there is little or no incentive to participate. The author described the final barrier as the lack of transparency and unfair selection process for trainees.

Bjerge et al. (2021) evaluated the impact employer-provided training has on addressing the gender wage gap. The results showed that trained women earn 7.4% more than untrained men and women. Trained women earned 1.8% less than trained men. Interestingly, untrained women earned 9.2% less than untrained men. When the authors adjust the numbers for variables like location, etc., the percentage drops to 4.2%. The results indicated that trained women increase their productivity, which contributes to closing the wage gap.

Rawashdeh and Tamimi (2019) evaluated how the perception of training is an essential factor in their study. Employees with a positive perspective of training also have a higher commitment to the organization. Supervisors play a vital role in promoting the importance of training. There are considerable benefits for an organization with an environment for learning and development stimulated by supervisors. Training can positively impact the job satisfaction, commitment, and career development of employees. The organization can benefit from employee performance, efficiency, productivity, and cost reduction. Both the employees and the supervisors have to value training. The training has to be beneficial to the employee and the organization. Like

Anlesinya (2018), the supervisor and the employees nurture a culture promoting the benefits of training.

Luba and Jana (2020) evaluated key roles and responsibilities of talented employees to identify factors contributing to an organization attracting talent. The authors stated that a key aspect of attracting talent is to retain current talent. To retain talented employees, an organization must be a high-quality employer. Several strategies were listed to help an organization become a high-quality employer, one of which is to offer opportunities for career development and further training. The authors found that the second-highest value in determining the ability to attract talented employees is the possibility to grow and develop one's potential. The first is the possibility to do fulfilling and meaningful work. Irrelevant to the study but still interesting, attractive corporate culture was the least determinant factor.

Lukowski et al. (2021) investigated employer-provided continuing education training for employees with different skill requirements. The authors hypothesized that firms will likely offer more training when the employee's job involves numerous complex tasks. Additionally, firms with a higher level of technology use provide more training to their employees. The results indicated that employees with medium-skilled jobs participated most in employer-provided training, and low-skilled employees participated the least. On average, firms that use digital technologies provide more training.

Avidov-Ungar and Herscu (2020) examined the perceptions of professional development through different periods of their professional life in the Israeli Ministry of

Education. Professional development is considered activities that contribute to a teacher's knowledge, skills, expertise, etc. The authors grouped the teachers into three categories: entry, advanced, and expert. The years of teaching are the determinants of which group they belong to. The results showed that teachers in different groups valued different types of professional development. In some cases, the type of development training differed from previous studies conducted. The training differences might indicate a shift in teachers' professional development choices. A key aspect is the needs and desires of the teachers appear to change as they progress through their careers. An organization's professional development program should account for the changing needs of the different career stages of employees.

Koumaditis et al. (2020) evaluated the effectiveness of virtual and physical training. The authors trained 100 participants in one of four conditions to assemble a 3D cube. The conditions were physical and virtual, with the trainers providing verbal or nonverbal assistance. The best-performing conditions were the ones with physical objects included. Surprisingly, there was no significance in whether the trainer provided verbal assistance. The physical aspect of the training is an essential factor regarding the success of the training.

Pantic-Dragisic and Borg (2018) conducted a qualitative study examining the concept of liminality. Liminality denotes the position of individuals for whom organizational boundaries or organizational belongings are unclear. Field engineers operate under similarly limited boundaries, possibly experiencing a sense of liminality

due to regular deployments to austere locations on a rotational basis. In such a scenario, the impact can be positive and negative, varying from one individual to another.

Ju and Li (2020) studied 1,531 individuals over 12 years to examine the relationship between job training, job tenure, skills, job match, and turnover intention. In this article, some sources delve deeper into the employee turnover phenomenon. The portion of the article I am most interested in covering is regarding training and turnover intention. Scholars have found the training to have both a negative and positive impact on employee turnover intention. The apparent divide in differing scholars' analyses creates an inconclusive result. The authors divided training into three different types: on-the-job training, off-job training, and distance training. Organizations will often use all three types in their training development program. There was a positive correlation between on-the-job training and employee turnover intention. The authors concluded that off-the-job training was inconclusive. An area of particular interest is understanding why off-job training is inconclusive and what additional studies would support this conclusion.

Buraimoh et al. (2021) sought to predict success using the student behavioral patterns/activities on learning management. The authors used six machine learning predictive models and evaluated them to ascertain which model provided optimum performance. The results showed behavioral and demographic attributes were the most contributing predictors in forecasting student performance. Academic attributes provided no tangible contribution to attribute performance. Their results showed that machine learning techniques efficiently identify student performance in time for possible aid to prevent failure in their courses.

Sao Joao et al. (2019) examined the relationship between human resources, employee productivity, and sustainability of a golf club. The authors aimed to determine the relationship between employee training and their ability to provide excellent service. The results acknowledged the importance of training, but lack of funds and time were the primary hindrances to training. In a service-type industry, customer satisfaction is the key metric to evaluate training effectiveness. Properly training employees contributed to the organization's efficiency and promoted member satisfaction.

Alvi et al. (2020) studied employee training, employee empowerment, and teamwork on job satisfaction. The authors sampled 160 employees of the Pakistan banking industry in managerial roles for data. The researchers proposed in Hypothesis 1 that employee training positively impacts employee satisfaction. The results indicated that employee training does have a significant positive impact on job satisfaction.

Mehany et al. (2021) looked into construction safety training and how effective current training methods are. The authors assessed participants from two distinct populations, students and industry professionals, using four different training methods to measure their ability to retain safety training. The results indicated that the four different training methods did not significantly impact the scores. The results also showed the need for long-term learning, as this was the most crucial factor in retaining training knowledge. The emphasis here is the importance of continuing education to assist in retention. Another critical factor has to do with providing this training early in the careers of the individuals.

Hur and Hawley (2020) conducted an interesting study investigating the high employee turnover rate in U.S. government jobs. They explained the worker's departure due to the fit between the individual and the organizational need, highlighting a mismatch between the skills required for the job and organizational needs. The solution to reducing turnover was to prioritize matching employment opportunities with the job skills and expectations of candidates. Careful hiring, appropriate placement, and employee training and support were ways to mitigate employee turnover.

Deepa and Rajasekar (2021) examined training and development within an information technology company. The purpose of training is to improve the performance or skills of an individual in a way that benefits the organization. The evidence suggests training effectively enhances employee confidence and increases organizational efficiency.

Hernandez et al. (2020) looked at the level of employee training and strategic organizational alliances as critical factors contributing to innovation and business survival. Employee training towards Research and Development (R&D) undeniably affects company survival when paired with strategic alliances and collaboration supporting R&D activities. Promoting employee training improves the R&D aspect, and the development of strategic goals will lead to business survival through innovation. The most innovative companies in the world invest in hiring and training employees at a high level to capitalize on the greater chances of success and survival through innovation.

Wu et al. (2021) addressed an interesting problem facing many students and professionals. After acquiring an education focusing on learning theories, individuals

may lack a deep understanding of practical applications and real-world knowledge from lived experiences. Engineering education and training practices sometimes prioritize memorization of concepts to pass tests. The authors addressed this issue by introducing a quasi-field production line for young mechanical engineering teachers. They categorized the teachers into three groups: professional senior teachers, backbone teachers, and excellent young teachers. The priority for young teachers is to increase their teaching ability. The idea is they will learn from teaching and working while learning.

Nelson et al. (2021) advanced the utilization of embedded educational experts that support electrical engineering, biomedical engineering academic inquiry scholarships, and chemical engineering instructors. Additionally, the authors used adaptive assessments, project-based learning, peer-assisted learning, and case studies. The results indicated several key areas of improvement. When implemented, certain areas, such as promoting active learning strategies, demonstrated an increase in pass rates and average grade point averages. The authors found peer-assisted learning valuable for 68% of the students. The embedded experts were a source for ways to make immediate and future course changes based on the feedback received.

Subramanian and Zimmermann (2020) looked into what conditions organizational firms in France provide training opportunities for their employees. The results showed three training models: Skills updating, development, and capability enhancement. The authors found each provided value to the employee or organization differently. Skill updating is firm-specific training that does not translate to employee mobility or career advancement. Skill development training promotes skills driven by the organization's

overall development that could be valuable in the external market. In addition, Skill development training does not consider employees' preferences. Capability-enhancing training is skill-developed training that provides a means for employees' personal development. The authors saw the need for all employees to have a voice in the training that can promote their aspirations in line with the organizational goals.

The author of Training for the Future (2020) emphasizes employee training and sees it as a necessary investment for the future of organizations today. References were listed throughout the article, reinforcing the understanding and value training brings. The author highlights that within the next two years, employees will need to adapt as 42% of the skills essential for their jobs are expected to change. With the constantly changing global environment, training is a solution. Training shows an increase in retention, profitability, and the creation of autonomy. As many other research articles have pointed out, providing training that aligns with organizational goals can improve the bottom line.

Barnette and Park (2021) investigated the training choices made by a worker entering the Trade Adjustment Assistance program. One area of particular interest is how employees who choose a training occupation beyond their skill level achieve higher earnings. The cost for doing so is the lower reemployment rate for these individuals. They are setting a high bar in an employee training program to push employees outside their comfort zone. While this might not work for every employee, providing this opportunity for those employees with competence and drive would be especially beneficial for the employee and the organization.

Yirci et al. (2021) investigated the in-service training of teachers in Turkey to assess its benefits and identify potential steps for program improvement. The authors found that the training lacked quality due to poor planning. However, there were strengths in learning new methods and techniques. Teachers thought the in-service training contributed to their professional development and helped them gain a new perspective. The results provided positive and critical reviews of the program. The vital aspects are beneficial because they highlight improvement areas that can become actionable.

Theme 3: Feedback Loops

Waqanimaravu and Arasanmi (2020) examined the relationship between employee training and service quality in the hospitality industry. In this study, the researchers investigated the influence of training in terms of perceived access to training, perceived benefits, and perceived support of training on service quality. The authors found that perceived access to training and service quality was significant. One area of note demonstrated in the study was the need for content-relevant training. Training covering a wide range and lacking specificity might result in adverse consequences. The perception of training benefits influenced positive outcomes for employees.

Ciurea and Pau (2020) examined wages and various other rewards as sources of motivation for employees, collecting data from a sample of 97 individuals. While wages can be a primary motivator for employees, they also expressed interest in alternative rewards. The authors discovered that employees perceive training as both a reward and an expense for the organization. Despite the cost of training employees, the return on

investment is enormous if it is consistent. The results showed a large percentage of employees (68.5%) perceived on-the-job training as beneficial, while 28.7 % said training is somewhat necessary, and 2.5% thought it was not important at all.

Ivica and Mihailo (2023) employed the questionnaire method in their study, targeting 52 employees from one of the working teams at NCR Company in Serbia. Their primary hypothesis posited that the continuous and successful development of a modern organization hinges on investments in employee training and development. Their third auxiliary hypothesis delved into the importance of feedback and performance evaluation in facilitating appropriate training methods. The study concludes that in large organizations, feedback plays a crucial role in devising and implementing effective training strategies tailored to the organization's business goals and nature. Through evaluation, both the advantages and drawbacks of training, as well as employee adaptation, can be discerned, enabling targeted efforts to address identified deficiencies.

Ahn and Huang (2020) proposed a model that can explain the relationship between employee training (both general and firm-specific) and employee turnover. A survey of 10,069 employees in Korea were participants. The results indicated both general and specific training negatively impact employee turnover. The magnitude is more extensive for specific training when compared to available training. The results highlight the importance of particular employee training as an essential factor. Similar to other studies in the review, finding specific training that can enable an employee to perform better will benefit the organization and the employee's well-being.

Anthony and Weide (2015) explored the correlation between career-development training initiatives and employee motivation using qualitative methodologies, specifically employing semistructured interviews. Their study involved the selection of 20 project managers and consultants situated in the south-central Texas area. The research framework drew upon Higgins's regulatory focus theory, which examines how individuals direct their motivations based on regulatory fit. Employing the van Kaam method, the authors coded and categorized themes emerging from the interviews alongside demographic data. Analysis of the data yielded four primary themes: delivery methods, interaction and purpose, repercussions of inadequate training, and training efficacy. Despite the disparity between this training model and the on-the-job training utilized for field engineers, the study underscores the imperative for participants to perceive value in the training, which serves as a significant incentive for active engagement.

