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## Training Effectiveness and Improvement Strategies for Motor Vehicle Safety and Technical Inspectors: Evidence from Two Vocational Institutions in Fujian, China

Xiaomei Yu, Ramon George Atento, PhD

### Abstract

This study evaluated the effectiveness of training programs for motor vehicle safety and technical inspectors at Quanzhou Vocational and Technical University and Zhangzhou Institute of Science and Technology in Fujian, China. It examined how training content relevance, adequacy of training resources and support, institutional context, and respondent characteristics relate to perceived training satisfaction and effectiveness. A mixed-methods design was used, combining survey data from 384 respondents with qualitative interview data. Quantitative data were analyzed using descriptive statistics, regression analysis, and structural equation modeling, while qualitative responses were examined through thematic analysis. The findings showed that the relevance and applicability of training content and the adequacy of training resources and support were significant predictors of training satisfaction and effectiveness. Institutional context also mattered, with respondents from Quanzhou Vocational and Technical University reporting slightly higher satisfaction, possibly reflecting its longer history and stronger industry connections in motor vehicle safety training. Demographic variables were not consistently significant predictors in the regression results. Qualitative findings reinforced the quantitative results, emphasizing the importance of job-relevant content, practical application, adequate resources, trainer professionalism, and institutional support. The study concludes that effective inspector training requires continuous alignment with job responsibilities, updated technical content, interactive delivery methods, trainer development, and stronger feedback mechanisms. The findings provide practical guidance for vocational institutions seeking to improve technical training quality and regulatory workforce readiness.

**Keywords:** *Training effectiveness; motor vehicle safety inspection; technical inspectors; vocational education; training satisfaction; structural equation modeling*

### 1. Introduction

The rapid expansion and technological transformation of China's automotive sector have intensified the need for competent, ethical, and technically proficient motor vehicle safety and technical inspectors. As motor vehicle ownership continues to increase, the inspection system has become a critical mechanism for ensuring road safety, regulatory compliance, environmental protection, and public trust in vehicle operations. Motor vehicle safety and technical inspection is not merely a procedural activity; it is a regulatory and professional function that depends heavily on the knowledge, judgment, and applied competence of inspection personnel. In this context, the quality of training provided to inspectors directly affects the reliability of inspection outcomes, the consistency of regulatory implementation, and the capacity of inspection institutions to respond to changing technical and legal standards.

Training and development occupy a central position in human resource management because they enable organizations to improve employees' job-related competencies, reduce performance gaps, and adapt to technological

and institutional change. Training is especially important in technical and safety-sensitive fields where errors may have direct public consequences. Prior studies have emphasized that employee training supports the development of job-relevant skills, strengthens organizational productivity, facilitates the transfer of knowledge, and enhances employee adjustment to work demands (Bieńkowska et al., 2022; Dwivedi et al., 2020; Godinho et al., 2023; Greer, 2021; Odai et al., 2021). In addition to its operational value, training may also influence job satisfaction, professional confidence, and employee retention when participants perceive the training as relevant, well-supported, and aligned with their work responsibilities (Flegl et al., 2022; Khaliq et al., 2020).

The training of motor vehicle safety and technical inspectors requires a combination of theoretical instruction, practical skill development, regulatory orientation, equipment familiarity, professional ethics, and continuous updating. Inspectors are expected to understand vehicle inspection standards, operate technical equipment correctly, interpret inspection results fairly, and comply with applicable legal and environmental requirements. These expectations have become more demanding due to technological changes in automotive design, the increased use of digital tools, and the continuing evolution of safety and environmental regulations. Consequently, training programs for inspectors must not only transmit technical knowledge but also ensure that trainees can apply such knowledge in real inspection contexts.

Within Fujian Province, Quanzhou Vocational and Technical University (QVTU) has historically played a significant role in the training of motor vehicle safety and technical inspection personnel. Its long-standing involvement in vocational skills appraisal and motor vehicle inspection training has positioned it as an important institutional case for examining training effectiveness. The university's training program has benefited from industry links, regulatory recognition, practical training facilities, and the involvement of technical experts with automotive inspection experience. These characteristics make QVTU a relevant site for evaluating how institutional history, technical capacity, and regulatory alignment contribute to perceived training effectiveness.