Södersved Källestedt et al. (2020) examined managers' perspectives regarding the competence of newly graduated nurses. The authors believed the managers were unsatisfied with the competence of these new nurses. Residency programs intend to assist nurses in their transition to professional nursing. The results show a gap between universities and healthcare organizations in maintaining continued learning. If the universities are not meeting the health care organization's desired level of competence, an alternative solution must fill the gap. Sometimes, managers in an organization can institute a developmental training program to assist the new nurses. Despite initial training, a key aspect will still be knowledge and competence gaps when starting a new

profession. An organization needs to adopt some form of continual learning to continue employee development.

Training must be relevant to the participants for active engagement in the learning process. While general training can still be beneficial, the authors suggested employees find greater value in training that is more specific to their needs (Anthony & Weide, 2015). Finally, employee training should be an ongoing pursuit by organizations. Managers in organizations must develop a reliable feedback system to gauge better what their employees lack in training and how to provide continuing, relevant training programs (Ahn & Huang, 2020).

Gossett et al.'s (2019) exploratory review led to the creation of the Tau conceptual framework model. the Tau conceptual framework investigates the interactions within the healthcare system, revealing a feedback process where changes in one aspect can impact others. For instance, improvements in safety and quality can lead to reduced costs and increased satisfaction, while worsening factors like preventable medical errors can decrease access, safety, and satisfaction, while costs rise. Understanding these feedback loops within the framework allows managers to make informed decisions to enhance healthcare outcomes and minimize unnecessary spending. Complex Adaptive System (CAS) theory serves as a valuable learning tool for comprehending the complexities of the U.S. health care and human services systems, offering opportunities for further research to identify correlations among variables and improve the system. By integrating this research into the Tau conceptual framework, stakeholders can develop submodels to address specific knowledge areas and contribute to overall system

enhancement. Identifying variables directly or inversely related to access, safety, quality, and satisfaction is crucial for understanding the negative feedback model, where improvements in safety and quality lead to cost reduction and satisfaction increase while worsening factors lead to adverse effects. Recognizing the substantial waste in the U.S. health care system underscores the importance of evidence-based practices and a CAS approach in addressing issues to improve access, safety, quality, and stakeholder satisfaction while reducing costs.

In the next subsection of my review of the literature, I will address how the COVID-19 pandemic affected training needs in organizations during its prevalence. Many organizations are considering the need for increased virtual training as masking, social distancing, and handwashing become the new norms. COVID introduced the world to alternative approaches to training.

Related Issue: COVID-19

Al-Aali and Ahmed (2021) tested how the learning, development, and work-life balance model helped boost employees' meaningfulness of work during the COVID-19 pandemic. The results indicated that employee training promotes work meaningfulness. Training opportunities may let employees see an element of concern since training is an investment in the employee's skill development. Additionally, the results indicated the need for organizations to view training as an investment opportunity for employees with promising results.

Opsahl et al. (2021) saw the impact of COVID-19 on face-to-face professional development. The solution has led to innovative virtual solutions to address the COVID-

19 limitations while still being effective. The virtual solution was a simple Zoom webinar requiring coordination with all the presenters. Additional tools involving Mentimeter provided tools for participant engagement throughout the presentations. While there was no test or evaluation to assess the effectiveness from a practical perspective, the overwhelmingly positive surveys following the event led the planning committee to consider it a success.

Alternative approaches to training are a form of forced evolution that has led to innovations in training and, in this case, professional development. Nagem (2021) evaluated how COVID-19 introduced new challenges for organizations, emphasizing that career development is a crucially overlooked aspect of work. The author goes through various ways an organization can cope with the recent concerns given the global pandemic. Nagem recommended that organizational managers develop a game plan that concentrates on and directly addresses professional development for the next two years, understanding that adjustments will be necessary. Organizational managers must embrace technology to increase communication through Zoom and identify gaps throughout the organization to address them before they become problematic. Managers should also use mentors and communication technology, so individuals are not forgotten. During the pandemic, it is easy to lose focus on employees; it is vital to prioritize professional development and show employees their careers are still a shared concern.

Like the previous article, Brooks et al. (2021) promoted Zoom technology for professional development and training. Several key characteristics of virtual professional development are the differences between webinars and webcasts, live events and pre-

recorded, and single events and conferences. Understanding the characteristics of each can help in deciding which method would be best for an organization. The final topic is regarding how to maximize the training following an event.

Transition

After I reviewed the conceptual framework in Section 1, I covered the literature review in Section 2 which were the results of using the search terms of *employee training, employee on-job training, on-the-job training, employer training, training effectiveness, Kirkpatrick's four levels,* and *resource-based view*. I identified three possible themes of importance in evaluating the effectiveness of training programs for field service engineers: (a) loyalty to the organization, (b) risk factors in training, and (c) the importance of feedback loops. In Section 3 of this study, I will cover the role of the researcher in depth, how I conducted research ethically, and how the participants were protected within the study while conducting the research. In Section 3 of this study, I will also cover the research methodology used in this study.

Section 3: Research Project Methodology

In Section 3, I address various components that were integral to the research endeavor, including describing my role as the researcher of the study, clarifying the fundamental nature of the project, specifying the target population, expounding upon the sampling methodology employed, detailing participant demographics, outlining the protocols for data collection, providing insight into the formulation of interview questions, explaining strategies for data organization and analysis, and evaluating the reliability and validity of the study's findings. I used semistructured Zoom interviews as the principal means of data acquisition from the participating individuals. Additionally, data were collected through a thorough examination of available organizational documents and data sets. Subsequently, I analyzed the gathered data along with insights gleaned from extant literature and participant feedback.

Project Ethics

Ethical research must uphold high standards to earn public trust and support (Saunders et al., 2019). I adhered to all Walden University Institutional Review Board (IRB) requirements and accessed participants within the organization through my personal and professional networks. One of the inclusion criteria for this study was that participants must either currently work as field engineering managers or have experience in that role. Another inclusion criterion was the participants were the direct managers of various-sized teams of field engineers. Each manager had to be responsible for selecting, hiring, and overseeing the training program for each field engineer on their respective programs. The participant eligibility criteria also included having at least 2 years of

experience as a field engineer manager. The participant must also have overseen the training of two or more field engineers and be responsible for ensuring the proficiency of the existing field engineers. The fact that participants had at least 2 years of experience hiring and training field engineers for their respective programs bolstered the study's credibility. Additionally, the participants' knowledge and experience gave them specific insight into answering the research question.

Before collecting any data for this study, I obtained approval from Walden University's IRB (Approval No. 04-01-24-1036274). The informed consent form was developed per Walden University's requirements. In compliance with IRB regulations, I safeguarded the study records and will continue to do so for 5 years, after which they will be permanently destroyed. No incentives were provided to participants in this study. To ensure confidentiality, I did not use participants' names, organizational names, or any personally identifiable information, as recommended by Ennever et al. (2019).

I ensured that each prospective subject met the study inclusion criteria before beginning the interview process. Each participant received an introductory email clarifying the voluntary nature of the interview and providing a complete description of their part in the study. I received "I consent" email confirmations from each participant in response to the IRB-approved consent form sent to each of them. Additionally, I have and will continue to abide by the confidentiality procedures to protect the participants and maintain their privacy by following the protocols defined in the *Belmont Report* (Department of Health, Education, and Welfare, 1979).

I explored the participants' perceptions to gain knowledge and insight into what strategies field engineer managers use to evaluate the effectiveness of their field engineer training programs. I interviewed five field engineer managers within the same U.S. organization. The participants were asked identical, semistructured, informal, in-depth, open-ended interview questions. I made sure to be wary that participants and myself may have had some biases and took proactive steps to mitigate them. The field engineer managers fulfilled the role of subject matter experts most qualified to answer the interview questions, and each provided their perspective. The participants' interview answers led to unexpected issues emerging and being explored (see Das, 2022). None of the interview questions could be answered with a simple "yes" or "no" response. As the researcher, I strictly adhered to procedures for capturing and analyzing data from interviews and other sources. Following this approach contributed to the reliability and trustworthiness of the study.

Bias can occur during the research phase (Pannucci & Wilkins, 2010), and as such, a researcher must plan to mitigate bias in all stages of research (Cypress, 2018). To mitigate bias, I used triangulation by combining data sources, theory, and methodology to contribute to quality data analysis. To mitigate bias during the interviews, I audio-recorded responses, reviewed the transcripts, used member checking, and listed possible themes developed from my review of the literature. The interviews were conducted via phone or Zoom conference calls at a time and place convenient for the interviewees. Before collecting data, I confirmed the willingness of the participants to take part in the study and secured their consent to record the interview.

Nature of the Project

Research Method

The nature of the project component of the study served a dual function: (a) justifying the qualitative methodology and (b) justifying the pragmatic inquiry design. In this study, I employed a qualitative approach to examine the strategies employed by managers in evaluating the effectiveness of training programs for field service engineers. Through the use of this approach, I identified knowledge gaps and laid the groundwork for exploring the research question. Researchers have the flexibility to choose from various methodological options, including qualitative, quantitative, or mixed methods (Strijker et al., 2020). In the context of this study, the qualitative methodology provided a unique insight into managers' assessment practices, facilitating a thorough examination of the research topic. The overarching research framework is determined by the context and research questions (Matović & Ovesni, 2023). Quantitative researchers use hypotheses to delineate variables, characteristics, or relationships, which is a feature that was not pertinent to the current study (see Tarhan & Yilmaz, 2014). The current study did not involve the examination of variables' characteristics or relationships for hypothesis testing. Mixed methods typically incorporate both quantitative hypothesis testing and qualitative methods (Yin, 2017). However, since I did not use the quantitative method in this study, the mixed method was not suitable for its intended purpose.

The study's participant population was situated in the United States. While a larger participant pool would be ideal, the field engineer manager position is relatively limited within the study site organization. The selected participants for this study oversaw

field engineers of varying capacities, with each engineer receiving specialized training tailored to their specific system and product. I conducted this study to provide insights into the individualized training programs of each business unit and how they assess their effectiveness.

Research Design

In this study, I adopted a pragmatic inquiry framework, a decision supported by Kelly and Cordeiro's (2020) study regarding the applicability and utility of pragmatism in qualitative research focusing on organizational processes. The authors described three foundational methodological principles essential to a pragmatic approach: (a) an orientation towards actionable knowledge; (b) acknowledgment of the interrelation among experience, cognition, and action; and (c) conceptualization of inquiry as an experiential endeavor. Drawing upon their research endeavors in the realm of nongovernmental organizations, Kelly and Cordeiro exemplified how adherence to these principles fortifies every facet of the research endeavor, spanning project conceptualization and data acquisition to analysis, conclusions, and dissemination.

Kelly and Cordeiro (2020) advocated for pragmatism as a robust epistemological framework that grounds research endeavors in the practical aspects of inquiry and real-world demands. Chiefly within the context of research concerning nongovernmental organizations, the emphasis on generating actionable insights ensures that the research remains contextually relevant while remaining theoretically informed. By embracing a pragmatic stance, researchers operating within organizational settings surpass the constraints of objectivist paradigms, which traditionally dominate organizational

research, thereby fostering a nuanced understanding of the intricate interplay between knowledge and action within specific contexts. According to Biesta (2010), such an approach to "knowing" holds transformative potential for practice.

Among the primary qualitative designs, I specifically chose the pragmatic inquiry design for its suitability to the study's objectives. In a case study design, researchers delve into complex social phenomena, striving to comprehend holistic perspectives through diverse avenues of data collection, facilitating the identification of recurring themes (Ji & Sun, 2022). This design was viable for the current study's focus on discerning best practices through the combination of multiple data sets within a singular research site; however, it was subject to the requisite approval from the organization or company. I deemed phenomenology, an alternative qualitative design, inappropriate given the current study's divergence from being an exploration of participants' lived experiences (see Meyer, 2022). Similarly, ethnography, while valuable for probing cultural contexts and behavioral patterns, did not align with the current study's aim of offering strategies adaptable across diverse cultural environments (see Meyer, 2022). Primarily, obtaining site agreements rendered the case study design a more pragmatic choice for the current study, requiring only informed consent from participants and their comprehension of the intent of the study to answer the research question.

Population, Sampling, and Participants

As the researcher, my responsibilities included identifying and vetting potential participants for the study, which involved reaching out to individuals within organizations through personal and professional networks, including colleagues, industry

contacts, and professional associations. Inclusion criteria for participants stipulated that they must currently work as field engineering managers or have prior experience in such roles. Additionally, participants needed to directly manage teams of field engineers of varying sizes and be responsible for overseeing their training programs. Eligible participants were required to have at least 2 years of experience as field engineer managers and to have overseen the training of two or more field engineers. The study population comprised five field engineer managers identified through professional networks like LinkedIn, each managing teams of field engineers and ensuring their training aligned with program requirements.

The data collection process was centered on semistructured, open-ended interviews conducted based on participants' availability. In cases where face-to-face interviews were not feasible, I conducted interviews via Zoom or the phone to ensure accessibility for all participants. Purposive sampling was employed to select participants with specific characteristics and experiences relevant to the research question. I monitored data saturation to ensure that additional interviews did not yield new, relevant information.

Following approval from the Walden University IRB, I contacted participants by emailing them informed consent forms to establish working relationships and arrange discussions regarding the study's requirements. Transparency regarding the research's purpose was ensured, and the informed consent process was completed before commencing the interview phase. To address potential issues with informed consent comprehension, I reached out to each participant to emphasize the form's significance

and encourage direct communication for any further clarifications. Upon receiving each participant's signed consent form, my efforts shifted toward establishing rapport, fostering effective communication, and adhering to the interview protocol throughout the interview process.

Data Collection Activities

As the researcher, I functioned as the primary instrument for data collection, with documents and journal reviews serving as secondary means of data gathering. All interviews were audio recorded either with a recording device or software program and in cases where participants were unavailable for in-person interviews, sessions were conducted via video conferencing software, recognized as a viable alternative (see Khan & MacEachen, 2022). I collected data through a semistructured, open-ended interview format, which is recognized as fundamental in qualitative data collection methodologies (see Gunawan et al., 2022). Some interview sessions were interactive, allowing for the observation of participants' behaviors during the process, while adherence to the interview protocol (see Appendix) was maintained throughout.

The interview stands as a prominent method for gathering study data (Yin, 2017). For this study, data collection involved conducting either face-to-face or video conference, semistructured interviews, with the latter serving as a practical alternative when necessary, comprising open-ended questions (see Khan & MacEachen, 2022). Additionally, I thoroughly analyzed any company documents provided by participants. The interview protocol helped me maintain consistency by aligning interview questions with the research inquiry (see Yeong et al., 2018) and ensuring adherence to the study's

overarching objectives (see Yin, 2017). Furthermore, I incorporated a final open-ended question to encourage participants to offer additional insights relevant to the research question (see Yeong et al., 2018).

Throughout the interview process, I carefully interpreted participants' responses and sought their validation through ongoing member checking, a technique enabling participants to review transcripts and researcher interpretations to verify the accuracy or provide clarifications (see Iivari, 2018). Participants were provided with summaries of their respective interview transcripts for review and approval, facilitating their continued engagement with and contribution to the data interpretation process (see Birt et al., 2016). To enhance the study's validity, I employed triangulation, leveraging multiple data collection methods, including semistructured interviews, document analysis, and journal reviews (see Cypress, 2018). This multifaceted approach served to minimize misinterpretation and bolster the overall validity of the findings.

Interview Questions

The interview questions were as follows:

1. What strategies do you use to evaluate the effectiveness of the training program for your field engineers?
2. What is your process to update or improve the training program?
3. What are your follow-up/on-the-job training strategies?
4. What strategies do you use to evaluate the field engineers' effectiveness after the training program's conclusion?
5. How do you determine if field engineers need additional training?

6. How is the cost-effectiveness of the training evaluated?
7. What else can you tell me about the strategies your organization uses to assess the effectiveness of your organization's training program for field engineers?

Data Organization and Analysis Techniques

A substantial amount of content, including transcripts of interviews and videos, documents, field notes, and other types of information, is generated by qualitative research. Byrd (2020) advised that managing data, papers, and notes in an organized manner is crucial to keep up with the sheer volume of created content. I cleaned all data by identifying and eliminating mistakes or incorrect information. In addition to cleaning the data, the data were transcribed or otherwise prepared for examination. Besides ensuring information accuracy and comprehensiveness, it is crucial to maintain confidentiality, organize file and document titles methodically, and store records appropriately. Skarbek (2020) emphasized the need for independent data validation to prevent issues.

In organizing the study's data, I employed the coding process to identify themes and categories, as outlined by Yin (2017). Specifically, I utilized Yin's thematic analysis process for data analysis, which involves interpreting data, employing both deductive and inductive methods, analyzing various processes, and applying coding and pattern recognition techniques. I transcribed the interviews and stored the transcripts and audio/video files. I collected and stored transcripts and all additional documents and files electronically in a password-protected flash drive for the next 5 years per Walden university requirements. I used ATLAS.ti software to support my qualitative data

analysis. ATLAS.ti has the features and capabilities to gather, organize, retrieve, and analyze data.

Data Analysis

Data analysis in this study aims to address the "how" and "why" by collecting comprehensive data within an interpretive philosophy framework (Mattimoe et al., 2021). To validate the study's outcomes, I leveraged various data sources and implemented triangulation by aligning findings from different sources, thereby enhancing validity (Farquhar et al., 2020). Triangulation increases research accuracy when handling large data sets and involves three forms: investigator triangulation with multiple analysts, data triangulation with multiple sources, and methodological triangulation using various methods to support a single conclusion (Valencia, 2022).

I utilized Yin's (2017) five-step approach as a structured method to thoroughly examine the collected data, enabling a comprehensive exploration of emerging themes and patterns. This systematic framework facilitated the identification of key findings and ensured the credibility and reliability of the analysis process. Moreover, the utilization of ATLAS.ti provided a dependable platform for organizing, coding, and cross-referencing the data, allowing for a nuanced understanding of the research phenomenon (Paulus et al., 2019). Through this analytical approach, I aimed to provide rich insights into the complexities of the study subject while maintaining transparency and methodological consistency.

Recognizing recurring themes is crucial, as Keyword In Context analyses help identify keywords that reveal underlying connections and repeated language used by

participants. Identifying key themes and language aids researchers in understanding the study's culture and developing better strategies for success (Mishra & Dey, 2022). I used ATLAS.ti to analyze and count each instance a code appears, which helped to understand the relative importance of deductive and inductive codes and identify key underlying themes (Mohamad et al., 2022). Finally, by conducting interviews with semistructured, open-ended questions and using software like Microsoft Word, Excel, and ATLAS.ti, I maintained and organized my data effectively. Yin's five-step approach to data analysis helped understand, group, and describe the data, ensuring methodological triangulation as the most effective method for this type of research.

Reliability and Validity

Reliability and validity are crucial elements in both quantitative and qualitative studies, albeit with differing criteria for assessment (Bell et al., 2022). Neglecting to address the dependability, credibility, transferability, and confirmability of data derived from a study may undermine the trustworthiness of qualitative research concerning its reliability and validity (Krawczyk et al., 2019). Ensuring reliability and validity in qualitative research requires consistent monitoring for authenticity and bias throughout the research process (Ghauri et al., 2020). By adhering to these evaluative criteria, it is reasonable to ensure that all findings accurately represent the phenomena under investigation.

Reliability

Reliability refers to the ability to consistently achieve similar findings (Yin, 2017). In qualitative research, reliability involves ensuring that the data collection

process, findings, and results are consistent and dependable (Dobakhti, 2020). To maintain this consistency, the researcher will employ semistructured, open-ended questions to elicit responses from participants consistently throughout the study (Bell et al., 2022). This approach enables researchers to better understand participants' viewpoints, beliefs, and information, thus enhancing the reliability of data production, comprehension, and analysis, as highlighted by Ghauri et al. (2020). To ensure dependability, repeatability, and consistency during the data collection process, the researcher utilized a standardized interview protocol (see Appendix), administering it uniformly to all participants. Employing identical open-ended questions for all participants ensured uniformity across interviews and the study, thus mitigating bias (Saunders et al., 2019). Additionally, analyzing notes made during the recordings of phone or Zoom interviews, and coded transcripts, facilitated accurate and reliable identification and analysis of participants' interviews.

Dependability

Dependability is a parallel criterion to reliability (Saunders et al., 2019). Dependability allows for the replication of the research project process by other scholars, a task that can be particularly challenging with qualitative approaches due to their narrative and subjective nature (Dobakhti, 2020). To ensure dependability in my research, I implemented several measures. In my notetaking, I documented potential biases and consciously set aside any preconceptions, beliefs, or assumptions regarding the phenomenon under study. During the interview process, I stayed vigilant for participant bias and utilized member checking to verify the accuracy of my interpretations in

representing participants' perspectives, as recommended by Krawczyk et al. (2019). Additionally, recordkeeping was maintained to establish a transparent data trail. Triangulation, drawing on insights from multiple sources, was employed to foster an interconnected analytical approach, aligning with the recommendations of Moon (2019) and Yin (2017). Furthermore, to strengthen dependability, I conducted thorough reviews and validations of the data collection process, employed bracketing in data analysis, and utilized member checking to ensure participants' satisfaction with both their responses and my interpretations.

Validity

Validity involves demonstrating the trustworthiness, credibility, and meaningfulness of the findings. Achieving validity in research demands meticulous attention to data collection, analysis, and interpretation, coupled with an emphasis on transparency and reflexivity to ensure high-quality outcomes (Ghauri et al., 2020). Validity manifests in both external and internal dimensions, with internal validity specifically addressing the confidence level in the accuracy of observed variations among the study's proposed variables. External validity concerns the extent to which findings from a study can be applied to other populations, environments, or timeframes. I employed a systematic coding process to ensure accurate recording and transcription of participant statements. To reinforce the validity of the research, meticulous documentation of findings was maintained, creating a well-audited trail as recommended by Walden University (2023). Achieving data saturation was pivotal in enhancing the credibility, transferability, and confirmability of this qualitative study, aligning with the

principles outlined by Yin (2017). For data collection, I utilized semistructured, open-ended interview questions, along with organizational documentation and a review of academic literature. By triangulating recurring themes across these sources, the study's credibility was strengthened. Triangulation, as advocated by Moon (2019), involves validating information through multiple data sources, researchers, theories, or methods on the same phenomenon, thus mitigating bias and bolstering validity. To ensure data saturation, triangulation, and overall validity, I incorporated member checking and thoroughly reviewed both organizational documentation and interviews. Data saturation, characterized by the absence of new information or themes upon further data collection (Saunders et al., 2019), served as a key indicator of research completeness and reliability. Member checking was incorporated into the research to enhance the reliability, validity, accuracy, and credibility of the findings by reflecting on the precision and accuracy of the data collected (Walden University, 2023).

Credibility

Credibility, as defined by Chin et al. (2021), pertains to the transparency of both the methodology and findings, allowing others to validate and replicate them. Researchers utilize member checking, a process endorsed by Krawczyk et al. (2019), to reinforce credibility by enabling participants to verify interpretations, ensuring accurate reflection of their perspectives. Qualitative researchers are advised by Varpio et al. (2017) to enhance credibility through prolonged engagement in the study and involving participants in the member-checking process, thereby fostering data sharing and interpretation. Triangulation, a technique commonly employed in qualitative research,

involves leveraging multiple data sources to bolster credibility, as noted by Varpio et al. The integration of triangulation with data saturation, as suggested by Mazerolle and Eason (2018), further fortifies credibility. To ensure the credibility of this study, I utilized triangulation, conducted member-checking of interpreted data with participants, and achieved data saturation.

Transferability

Transferability, also known as generalizability, pertains to the extent to which the findings of a study can be reasoned to other contexts or settings (Krawczyk et al., 2019; Moon et al., 2019; Thurairajah, 2019). The managers comprising the population sample possess considerable experience and expertise in implementing training programs, thereby improving the validity and transferability of the study (Fusch & Ness, 2015). Qualitative researchers often employ triangulation to enhance transferability by examining outcomes from multiple angles and sources (Fusch & Ness, 2015; Mazerolle & Eason, 2018; Varpio et al., 2017). In this study, direct interviews with managers responsible for training program implementation were conducted to ensure validity, while descriptive data was utilized to enable readers to gauge the study's transferability objectively (Thurairajah, 2019).