The Zhangzhou Institute of Science and Technology (ZIST) provides a useful comparative case because of its emphasis on vocational education, applied technical training, and responsiveness to regional industry needs. Its inclusion allows the study to move beyond a single-institution evaluation and examine whether training effectiveness differs across institutional contexts. While QVTU represents a more established training environment with deeper historical links to motor vehicle safety inspection, ZIST reflects a more adaptive and innovation-oriented vocational setting. Comparing these institutions provides an opportunity to identify shared strengths, context-specific challenges, and possible areas for inter-institutional learning.

Despite the practical importance of inspector training, systematic evaluation of training effectiveness in this specialized field remains limited. Many training programs are implemented as compliance or capacity-building activities, yet fewer studies examine whether trainees perceive the content as relevant, whether adequate resources and support are provided, and whether training satisfaction and perceived effectiveness are influenced by institutional or demographic factors. Training needs analysis remains a critical starting point in this process because it connects organizational goals, job requirements, and individual learning needs (McGehee & Thayer, 1961; Sahoo & Mishra, 2018). Recent literature also suggests that demand-driven and job-aligned training can improve the precision and usefulness of training interventions, particularly when programs are designed around actual occupational requirements rather than generic instructional content (Aljohani et al., 2022; Gupta et al., 2024).

The present study addresses this gap by evaluating the training effectiveness of motor vehicle safety and technical inspector programs at QVTU and ZIST. It focuses on three central dimensions: the relevance and applicability of training content, the adequacy of training resources and support, and satisfaction with the effectiveness of training. It further examines whether these dimensions predict training satisfaction and effectiveness using regression analysis and structural equation modeling. To complement the quantitative findings, the study also incorporates qualitative interview data to identify themes related to perceived relevance, usefulness, resource adequacy, training effectiveness, and job satisfaction.

This study is significant for several reasons. First, it contributes to the improvement of vocational training systems in a safety-sensitive technical field. Second, it provides evidence that may assist vocational institutions in aligning training content and support systems with actual work demands. Third, it offers practical insights for improving inspector preparedness, trainer development, feedback mechanisms, and inter-institutional collaboration. Finally, by examining two vocational institutions, the study contributes to a more contextualized understanding of how institutional characteristics may shape training outcomes.

This study aimed to evaluate the effectiveness of training programs for motor vehicle safety and technical inspectors at Quanzhou Vocational and Technical University and Zhangzhou Institute of Science and Technology. Specifically, it sought to:

1. describe the profile of the respondents in terms of gender, age, educational level, and number of years in their current position;
2. assess respondents' perceptions of the relevance and applicability of training content, adequacy of training resources and support, and satisfaction and effectiveness of training;
3. determine the significant predictors of satisfaction and effectiveness of training using regression analysis;
4. examine the relationships among demographic factors, training content relevance, resource and support adequacy, institutional context, and training satisfaction and effectiveness using structural equation modeling;
5. identify qualitative themes that explain how trainees perceive training relevance, usefulness, resource adequacy, effectiveness, and training-related job satisfaction; and
6. propose improvement strategies for strengthening training programs for motor vehicle safety and technical inspectors in both institutions.

## 2. Review of Related Literature

### *2.1 Motor Vehicle Safety Inspection, Regulation, and Inspector Competence*

Motor vehicle safety and technical inspection is a regulatory and professional process intended to determine whether vehicles comply with prescribed safety, technical, and environmental standards. In the context of road safety and regulatory enforcement, inspection personnel occupy a critical role because the reliability of inspection results depends not only on equipment and procedures but also on the competence, judgment, and ethical conduct of inspectors. Technical inspection has been described as a systematic examination of vehicles to ensure compliance with safety standards and environmental regulations, usually performed by certified inspectors (Alonso et al., 2021). Similarly, motor vehicle safety inspection involves assessing vehicles against national safety and technical standards to ensure compliance (Gierl et al., 2022).

The literature on vehicle inspection emphasizes the importance of technical standards, regulatory supervision, inspection equipment, and inspector competence. Liu et al. (2022) examined changes in the GB 38900 standard and identified the importance of operational guidelines covering personnel, equipment, procedures, legal compliance, environmental conditions, and measurement systems. This suggests that inspection quality is not dependent on a single factor but on the coordinated performance of human, technical, procedural, and regulatory elements. Ekkachai et al. (2022) also highlighted the role of inspection methods and equipment in the context of vehicle emissions and environmental compliance, showing that inspection systems must adapt to changing regulatory and technological expectations.