Confirmability

Confirmability refers to the extent to which research findings can be verified or supported by other researchers (Krawczyk et al., 2019; Moon et al., 2019). Researchers often employ confirmability and triangulation strategies to mitigate bias and ensure the reproducibility of study results (Mazerolle & Eason, 2018; Varpio et al., 2017).

Confirmability becomes evident once credibility, transferability, and dependability have been established, indicating that another researcher can replicate the study's methods, evidence, and results (Yin, 2017). To ensure confirmability in this study, I compared data with the outcomes and addressed any potential biases throughout the research process. Additionally, I engaged in member checking and sought feedback from participants to validate assumptions and minimize bias reflected in my reflective journal. Sharing interview transcripts and interpretations with participants further facilitated confirmation of accuracy and identification of potential biases.

Data Saturation

Credibility, transferability, dependability, and confirmability stand as key pillars of high-quality qualitative research (Krawczyk et al., 2019; Moon et al., 2019). Data saturation, where the researcher uncovers minimal or no new information or themes, marks a crucial milestone in qualitative inquiry (Saunders et al., 2019; Yin, 2017). Achieving data saturation ensures credibility, transferability, and confirmability, thus meeting the criteria for a valid research study (Yin, 2017). Throughout the interview process, I took measures to ensure participants comprehended the research question, objectives, and their role, fostering agreement on the interpretation of their responses. Employing member checking allowed participants to provide additional insights or clarification during and after interviews. Researchers reach data saturation when further interviews yield no novel information (Fofana et al., 2020). Methodological triangulation, such as employing in-depth, semistructured, open-ended interview questions and document analysis, facilitated the attainment of data saturation in this study.

Transition and Summary

In Section 3, I delineated the researcher's responsibilities, provided the rationale for participant selection criteria and eligibility, elucidated the chosen research methodology and design, expounded upon the population selection process and sampling methodology, addressed ethical considerations, delineated data collection instruments, and techniques, and outlined data analysis methodologies. Furthermore, within Section 3, I expanded on approaches aimed at ensuring reliability, validity, and attainment of data saturation.

Section 4 will center on presenting the findings and conclusions of the study. Additionally, I will discuss the implications of the study for business practices and social change, offering recommendations for implementing strategies within the social enterprise to improve, broaden, or adapt their business practices. The section will conclude by proposing avenues for further research in this area.

Section 4: Findings and Conclusions

Presentation of the Findings

The purpose of this qualitative pragmatic inquiry was to explore the strategies that aerospace and defense industry managers use to evaluate the effectiveness of training programs for field service engineers. The research question for this study was: What strategies do aerospace and defense industry managers use to assess the effectiveness of their training programs for field service engineers? The study participants were five field engineer managers located in the midwestern United States who had successfully implemented strategies to evaluate their training programs' effectiveness for field engineers. Data collection included semistructured interviews with open-ended questions. Each interview lasted no more than 1 hour, allowing for comprehensive responses and additional input from participants. I confirmed that all five participants had implemented effective strategies for their training programs.

To bolster the credibility and dependability of the research findings, I employed member checking, ensuring that participants could verify the accuracy of my interpretations of their interview responses. Beyond conducting semistructured interviews, I employed methodological triangulation by comparing transcripts, interview responses, relevant social media data, and any available company documents to ensure the validity of the findings, enhancing the robustness of the study's conclusions. By using member checking and triangulation, I reinforced the study's reliability and validity.

To maintain the confidentiality of the participants, I substituted the names of the field engineer managers with the following identifiers: Participant 1 (P1), Participant 2

(P2), Participant 3 (P3), Participant 4 (P4), and Participant 5 (P5). After comprehensively coding the collected data and identifying thematic elements, the next step was member checking. This process involved sending a condensed transcription to each participant and conducting individualized sessions with each of the five participants for a thorough review. The primary objective of these sessions was to ensure an accurate representation of our dialogues and their responses to the inquiries. The purpose of this iterative member-checking process was twofold: to prevent omissions or errors in the participants' statements and to validate the accuracy of the collected data through triangulation methodologies. The data revealed the following themes: (a) feedback-driven assessment and adaptive training, (b) on-the-job training and hands-on learning, and (c) performance reviews and cost-effectiveness.

Figure 1 provides a visual representation of the codes derived from the participants' responses. Figure 2 displays a graphical representation in the form of a Sankey diagram that depicts the key groupings derived from the 3,866 relevant codes identified using ATLAS.ti to qualitatively analyze the research responses from interviews and other supporting documents.

Figure 1

Data Saturation Bar Graph

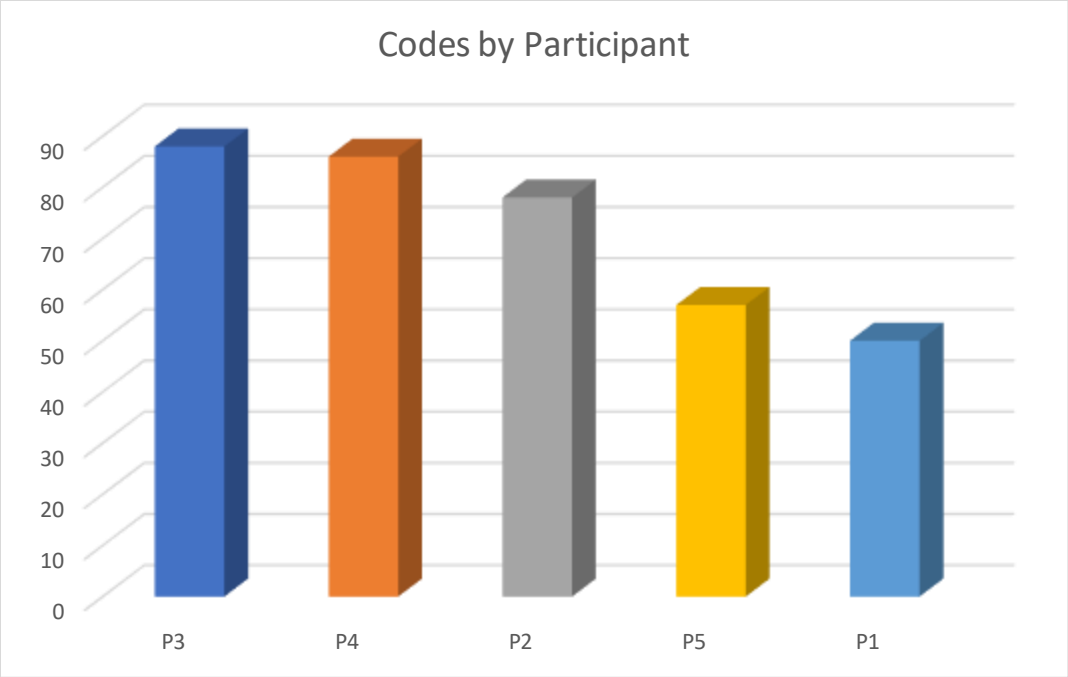
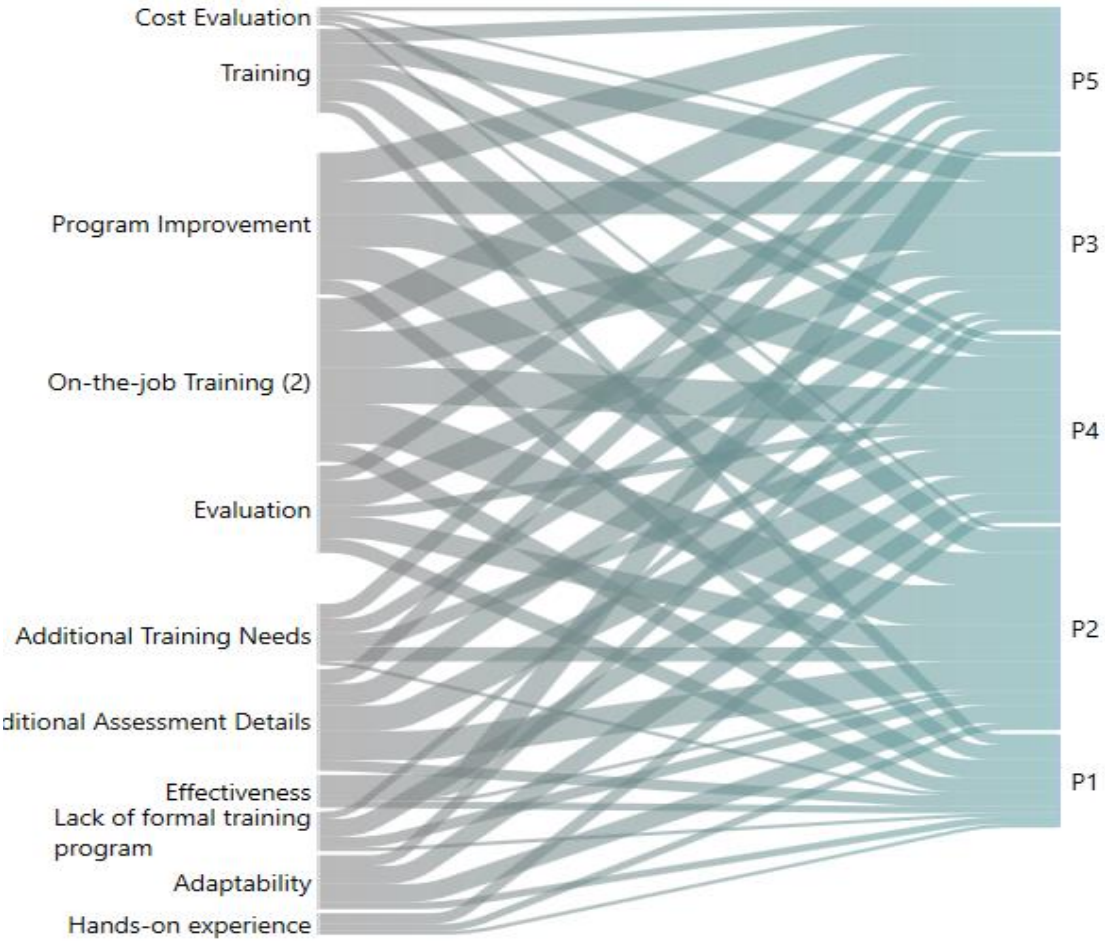


Figure 2

Sankey Diagram: Commonalities in Key Words



Note. The thickness of the lines in the diagram corresponds proportionally to the identified connections between the analysis and other codes elicited during the interview process. I created the diagram using ATLAS.ti Desktop for PC to serve as a visual representation to convey the research findings.

Theme 1: Feedback-Driven Assessment and Adaptive Training

Across participants, there was an emphasis on gathering feedback from various sources, such as peers, end-user customers, and senior engineers. Feedback helps managers to continuously adapt and refine training programs to meet the changing needs of field engineers. Evaluations and feedback were collected through a range of methods, such as quizzes, one-on-one discussions, teleconferences, site reports, and formal and informal assessments. This adaptive approach ensures that training programs remain relevant and effective in preparing engineers for the evolving demands of their roles.

Findings From Participant Interviews

P1 stated,

> We evaluate that by seeing how they [the trainee] do when they get to the site when they're starting to actually provide customer support see how they use their previous experiences to use their strengths and to focus on weaknesses, train from that aspect.

P2 shared that,

> we [the trainee and trainer] will go through a complete teardown and build-up of that system, the various components, and then go back to regular training, and I will basically let that sit for a while and then we'll go back and do it, I'll more or less be an observer and ask questions as they go through the process, just to see where they stand and what they're capable of.

P2 added that "primarily feedback based from the operators, our actual supporting customer and our engineering team, and sometimes from senior field engineers."

P3 stated that they "get the feedback from them [the trainees] on a quiz that touched on key systems and components that are part of the OJT training, it would give me basic understanding of where they were at." Concerning gauging their need for additional training and training effectiveness, P3 said, "that's where weekly teleconferences and stuff can come in. Those are very key along with weekly reports so that you can gauge where a particular site is at.".