Beyond equipment and standards, information technology has become increasingly relevant to inspection governance. Gong et al. (2022) discussed the use of information systems to address unauthorized practices, data inaccuracy, and monitoring problems in inspection activities. While this work is not limited to motor vehicle inspection, it supports the broader point that inspection systems increasingly rely on digital monitoring, traceability, and risk-management tools. In relation to personnel, Rohmani (2024) emphasized that inspector competence is central to the credibility and quality of safety inspection. This is directly relevant to the present study because training

effectiveness among motor vehicle safety and technical inspectors cannot be separated from the regulatory expectations attached to inspection work.

Professional certification is another recurring concern in the literature. Training institutions are expected to align their curricula with industry standards, regulatory requirements, and certification expectations. Certification functions as an assurance mechanism that inspectors possess the minimum technical and professional competence required for safe and reliable inspection work (Kinlaw, 2023). In technical-vocational contexts, such certification processes require training programs that integrate theoretical knowledge, practical application, equipment familiarity, and ethical responsibility. This indicates that the effectiveness of inspector training should be assessed not merely by participant satisfaction but also by the perceived relevance of training content to actual inspection duties.

## *2.2 Training Needs, Content Relevance, and Workforce Development*

Training is commonly understood as a planned learning experience intended to improve employees' knowledge, skills, and abilities for specific job roles (Islam et al., 2024). In technical and safety-sensitive fields, training must be explicitly tied to job requirements because inadequate training may weaken compliance, reduce inspection accuracy, and undermine public trust. Training content refers to the skills, knowledge, and abilities taught during training sessions and should be relevant to the requirements of the job (Falloon, 2020). For motor vehicle safety and technical inspectors, this means that the curriculum must address inspection standards, regulatory knowledge, equipment use, calibration procedures, safety protocols, communication, quality control, professional ethics, and continuous updating.

The literature emphasizes training needs analysis as a foundation for effective training. Training needs analysis identifies the knowledge and skills required for an organization to achieve its operational goals (Judijanto et al., 2023). McGehee and Thayer's three-level analysis provides a classical basis for examining needs at the organizational, task, and individual levels (McGehee & Thayer, 1961). In this framework, organizational analysis identifies strategic and institutional requirements, task analysis identifies job-specific competencies, and individual analysis identifies the learning needs of particular employees or trainees. Sahoo and Mishra (2018) similarly argued that training needs analysis is essential because it clarifies the gap between present competencies and required performance.

Recent literature also supports the value of demand-driven and job-aligned training. Aljohani et al. (2022) examined the gap between university curricula and labor market requirements, emphasizing the importance of aligning educational preparation with actual occupational needs. Gupta et al. (2024) likewise stressed that vocational education and training should be demand-driven, experiential, and connected to job responsibilities and performance objectives. In the context of motor vehicle safety inspection, this means that training should not be generic; it should be structured around the actual tasks, compliance duties, and professional challenges encountered by inspectors. Similar competency-alignment concerns have been raised in health workforce planning, where training systems are expected to address not only workforce supply but also readiness gaps in language, digital documentation, regulatory adaptation, and role-specific competencies (Atento et al., 2025). In professional education more broadly, curriculum-practice alignment has been treated as a systems-level leadership concern because training quality, institutional resources, licensure expectations, and workforce readiness interact rather than operate as isolated issues (Bermido et al., 2025).

Training relevance is also associated with satisfaction and perceived usefulness. When employees perceive training as directly applicable to their work, they are more likely to value the program and transfer learning into practice. This is consistent with the study's concern with relevance and applicability of training content as one of the major predictors of satisfaction and effectiveness. Prior studies suggest that effective training supports job competence, organizational productivity, and the transfer of knowledge to work settings (Bieńkowska et al., 2022; Dwivedi et al., 2020; Odai et al., 2021). In this sense, content relevance is not simply a curriculum-design issue; it is a strategic condition for workforce development and professional performance.

## *2.3 Training Resources, Support Systems, and Technology-Enhanced Delivery*

Training effectiveness depends not only on content but also on the adequacy of resources, learning support, training facilities, instructional materials, and delivery methods. Training resources include manuals, slides, digital

resources, equipment, practical facilities, technical support, expert inputs, and supplementary materials that help trainees understand and apply what they learn. Trainer performance also matters because trainers are responsible for delivering content, engaging trainees, clarifying technical concepts, and supporting the learning process (Kirkpatrick & Kirkpatrick, 2016). In highly technical areas such as motor vehicle inspection, trainers must possess both subject-matter expertise and the instructional capability to connect theory with workplace application.