P4 responded, "The strategy that we use is customer feedback and peer feedback." Additionally, they reported using a corporate-level survey to illicit feedback, describing it as "an overall survey that a company send out to all employees checking their feedback on how the company is treating the employees and what we can do."

P5 stated that it "usually comes with customer feedback, or, actually, more often than not when they're talking to me about something."

In summary, the participants reported that receiving feedback from a variety of sources, including peers, end-user customers, and senior engineers, is crucial for continuously adapting and refining training programs for field engineers. This feedback, collected through methods, such as quizzes, discussions, teleconferences, site reports, and assessments, ensures that training remains relevant and effective in meeting the evolving demands of engineers' roles. Participants highlighted the importance of observing field performance, incorporating continuous learning, and using both formal and informal evaluations to update training programs. This comprehensive, feedback-driven approach helps maintain high performance and meets the dynamic needs of the field engineering profession.

Relationships to the Conceptual Framework

The Kirkpatrick model is a framework for assessing training program efficacy and encompasses four key levels: (a) reaction gauges participant responses to the training, (b) learning assesses the acquisition of knowledge and skills, (c) behavior evaluates practical application in the workplace, and (d) results measure the ultimate impact on organizational objectives (Kirkpatrick & Kirkpatrick, 2006). Feedback mechanisms are pivotal across all levels of the Kirkpatrick model. In the reaction phase, participants' feedback offers insights into the training program's efficacy, encompassing opinions on materials, instructor effectiveness, and content relevance, which aid trainers in identifying strengths and areas for improvement. In the learning stage, diverse feedback methods, like quizzes and evaluations, help participants gauge their understanding and identify areas for growth, fostering a feedback loop that reinforces learning. Within the behavior level, feedback from managers and trainers guides employees in applying newfound skills effectively, with constructive criticism aiding in the integration of training into daily tasks. In the results tier, feedback from stakeholders allows organizations to evaluate the training's impact on overarching goals, such as productivity and customer satisfaction, facilitating informed decisions regarding training effectiveness. In summary, feedback is integral to each level of the Kirkpatrick model because it enables continuous improvement and ensures that training programs effectively meet the needs of both participants and the organization as a whole.

Relationship of Existing Studies and Research Findings

The findings from the literature review emphasized the pivotal role of managerial support in enhancing training programs, as highlighted by Zweni (2023) and Urbancová et al. (2021). Effective training requires continuous evaluation and adaptation, with managers playing a crucial role in assessing training relevance through diverse methods. These assessments help ensure that the training programs align with organizational goals and meet the evolving needs of the workforce.

Current study participants emphasized the necessity of gathering feedback from various sources, including peers and senior engineers, to tailor the training effectively. They mentioned the use of quizzes, discussions, and both formal and informal assessments to maintain the training's relevance. While the literature findings from Zweni (2023) and Urbancová (2021) focused on the strategic role of management and the influence of organizational culture, participant responses highlighted practical feedback mechanisms and adaptive strategies that ensure the effectiveness of training initiatives. Both perspectives agreed on the importance of continuous feedback and adaptation in training programs.

Theme 2: On-the-Job Training/Hands-On Learning

Managers rely heavily on on-the-job training (OJT) and hands-on experiences for field service engineers. These strategies involve shadowing experienced engineers, working with subject matter experts, and participating in real-world problem-solving scenarios. These practical, immersive training experiences help engineers apply what

they have learned directly to their work, allowing managers to assess the engineers' effectiveness in real-world contexts.

Findings From Participant Interviews

P1 stated OJT includes the following, "I'll send a newer person just completing the training to shadow a more senior field engineer and be able to talk through the process of what you are doing as you are going and what to look at it." Adding that there is "an opportunity for us to get the field engineers working with some depot maintainers" for additional OJT.

P2 stated, "So the majority of it [training] is OJT." Additionally saying, "So, on average, I would say 4 to 6 months, for the hands-on guided training." P3 replied, "The majority of the training that I did with field service engineers was OJT training." P4 shared that, "we start off by shadowing and have that OJT. That's just the most effective way from our point of view."

In conclusion, field engineer managers heavily rely on OJT and hands-on experiences for field service engineers, including shadowing experienced engineers, collaborating with subject matter experts, and engaging in real-world problem-solving scenarios. These immersive training strategies enable engineers to directly apply their learning to their work, providing managers with a practical means to assess their effectiveness in real-world contexts. Participants highlighted various aspects of OJT, such as initial training periods, continuous hands-on experiences, and scenario-based troubleshooting, emphasizing the value of practical, in-person training over remote methods due to the classified nature of their product support.

Relationships to the Conceptual Framework

OJT or hands-on learning takes place within the participants' work environment, seamlessly integrating learning into their regular job tasks. OJT serves as a practical method for individuals to acquire new skills, knowledge, and competencies while performing their duties. The Kirkpatrick model serves as a comprehensive tool for assessing the efficacy of OJT across its four levels. At the reaction level (i.e., Level 1), feedback mechanisms, like surveys, interviews, or focus groups, collect employees' responses to OJT, shedding light on the training's reception, relevance, engagement level, and areas necessitating improvement in delivery. Transitioning to the learning level (i.e., Level 2), the evaluation focuses on employees' acquisition of new skills and knowledge, involving pre- and posttraining assessments, job task observation, or live skill demonstrations, alongside feedback from performance reviews or supervisor assessments to track learning progression. Progressing to the behavior level (i.e., Level 3), the assessment revolves around the application of newly acquired skills and knowledge on the job, with managers observing employees' integration of training into daily tasks and providing feedback for effective application and further development areas. Lastly, at the results level (i.e., Level 4), the ultimate gauge of OJT effectiveness lies in its impact on organizational goals and outcomes, considering metrics, such as enhanced productivity, improved work quality, repair rates, or heightened customer satisfaction. Feedback mechanisms encompass collecting data on key performance indicators, posttraining evaluations, and analyzing performance trends to gauge long-term training impact on organizational results.

In summary, the Kirkpatrick Model presents a structured approach to assess OJT effectiveness by examining reactions, learning outcomes, behavioral changes, and organizational results. Feedback plays a crucial role across all evaluation levels, fostering continuous improvement and ensuring alignment of OJT programs with organizational objectives.

Relationship of Existing Studies and Research Findings

The extant literature from other researchers emphasized the importance of designing training programs that are practical and closely tied to real-world applications (Dietrich et al., 2021; Rogers & Burke, 2021). Effective training should be immersive and directly applicable to the job, enhancing both learning and retention by providing experiences that trainees can relate to their everyday work tasks.

Participants underscored the reliance on OJT and hands-on learning experiences, such as shadowing experienced engineers and engaging in real-world problem-solving scenarios. These methods allow trainees to apply their skills directly to their roles, making the training more relevant and effective. While the literature offered a broad perspective on the necessity of practical training designs, participant responses provided concrete examples of how these principles are implemented in practice, reinforcing the shared view that hands-on experiences are invaluable for effective training.

Theme 3: Performance Reviews and Cost-Effectiveness

Biannual performance reviews and ongoing evaluations are common strategies used by managers to assess field engineers' capabilities, communication skills, problem-solving abilities, and overall job performance. Additionally, cost-effectiveness is

evaluated by measuring customer savings, efficiency in troubleshooting, and cost avoidance for customers. Managers use these metrics to determine how well the training programs prepare engineers to deliver high-quality services cost-effectively.

Findings From the Participant Interviews

P1 stated that cost-effectiveness is "evaluated by the amount or the percentage of assets that are repaired in the fields." Additionally, "We have biannual performance evaluations that are discussed with the FSR to talk about their training and how they're performing in the field." P3 shared that, "retraining is probably the easiest metric to see" concerning how cost-effectiveness is evaluated. P4 replied that "cost avoidance for the end-use customers." P5 stated, "we save our customer, you know, easily between $1 and $2 million a year."

In summary, managers commonly use biannual performance reviews and ongoing evaluations to assess field engineers' capabilities, communication skills, problem-solving abilities, and overall job performance. Additionally, cost-effectiveness is evaluated through metrics such as customer savings, efficiency in troubleshooting, and cost avoidance for customers. These assessments help determine how well the training programs prepare engineers to deliver high-quality services cost-effectively. Participants emphasized the importance of safety, efficiency, quality assurance, and customer satisfaction in these evaluations, highlighting that the success of the training programs is reflected in tangible benefits such as maintenance manhour savings and improved customer communication.

Relationships to the Conceptual Framework

Performance reviews and cost-effectiveness stand as crucial themes in the evaluation of training programs, both seamlessly integrated into the Kirkpatrick model. Performance reviews, typically conducted by managers or supervisors at regular intervals, offer invaluable insights into employees' job performance. These assessments gauge how effectively employees apply acquired skills and knowledge from training sessions. By comparing pre- and posttraining performance, managers discern areas necessitating improvement and development, mirroring the Kirkpatrick model's behavior level which assesses the application of learning on the job. Moreover, these reviews serve as a feedback mechanism to gauge the training's impact on individual performance metrics and job responsibilities.

Additionally, evaluating the cost-effectiveness of training programs is important for organizations to ensure efficient resource allocation. This evaluation encompasses the costs associated with implementing the training against the outcomes achieved. Within the Kirkpatrick model, cost-effectiveness is addressed across various levels. At the reaction level (i.e., Level 1), feedback from participants gauges the perceived value of the training investment in terms of relevance, quality, and ROI. At the results level (i.e., Level 4), the ultimate measure of cost-effectiveness emerges through its impact on organizational goals and outcomes. By comparing training implementation costs to the benefits realized in terms of enhanced performance, productivity, or desired outcomes, organizations ascertain the overall cost-effectiveness of the training program.

In summary, performance reviews and cost-effectiveness are foundational pillars in evaluating training programs within the Kirkpatrick model framework. While performance reviews illuminate how training translates into enhanced job performance, cost-effectiveness analysis ensures that training investments yield maximal organizational value. The integration of these themes into the Kirkpatrick model empowers organizations to comprehensively evaluate the effectiveness and efficiency of their training initiatives.

Relationship of Existing Studies and Research Findings

Existing researcher studies delve into the relationship between training, employee performance, and organizational outcomes, as highlighted by studies from Yahya and Tan (2017) and Kaźmierczyk et al. (2020). Effective training programs are associated with enhanced performance and cost-effectiveness, which in turn influence employee retention and loyalty, underscoring the strategic importance of training initiatives within organizations.

Participants emphasize the use of biannual performance reviews and ongoing evaluations to gauge engineers' skills and job performance. Figure 3 displays the frequency of words that appeared in the participants' responses. Metrics such as customer savings and troubleshooting efficiency are utilized to measure cost-effectiveness, showcasing the tangible benefits of training in delivering high-quality and economically efficient services. While both the literature and participant responses acknowledge the significance of evaluating training effectiveness, the literature review provides a broader perspective on the overall impact of training on organizational performance, whereas

participant insights offer specific performance metrics and practical outcomes derived from training efforts.

Figure 3

Consolidated Frequency of Words Communicated by Participants

Note. The size of the words indicates the frequency of the words mentioned during the interview. The different colors portray the words with differentiated purposes.

Business Contributions and Recommendations for Professional Practice

The study delves into three critical themes shaping the effectiveness of training programs for field engineers. Firstly, feedback-driven assessment and adaptive training highlight the importance of gathering feedback from diverse sources such as peers and customers to continually refine training content. Methods like quizzes and discussions ensure that training programs remain relevant and responsive to the evolving demands of the field. Secondly, OJT/hands-on learning emerges as a fundamental approach, with

managers heavily relying on immersive experiences to equip engineers with practical skills directly applicable to their roles. Shadowing experienced engineers and engaging in real-world scenarios enable trainees to learn effectively and for managers to assess their readiness for field work. Lastly, performance reviews and cost-effectiveness underscore the necessity of ongoing evaluation to assess engineers' capabilities and the economic efficiency of training initiatives. Biannual reviews and metrics like customer savings ensure that training programs not only enhance skills but also contribute to organizational objectives in a cost-efficient manner.

Business and organization leaders are urged to prioritize adaptive feedback mechanisms, immersive training experiences, and rigorous performance evaluations to ensure their workforce remains adept at tackling dynamic challenges. By investing in these strategies, leaders can foster a culture of continuous learning and development, ultimately driving organizational performance and innovation. Meanwhile, the research-scholar community is encouraged to further explore the implications of feedback-driven assessment, hands-on learning, and performance evaluation in the realm of training and development. Continued investigation into these themes can advance our understanding of effective training methodologies, ultimately benefiting both academia and industry by informing best practices and driving future research directions.

Implications for Social Change

The study is potentially significant because there is limited research in the aerospace sector on training effectiveness for field engineer managers. The study's findings may contribute to the knowledge of field engineer manager training

development and strategies. While there is extensive research on general organizational training programs, they might not meet all the specific needs of field engineer managers which could result in an inability to deal with emergent issues that field engineer managers face from time to time. The diversity of field engineer managers and their employees is a challenging opportunity to assess what works for the variations of employee backgrounds receiving training. The study's findings can contribute to finding a more inclusive training strategy that can provide methods and strategies for benefiting field engineers, families, and communities by breaking barriers that the diverse field engineers and managers can show and become agents of change.

Training programs are widely considered essential for all organizations, and yet, many organizations fail to evaluate their training programs' effectiveness (Esteban-Lloret et al., 2018). In the aerospace sector, training programs could provide insight from Kirkpatrick's four-level model and provide additional insights into what training programs need to accomplish and options for improvement. Employee job satisfaction has a positive effect on employee performance (Edward & Kaban, 2020). Assessing the training program's effectiveness requires evaluating what is or is not working for the employees. Managers need methods of assessing what training strategies are contributing to the employees' success in the field. The manager has to understand what is working, and what is not, and timely implementation of new strategies to evolve with an ever-changing workforce. Organizations can benefit from focusing the training program on the employees' needs and creating alignment with the organizational goals through training that could be immediately helpful in improving aerospace field engineers' performance.

My study could contribute to positive social change in several essential ways. Effective training contributes to employee retention and helps fulfill the employee's needs (Kalyanamitra et al., 2020). Employees can be more engaged at work and find more meaning and purpose due to effective training. Focusing training on the employee's needs will inherently bring further awareness and opportunities for improving their well-being. Better-trained employees can contribute to the overall long-term success of the organization. The success of the organization contributes to more jobs and opportunities for local community members who are seeking employment. Additionally, successful organizations can participate in social programs that can have direct impacts on the local community and beyond.

Recommendations for Further Research

During the proposal phase of this research, I identified limitations to the study. One of the limitations of my study involved the choice of only a few organizations operating within the aerospace and defense industry located in the United States, which may not be representative of all companies in the aerospace and defense industries. Furthermore, the study findings may not apply to all U.S. or abroad aerospace and defense industry organizations because of the limited geographical scope of the study.

Another limitation of the study was the participant sample size because I interviewed a small number of aerospace and defense industry managers with direct reporting field engineers. The study's final limitation involved using semistructured interviews as my primary data collection method. Bloomberg and Volpe (2019) suggested that not all participants share the same level of cooperation, perception, and

ability to articulate. Many studies have limitations, so the investigators need to be transparent regarding the limitations of their findings.

In this study, I used a pragmatic inquiry approach to explore strategies employed by field engineer managers to assess the effectiveness of their training programs for field engineers. The sample included five field engineer managers from the Midwest region of the United States. Data were collected and validated through Zoom and phone interviews using a semistructured format with open-ended questions. Initial contact with participants was made via email, providing comprehensive information about the study and professionally soliciting their participation.

I carefully considered potential research biases throughout the study. Future research should prioritize a more diverse sample, including participants from additional geographic locations, to enhance the study's generalizability. Given the ease of establishing connections through email and conducting interviews via platforms like Zoom, Skype, or Teams, it is feasible to expand the scope of research. Additionally, replicating this study in different market types and regions within the United States and internationally is recommended. This approach would account for the varied training strategies required by different end-user products and enable the observation of participant body language to build better rapport and trust. Conducting the study over a longer period with a broader range of cases and regions could provide a more comprehensive analysis.

Conclusion

In this study, I investigated the strategies used by aerospace and defense industry managers to assess the effectiveness of training programs for field service engineers. In this research, I found that feedback from various sources, such as peers, customers, and senior engineers, is crucial in continuously adapting and refining training programs. Managers use diverse feedback methods, including quizzes, discussions, teleconferences, site reports, and both formal and informal assessments. This adaptive approach when used by managers ensures that training programs remain relevant and effective in preparing engineers for the evolving demands of their roles. By emphasizing feedback, managers can tailor training to address specific needs, ensuring high performance and ongoing improvement.

Another significant finding is the reliance on OJT) and hands-on learning experiences. Field engineer managers employ strategies such as shadowing experienced engineers, collaborating with subject matter experts, and engaging in real-world problem-solving scenarios. These practical, immersive training methods will assist engineers in applying their learning directly to their work, providing managers with a practical means to assess their effectiveness in real-world contexts. Participants highlighted various aspects of OJT, including initial training periods, continuous hands-on experiences, and scenario-based troubleshooting. This approach underscores the value of practical in-person training, especially given the classified nature of the products supported by field engineers.

Last, I found the importance of performance reviews and evaluating cost-effectiveness needs to be underscored in their importance. Managers commonly use biannual performance reviews and ongoing evaluations to assess engineers' skills, communication abilities, problem-solving capabilities, and overall job performance. Cost-effectiveness is evaluated through metrics such as customer savings, efficiency in troubleshooting, and cost avoidance for customers. These assessments help determine how well training programs prepare engineers to deliver high-quality services cost-effectively. Participants emphasized safety, efficiency, quality assurance, and customer satisfaction as critical factors in these evaluations. The comprehensive feedback-driven approach ensures training programs are effective manhours when aligned with organizational goals, resulting in tangible benefits like maintenance savings, improved customer communications, and increased field repair rates.

References

Ahn, J., & Huang, S. (2020). Types of employee training, organizational identification, and turnover intention: evidence from Korean employees. *Problems and Perspectives in Management*, 18(4), 517–526. https://doi.org/10.21511/ppm.18(4).2020.41

Al-Aali, L., & Ahmed, U. (2021). Addressing the issue of meaningful work during COVID-19 through LDW model: An empirical study. *Ilkogretim Online*, *20*(4), 1791–1799.

Allen, L. M., Hay, M., & Palermo, C. (2022). Evaluation in health professions education-Is measuring outcomes enough? *Medical Education*, *56*(1), 127–136. https://doi.org/10.1111/medu.14654

Alsalamah, A., & Callinan, C. (2021). Adaptation of Kirkpatrick's four-level model of training criteria to evaluate training programmes for head teachers. *Education Sciences, 11*(116), 116. https://doi.org/10.3390/educsci11030116

Alvi, A. K., Kayani, U. S., & Mir, G. M. (2020). Relationship of employee training, employee empowerment, teamwork with job satisfaction. *Journal of Arts & Social Sciences*, *7*(2), 185–198. https://doi.org/10.46662/jass-vol7-iss2-2020(185-198)

Anlesinya, A. (2018). Organizational barriers to employee training and learning: evidence from the automotive industry. *Development and Learning in Organizations*, *32*(3), 8-10. https://doi.org/10.1108/dlo-03-2017-0022

Anthony, P. J., & Weide, J. (2015). Motivation and career-development training programs: Use of regulatory focus to determine program effectiveness. *Higher Learning Research Communications*, *5*, 24. https://doi.org/10.18870/hlrc.v5i2.214

Avidov-Ungar, O., & Herscu, O. (2020). Formal professional development as perceived by teachers in different professional life periods. *Professional Development in Education*, *46*(5), 833–844. https://doi.org/10.1080/19415257.2019.1647271

Bahadoran, H., Babadadi, A., & Haghighi, S. (2011). An empirical study on evaluating training programs: A case study of university employees. *Management Science Letters*, *1*(3), 247–252. https://doi.org/10.5267/j.msl.2010.04.005

Barnette, J., & Park, J. (2021). Skill overshooting in job training with the trade adjustment assistance program. *Economic Development Quarterly*, *35*(2), 141–156. https://doi.org/10.1177/0891242420984843

Bell, E., Bryman, A., & Harley, B. (2022). *Business research methods*. Oxford University Press.

Berckman, L., Hardin, K., Sloane, M., & Dronamraju, T. (2023, November 28). *2023 aerospace and defense industry outlook.* Deloitte. https://www2.deloitte.com/us/en/pages/manufacturing/articles/aerospace-and-defense-industry-outlook.html

Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. InA. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioural sciences* (2nd ed.; pp. 95–118). SAGE.

Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking. *Qualitative Health Research*, *26*(13), 1802–1811. https://doi.org/10.1177/1049732316654870

Bjerge, B., Torm, N., & Trifkovic, N. (2021). Can training close the gender wage gap? Evidence from Vietnamese SMEs. *Oxford Development Studies*, *49*(2), 119–132. https://doi.org/10.1080/13600818.2021.1883572

Bloomberg, D. L., & Volpe, M. (2019). *Completing your qualitative dissertation: A road map from beginning to end.* SAGE Publishing

Boțoc, C., Vătavu, S., & Gheorghe, L. (2019). Is continuous training relevant to employees and sustainable development? Evidence from Timis County. *Ovidius University Annals: Economic Sciences Series*, *XIX*(1), 365–370.

Brinkerhoff, R. O. (2003). *The success case method: Find out quickly what's working and what's not.* Berrett-Koehler.

Brinkerhoff, R. O. (2005). The success case method: A strategic evaluation approach to increasing the value and effect of training. *Advances in Developing Human Resources, 7*(1), 86–101. https://doi.org/10.1177/1523422304272172

Brooks, C., Fan, X., & McMullen, J. M. (2021). Are you Zoomed in? Considerations for successfully navigating virtual professional development. *JOPERD: The Journal of Physical Education, Recreation & Dance*, *92*(1), 55–56. https://doi.org/10.1080/07303084.2021.1844554

Buraimoh, E., Ajoodha, R., & Padayachee, K. (2021). *Application of machine learning techniques to the prediction of student success.* 2021 IEEE International IOT,

Electronics and Mechatronics Conference (IEMTRONICS), 1–6. https://doi.org/10.1109/iemtronics52119.2021.9422545

Buriak, S. E., & Ayars, C. L. (2019). Evaluation of a drug and alcohol safety education program in aviation using interrupted time series and the Kirkpatrick framework. *Evaluation and Program Planning*, *73*, 62–70. https://doi.org/10.1016/j.evalprogplan.2018.11.003

Byrd, R. (2020). Qualitative research methods [Virtual class, Memphis]. *Recuperado Em*, *17*.

Chin, J., DeHaven, A., Heycke, T., Holcombe, A., Mellor, D., Pickett, J., Steltenpohl, C., Vazire, S., & Zeiler, K. (2021). Improving the credibility of empirical legal research: Practical suggestions for researchers, journals and law schools. *Law, Technology and Humans*, *3*(2), 107–132. https://doi.org/10.5204/lthj.1875

Ciurea, J., & Pau, C. (2020). Wages and training - SMEs employees' components of motivation. *Robotica & Management*, *25*(2), 37–41.

Custers, M. (2012). Rethinking existing HR technologies for new gains in employee engagement and benefits. *Compensation & Benefits Review*, *44*(6), 332–335. https://doi.org/10.1177/0886368713476929

Cypress, B. (2018). Qualitative research methods: A phenomenological focus. *Dimensions of Critical Care Nursing*, *37*(6), 302–309. https://doi.org/10.1097/DCC.0000000000000322

Das, M. K. (2022). An introduction to qualitative and mixed methods study designs in health research. *Indian Pediatrics*, *59*(5), 416–423.

Deepa, S. R., & Rajasekar, D. (2021). A study on employees training and development with reference to information technology companies in Chennai. *Ilkogretim Online, 20*(4), 1865–1871.

Department of Health, Education, and Welfare. (1979). *The Belmont Report.* https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf

Dietrich, J., Greiner, F., Weber-Liel, D., Berweger, B., Kämpfe, N., & Kracke, B. (2021). Does an individualized learning design improve university student online learning? A randomized field experiments. *Computers in Human Behavior*, *122*. https://doi.org/10.1016/j.chb.2021.106819

Dobakhti, L. (2020). The process of enhancing validity, reliability, and ethics in research. *Iranian Journal of Applied Language Studies*, *12*(2), 59–88. https://doi.org/10.22111/ijals.2020.5978

Edward, Y. R., & Kaban, L. M. (2020). The effect of transformational leadership and competence on employee performance with job satisfaction as intervening variable. *Academic Journal of Economic Studies*, *6*(2), 62. https://doi.org/10.21070/acopen.5.2021.1960

Ennever, F. K., Nabi, S., Bass, P. A., Huang, L. O., & Fogler, E. C. (2019). Developing language to communicate privacy and confidentiality protections to potential clinical trial subjects: Meshing requirements under six applicable regulations, laws, guidelines and funding policies. *Journal of Research Administration*, *50*(1), 20–44.

Esteban-Lloret, N. N., Aragón-Sánchez, A., & Carrasco-Hernández, A. (2018). Determinants of employee training: impact on organizational legitimacy and organizational performance. *International Journal of Human Resource Management, 29*(6), 1208–1229. https://doi.org/10.1080/09585192.2016.1256337

Farquhar, J., Michels, N., & Robson, J. (2020). Triangulation in industrial qualitative case study research: Widening the scope. *Industrial Marketing Management, 87*, 160-170. https://doi.org/10.1016/j.indmarman.2020.02.001

Feeko, P., & Fuller, S. (2021, November 8). *2021 A&D Workforce Study*. EY. https://www.ey.com/en_us/aerospace-defense/2021-a-d-workforce-study

Fofana, F., Bazeley, P., & Regnault, A. (2020). Applying a mixed methods design to test saturation for qualitative data in health outcomes research. *PLoS ONE*, *15*(6), e0234898. https://doi.org/10.1371/journal.pone.0234898

Fusch, P. I. P. D., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *Walden Faculty and Staff Publications*.

Ghasemi, R., Akbarilakeh, M., Fattahi, A., & Lotfali, E. (2020). Evaluation of the effectiveness of academic writing workshops in medical students using the Kirkpatrick Model. *Novelty in Biomedicine*, *8(4),* 182–195.

Ghauri, P., Grønhaug, K., & Strange, R. (2020). *Research methods in business studies*. Cambridge University Press. https://doi.org/10.1017/9781108762427.004

Gossett, K., Padgett, J., Pierce, S., & Scott, J. (2019). Complex adaptive systems theory and the Tau conceptual framework for understanding healthcare and human services in the United States. *Journal of Academic Perspectives,* 2019(2).

Gultom, C., Madhakomala, R., & Hamidah. (2020). Evaluation of the effectiveness of the initial flight attendant training program in Garuda Indonesia training center. *Journal of Business and Behavioural Entrepreneurship*, *4(2),* 47–65. https://doi.org/10.21009/JOBBE.004.2.05

Gunawan, J., Marzilli, C., & Aungsuroch, Y. (2022). Online 'chatting' interviews: An acceptable method for qualitative data collection. *Belitung Nursing Journal*, *8(4).* https://doi.org/10.33546/bnj.2252

Hajjar, S. T., & Alkhanaizi, M. S. (2018). Exploring the factors that affect employee training effectiveness: A case study in Bahrain. *SAGE Open*, *8(2).* https://doi.org/10.1177/2158244018783033

Hernandez, G., Mantilla Duarte, C. A., Rueda Galvis, J. F., & Uribe Bermudez, J. M. (2020). Impact of employee training and strategic alliances on business innovation and survival. *Utopia y Praxis Latinoamericana*, *25*, 77–94.

Hur, H., & Hawley, J. (2020). Turnover behavior among US government employees. *International Review of Administrative Sciences*, *86(4),* 641–656. https://doi.org/10.1177/0020852318823913

Iivari, N. (2018). Using member checking in interpretive research practice: A hermeneutic analysis of informants' interpretation of their organizational realities. *Information Technology & People*, *31(1),* 111–133. https://doi.org/10.1108/ITP-07-2016-0168

Ivica, M., & Mihailo, C. (2023). The importance of training and employee development for organizational efficiency. *Ekonomija: Teorija i Praksa*, *26(2),* 24–43.

Ji, C., & Sun, W. (2022). A review on data-driven process monitoring methods: Characterization and mining of industrial data. *Processes, 10(2),* 335. https://doi.org/10.3390/pr10020335

Jones, C., Fraser, J., & Randall, S. (2018). The evaluation of a home-based paediatric nursing service: Concept and design development using the Kirkpatrick model. *Journal of Research in Nursing, 23(6),* 492–501. https://doi.org/10.1177/1744987118786019

Ju, B., & Li, J. (2020). Exploring the impact of training, job tenure, and education-job and skills-job matches on employee turnover intention. *European Journal of Training & Development, 44(3/4),* 214–231. https://doi.org/10.1108/ejtd-05-2018-0045

Kalyanamitra, P., Saengchai, S., & Jermsittiparsert, K. (2020). Impact of training facilities, benefits and compensation, and performance appraisal on the employees' retention: A mediating effect of employees' job satisfaction. *Systematic Reviews in Pharmacy, 11(3),* 166–175.

Kaźmierczyk, J., Romashkina, G. F., & Wyrwa, J. (2020). The value of training and loyalty. A comparative analysis. *Entrepreneurship and Sustainability Issues, 8(1),* 762-779. https://doi.org/10.9770/jesi.2020.8.1(51)

Kelly, L. M., & Cordeiro, M. (2020). Three principles of pragmatism for research on organizational processes. *Methodological Innovations, 13.* https://doi.org/10.1177/2059799120937242

Khan, T., & MacEachen, E. (2022). An alternative method of interviewing: Critical reflections on videoconference interviews for qualitative data collection. *International Journal of Qualitative Methods*, *21*. https://doi.org/10.1177/16094069221090063

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs*. Berrett-Koehler Publishers.

Koumaditis, K., Chinello, F., Mitkidis, P., & Karg, S. (2020). Effectiveness of virtual versus physical training: The case of assembly tasks, trainer's verbal Assistance, and task complexity. *IEEE Computer Graphics and Applications, 40(5),* 41–56. https://doi.org/10.1109/mcg.2020.3006330

Krawczyk, P., Maslov, I., Topolewski, M., Pallot, M., Lehtosaari, H., & Huotari, J. (2019). Threats to reliability and validity of mixed methods research in user experience. *2019 IEEE International Conference*, 1–7. https://doi.org/10.1109/ICE.2019.8792676

Kutlay, K., & Safakli, O. V. (2019). The impact of training and development programs on the banking personnel. *Revista de Cercetare Si Interventie Sociala*, *65*, 292–305. https://doi.org/10.33788/rcis.65.18

Lee, H., & Song, Y. (2021). Kirkpatrick Model evaluation of accelerated second-degree nursing programs: A scoping review. *Journal of Nursing Education*, *60(5)*, 265–271. https://doi.org/10.3928/01484834-20210420-05

Legesse, S., Alemu, T., Tassew, M., Shiferaw, B., Amare, S., Tadesse, Z., & Maru, M. (2020). Evaluation of in-service training program of laboratory professionals in

Amhara Public Health Institute Dessie Branch, northeast Ethiopia: A concurrent mixed-method study. *PLoS ONE*, *15(12),* 1–11. https://doi.org/10.1371/journal.pone.0243141

Luba, T., & Jana, C. (2020). Leading and education of talented employees as one of the major impacts of globalization on human resources management. *SHS Web of Conferences*, *74*, 04029. https://doi.org/10.1051/shsconf/20207404029

Lukowski, F., Baum, M., & Mohr, S. (2021). Technology, tasks and training – Evidence on the provision of employer-provided training in times of technological change in Germany. *Studies in Continuing Education*, *43(2),* 174–195. https://doi.org/10.1080/0158037x.2020.1759525

Marshall, C., & Rossman, G. B. (2016). *Designing qualitative research.* SAGE publishing.

Matović, N., & Ovesni, K. (2023). Interaction of quantitative and qualitative methodology in mixed methods research: Integration and/or combination. *International Journal of Social Research Methodology: Theory & Practice*, 26(1), 51–65. https://doi.org/10.1080/13645579.2021.1964857

Mattimoe, R., Hayden, M. T., Murphy, B., & Ballantine, J. (2021). Approaches to analysis of qualitative research data: a reflection on the manual and technological approaches. *Accounting, Finance, & Governance Review*, *27(1).* https://doi.org/10.52399/001c.22026

Mazerolle, S. M., & Eason, C. M. (2018). The organizational climate in collegiate athletics: An athletic trainer's perspective. *Journal of athletic training, 53(1),* 88-97. https://doi.org/10.4085/1062-6050-52.12.24

Mehale, K. D., Govender, C. M., & Mabaso, C. M. (2021). Maximising training evaluation for employee performance improvement. *South African Journal of Human Resource Management, 19(0),* e1–e11. https://doi.org/10.4102/sajhrm.v19i0.1473

Mehany, H., Killingsworth, J., & Shah, S. (2021). An evaluation of training delivery methods' effects on construction safety training and knowledge retention - A foundational study. *International Journal of Construction Education & Research, 17(1),* 18–36. https://doi.org/10.1080/15578771.2019.1640319

Meyer, C. (2022). The phenomenological foundations of ethnomethodology's conceptions of sequentially and indexicality. Harold Garfinkel's references to Aron Gurwitsch's "field of consciousness." *Online Journal of Verbal Interaction, 23,* 111-144. http://www.gespraechsforschung-online.de/fileadmin/dateien/heft2022/si-meyer.pdf

Mishra, S., & Dey, A. K. (2022). Understanding and identifying 'themes' in qualitative case study research. *South Asian Journal of Business and Management Cases, 11(3),* 187–192. https://doi.org/10.1177/22779779221134659

Mohamad, A., Yan, F., Aziz, N., & Norhisham, S. (2022). Inductive-deductive reasoning in qualitative analysis using ATLAS.ti: Trending cybersecurity twitter data

analytics. *2022 3rd International Conference for Emerging Technology (INCET),* 1–5. https://doi.org/10.1109/INCET54531.2022.9824944

Moon, H., Ryu, D., & Jeon, D. (2019). The evaluation of learning transfer of industry skills council (ISC) training programs using success case method: Reinforcing role and function of ISC. *European Journal of Training and Development, 43(5/6),* 570–591. https://doi.org/10.1108/EJTD-11-2018-0111

Moon, M. D. (2019). Triangulation: A method to increase validity, reliability, and legitimation in clinical research. *Journal of Emergency Nursing, 45(1),* 103–105. https://doi.org/10.1016/j.jen.2018.11.004

Nadeak, B., & Naibaho, L. (2020). Motivation and HRM factors relation to employee loyalty. *Polish Journal of Management Studies, 22(2),* 261–276. https://doi.org/10.17512/pjms.2020.22.2.18

Nagata, C., Tsutsumi, M., Kiyonaga, A., & Nogaki, H. (2021). Evaluation of a training program for community-based end-of-life care of older people toward aging in place: A mixed methods study. *Nurse Education in Practice, 54.* https://doi.org/10.1016/j.nepr.2021.103091

Nagem, S. (2021). Career development in a virtual world: Amid upheaval on numerous fronts, organizations shouldn't neglect the development of their employees. *Journal of Accountancy,* 1–4.

Nelissen, J., Forrier, A., & Verbruggen, M. (2017). Employee development and voluntary turnover: Testing the employability paradox. *Human Resource Management Journal, 27(1),* 152–168. https://doi.org/10.1111/1748-8583.12136

Nelson, R., Marone, V., Garcia, S. A., Yuen, T. T., Bonner, E. P., & Browning, J. (2021). Transformative practices in engineering education: The embedded expert model. *IEEE Transactions on Education, 64(2),* 187–194. https://doi.org/10.1109/te.2020.3026906

Noe, R. A., Tews, M. J., & Michel, J. W. (2017). Managers' informal learning: A trait activation theory perspective. *International Journal of Training & Development, 21(1),* 1–17. https://doi.org/10.1111/ijtd.12092

Northrop Grumman. (2024). *Field engineer or principal field engineer*. Northrop Grumman Careers. https://www.northropgrumman.com/jobs/Engineering/General/United-States-of-America/California/San-Diego/R10158531/field-engineer-or-principal-field-engineer

Opsahl, A. G., Embree, J. L., & Howard, M. S. (2021). Innovative opportunities for civility: Professional development in the time of COVID-19. *The Journal of Continuing Education in Nursing, 52(1),* 11-12. https://doi.org/10.3928/00220124-20201215-05

Pagnoccolo, J., & Bertone, S. (2021). The apprentice experience: The role of interpersonal attributes and people-related generic skills. *Education + Training, 63(2),* 313–327. https://doi.org/10.1108/et-05-2020-0116

Pannucci, C. J., & Wilkins, E. G. (2010). Identifying and avoiding bias in research. *Plastic and Reconstructive Surgery, 126*(2), 619–625. https://doi.org/10.1097/PRS.0b013e3181de24bc

Pantic-Dragisic, S., & Borg, E. (2018). Creating the mobile engineer: A study of a training program for engineering consultants. *European Journal of Training and Development, 42(7),* 381-399. https://doi.org/10.1108/ejtd-12-2017-0117

Paulus, T. M., Pope, E. M., Woolf, N., & Silver, C. (2019). It will be very helpful once I understand ATLAS.ti: Teaching ATLAS.ti using the five-level QDA method. *International Journal of Social Research Methodology, 22(1),* 1–18. https://doi.org/10.1080/13645579.2018.1510662

Peterson, B. D., Song, Y. H., & Udell, C. (2019). Making performance real: Six paths to training that matters. *Journal of Comparative International Management, 22(1),* 61–80. https://doi.org/10.7202/1075638ar

Phillips, J. J. (1996). How much is the training worth? *Training & Development, 50(4),* 20.

Phillips, P. P., & Phillips, J. J. (2019). *ROI basics*. ATD Press.

Philpot, D. R., & Aguilar, M. (2021). Post-leave (return to work) training needs and human resource development. *Advances in Developing Human Resources, 23(2),* 171–184. https://doi.org/10.1177/1523422320982935

Rawashdeh, A. M., & Tamimi, S. A. (2019). The impact of employee perceptions of training on organizational commitment and turnover intention: An empirical study of nurses in Jordanian hospitals. *European Journal of Training and Development, 44(2/3),* 191-207. https://doi.org/10.1108/ejtd-07-2019-0112

Raytheon Technologies. (2024). *Field engineer*. Raytheon Technologies Careers. https://careers.rtx.com/global/en/job/01685192/Field-Engineer

Rogers, A., & Burke, C. (2021). Outside the box: An experienced registered nurse orientation redesign. *Journal for Nurses in Professional Development, 37(3),* 147–150. https://doi.org/10.1097/nnd.0000000000000726

Sahni, J. (2020). Managerial training effectiveness: An assessment through Kirkpatrick framework. *TEM Journal, 9(3),* 1227–1233. https://doi.org/10.18421/tem93-51

Sao Joao, E. A., Spowart, J., & Taylor, A. (2019). Employee training contributes to service quality and therefore sustainability. *African Journal of Hospitality, Tourism and Leisure, 8(2).*

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education Limited.

Shinohara, M., Nakamura, T., Kunikata, N., Okudera, H., & Kuroda, Y. (2020). A half-day stroke workshop based on the Kirkpatrick model to improve new clinical staff behavior. *Journal of Advances in Medical Education and Professionalism, 8(1),* 10–17.

Skarbek, D. (2020). Qualitative research methods for institutional analysis. *Journal of Institutional Economics, 16(4),* 409-422. https://doi.org/10.1017/s174413741900078x

Södersved Källestedt, M., Asp, M., Letterstål, A., & Widarsson, M. (2020). Perceptions of managers regarding prerequisites for the development of professional competence of newly graduated nurses: A qualitative study. *Journal of Clinical Nursing, 29(23/24),* 4784–4794. https://doi.org/10.1111/jocn.15522

Spreen, T. L., Afonso, W., & Gerrish, E. (2020). Can employee training influence local fiscal outcomes? *American Review of Public Administration*, *50(4/5),* 401–414. https://doi.org/10.1177/0275074020911717

Steil, A., de Cuffa, D., Iwaya, G., & Pacheco, R. (2020). Perceived learning opportunities, behavioral intentions and employee retention in technology organizations. Journal of Workplace Learning, *32(2),* 147–159. https://doi.org/10.1108/jwl-04-2019-0045

Strijker, D., Bosworth, G., & Bouter, G. (2020). Research methods in rural studies: Qualitative, quantitative and mixed methods. *Journal of Rural Studies, 78*, 262-270. https://doi.org/10.1016/j.jrurstud.2020.06.007

Subramanian, D., & Zimmermann, B. (2020). Voice in French corporate training: A critical issue in developing employee capability. *Economic & Industrial Democracy*, *41(2),* 296–322. https://doi.org/10.1177/0143831x17704311

Tarhan, A., & Yilmaz, S. G. (2014). Systematic analyses and comparison of development performance and product quality of incremental process and agile process. *Information and Software Technology*, *56(5),* 477–494. https://doi.org/10.1016/j.infsof.2013.12.002

Thurairajah, K. (2019). Uncloaking the researcher: Boundaries in qualitative research. *Qualitative Sociology Review*, *1*, 132-147. https://doi.org/10.18778/1733-8077.15.1.06

Training for the future: Investing in employee development is a must for companies today. (2020). Journal of Property Management, *85(4),* 42–43.

Urbancová, H., Vrabcová, P., Hudáková, M., Petrů, G. J., & Bratianu, C. (2021). Effective training evaluation: The role of factors influencing the evaluation of effectiveness of employee training and development. *Sustainability, 13(5),* 2721. https://doi.org/10.3390/su13052721

U.S. Department of Labor. (2022). *Occupational Requirements Survey summary*. https://www.bls.gov/news.release/ors.nr0.htm#BLStable_2022_11_15_14_29_footnotes

Valencia, A. (2022). Principles, scope, and limitations of the methodological triangulation. *Investigation Into Education Enfermeria, 40(2),* e03.

van Assen, M. F. (2021). Training, employee involvement and continuous improvement – The moderating effect of a common improvement method. *Production Planning & Control, 32(2),* 132–144. https://doi.org/10.1080/09537287.2020.1716405

Varpio, L., Gruppen, L., Hu, W., O'Brien, B., Ten Cate, O., Humphrey-Murto, S., & Durning, S. J. (2017). Working definitions of the roles and an organizational structure in health professions education scholarship: Initiating an international conversation. *Academic Medicine, 92(2),* 205-208. https://doi.org/10.1097/acm.0000000000001367

Waqanimaravu, M., & Arasanmi, C. N. (2020). Employee training and service quality in the hospitality industry. *Journal of Foodservice Business Research, 23(3),* 216–227. https://doi.org/10.1080/15378020.2020.1724850

Wu, C., Wu, J., Guo, C., Gao, S., Chen, M., & Li, D. (2021). Exploration on the development of engineering practice teaching ability for young teachers in

professional education. 2021 2nd Information Communication Technologies Conference (ICTC), 333–337. https://doi.org/10.1109/ictc51749.2021.9441640

Yahya, K. K., & Tan, F. (2017). Enhancing career commitment: The influence of human resource management practices. *International Journal of Business & Society*, *16(2),* 237–246. https://doi.org/10.33736/ijbs.566.2015

Yeong, M. L., Ismail, R., Ismail, N. H., & Hamzah, M. I. (2018). Interview protocol refinement: Fine-tuning qualitative research interview questions for multi-racial populations in Malaysia. *The Qualitative Report, 23(11),* 2700-2713. https://doi.org/10.46743/2160-3715/2018.3412

Yin, R. K. (2017). *Case study research: Design and methods* (6th ed.). SAGE Publications.

Yirci, R., Durna, Ş., & Kocabaş, İ. (2021). The current status of in-service training for teachers and expectations: Do they match? *International Online Journal of Education & Teaching*, *8(2),* 762–777. https://doi.org/10.1080/19415257.2014.994136

Yuk, A. L., Malik, A., Rosenberger, Philip J., I., II, & Sharma, P. (2020). Demystifying the differences in the impact of training and incentives on employee performance: Mediating roles of trust and knowledge sharing. *Journal of Knowledge Management, 24(8),* 1987-2006. https://doi.org/10.1108/jkm-04-2020-0309

Zweni, N. (2023). Employee participation in training and development interventions at a selected municipality. *SA Journal of Human Resource Management, 21(0),* e1–e10. https://doi.org/10.4102/sajhrm.v21i0.2258

Appendix: Interview Protocol

Primary Business Research Phenomenon Under Study and Overarching Research Question

The topic for my research project is: What strategies do aerospace and defense industry managers use to evaluate their training program's effectiveness for field service engineers?

Primary Research Goal to Achieve from This Interview

The purpose of this interview is to explore strategies industry managers use to evaluate their training program's effectiveness for field service engineers.

.

Introduction

Interview Protocol	
What you will do	What you will say—script
Introduce the interview and set the stage—often over a meal or coffee	Script 1. Thank you for participating in this study. Your participation in this project on strategies used to evaluate the training program's effectiveness for field service engineers is important. It will help better understand how to support training programs, which are indispensable in the aerospace and defense industry. 2. I will be interviewing you and several other field engineer managers. So, I hope to have adequate information for this research study. Before we get into the meat of things, I would like to go over just a few things with you.

	3. First, you should know that your participation is totally voluntary. So, if I ask a question that you don't want to answer, or if you need to stop the interview at any time, just let me know. 4. I will be audiotaping the interview and taking some notes. Later, I will provide you with a transcript of the audiotape along with my notes so you can look at them, review them, and make any corrections that you see need to be made, making sure that we captured what you needed to say accurately. 5. This study may be shared with my committee, there will be no mention of your names. Even if I use direct quotes, I will use pseudonyms. It might also be used in conferences and professional meetings. 6. I will keep your shared information strictly confidential and safely stored for five years after my study's completion date and then destroy it. 7. Do you have any questions? 8. As you know, we have set about 60 - 90 minutes for this interview. Does that seem to be ok for you? We won't go beyond that time unless you wish to do so. 9. Ready to go? 10. Let's get started then!
• Watch for nonverbal cues. • Paraphrase as needed. • Ask follow-up probing questions to get more in-depth.	Example: 1. What strategies do you use to evaluate the effectiveness of the training program for your field engineers? 2. What is your process to update or improve the training program? 3. What are your follow-up/on-the-job training strategies? 4. What strategies do you use to evaluate the field engineers' effectiveness after the training program's conclusion? 5. How do you determine if field

	engineers need additional training? 6. How is the cost-effectiveness of the training evaluated? 7. What else can you tell me about the strategies your organization uses to assess the effectiveness of your organization's training program for field engineers?
Wrap up interview thanking participant	Script 1. Thank you very much for your time, The information you provided is valuable and will help me successfully complete my study.
Schedule follow-up member checking interview	Script 2. I would like to schedule a follow-up interview with you to review and discuss the audiotape transcript and my notes to ensure I interpreted your responses accurately. Would xx date and xx time be okay for you? 3. I will provide you with the transcript and notes at least three days in advance to allow you sufficient time to review. 4. Again, thank you very much for participating in my research study.

Follow–up Member Checking Interview	
Introduce follow-up interview and set the stage	Script 1. Thank you very much for your time. The information you previously provided is valuable and will help me successfully complete my study. 2. I would like to review and discuss the audiotape transcript and my notes to ensure I interpreted your responses accurately and get your feedback.

Share a copy of the succinct synthesis for each individual question. Bring in probing questions related to other information that you may have found—note the information must be related so that you are probing and adhering to the IRB approval. Walk through each question, read the interpretation, and ask: Did I miss anything? Or,	Script XXXXXXXXXXXXXXXXXXXX
	1. Question and succinct synthesis of the interpretation—perhaps one paragraph or as needed
	2. Question and succinct synthesis of the interpretation—perhaps one paragraph or as needed
	3. Question and succinct synthesis of the interpretation—perhaps one paragraph or as needed
	4. Question and succinct synthesis of the interpretation—perhaps one paragraph or as needed
	5. Question and succinct synthesis of the interpretation—perhaps one paragraph or as needed

What would you like to add?	