The literature on training and professional development suggests that well-supported learning environments can improve training outcomes. Bécue et al. (2021) linked training effectiveness to program aspects such as content and environment, indicating that effective training requires attention to the setting in which learning occurs. Bernardino and Curado (2020) also emphasized the influence of course design on training outcomes, suggesting that evaluation should consider not only whether trainees liked the training but also whether the program structure supported learning and transfer. Similarly, Islam et al. (2020) highlighted the role of skill development in training effectiveness, which implies that training resources should be practical enough to support the development of applicable competencies.

Technology-enhanced training has become increasingly important in vocational and technical education. Chiang et al. (2022) found that augmented reality and related immersive technologies can enhance engagement and skill acquisition in vocational training. This is relevant to motor vehicle inspection because trainees may benefit from simulations, virtual diagnostic environments, and digital tools that allow them to practice decision-making without the risks associated with real-world errors. Xinfu et al. (2023) also discussed digital teaching and learning in relation to technological and environmental goals, reinforcing the need for training systems that adapt to contemporary technological expectations. In adjacent educational settings, AI-enabled and adaptive learning tools have been perceived as useful for engagement, content relevance, and learning analytics, although their instructional value remains conditioned by access, cost, privacy, bias, and support constraints (Rao et al., 2025).

Technology adoption, however, depends on perceived usefulness and ease of use. The Technology Acceptance Model proposes that individuals are more likely to adopt digital tools when they perceive them as useful and easy to use (Davis, 1989; Venkatesh & Davis, 2000). Applied to inspector training, this means that digital tools should not be introduced merely for modernization; they must clearly improve learning, practice, assessment, feedback, or performance. Adult Learning Theory also supports this point because adult trainees tend to value learning experiences that are practical, experience-based, and connected to immediate work needs (Knowles, 1970; Knowles et al., 2014). Thus, resource adequacy and support should be evaluated not only by availability but by their perceived contribution to job-relevant learning. Related evidence from higher education e-learning further suggests that digitalization becomes educationally meaningful when linked to curriculum audit, faculty development, and institutional strategy rather than treated only as instructional continuity infrastructure (Atento, 2025).

#### *2.4 Models for Evaluating Training Effectiveness*

Training effectiveness refers to the extent to which training programs achieve their intended outcomes by improving participants' knowledge, skills, attitudes, and performance in relation to specific job roles (Kirkpatrick & Kirkpatrick, 2016). The literature on training evaluation offers several models for assessing these outcomes. Kirkpatrick's four-level model remains one of the most widely used frameworks, evaluating training through reaction, learning, behavior, and results (Kirkpatrick, 1959; Kirkpatrick & Kirkpatrick, 2006). Its relevance to this study lies in its recognition that participant satisfaction alone is insufficient; effective training should also lead to learning, behavioral application, and institutional or organizational outcomes. Comparable knowledge-to-practice gaps have been documented in community health education, where awareness showed weak associations with preventive practice, suggesting that training evaluation should examine enabling conditions and behavioral transfer rather than knowledge acquisition alone (Temporada et al., 2025).

Several models extend or complement Kirkpatrick's framework. Hamblin's five-level model expanded the evaluation of training by adding attention to organizational goals and broader organizational effects (Hamblin, 1974). Kaufman's model further widened the evaluation scope by incorporating social benefits, suggesting that training outcomes may extend beyond the organization to clients, communities, and society (Kaufman & Keller, 1994).

Phillips' ROI model introduced a financial dimension, requiring training evaluation to consider costs, benefits, and economic returns (Phillips, 1996). While ROI analysis may not be the central concern of all vocational institutions, it remains relevant when training programs require substantial institutional investment.

Process-oriented models also contribute to the evaluation of training effectiveness. The CIPP model evaluates context, input, process, and product, thereby extending evaluation beyond post-training outcomes (Stufflebeam, 1967). This model is relevant to vocational training because it allows institutions to examine whether training needs were correctly identified, whether resources and program designs were adequate, whether implementation was effective, and whether training achieved the desired outcomes. The CIRO model similarly evaluates context, input, reaction, and output, emphasizing the need to assess training across different stages rather than only after completion (Warr et al., 1970).

Contemporary research also emphasizes the need for flexible, multidimensional, and mixed-method evaluation approaches. Kakkar et al. (2020), Yin et al. (2023), and Urbancová et al. (2021) stressed the dynamic nature of training evaluation and the importance of aligning evaluation systems with organizational change and sector-specific demands. Iqbal et al. (2021) compared training evaluation models and highlighted the importance of selecting models appropriate to the educational or institutional context. In addition, Lantu et al. (2021) advocated combining qualitative and quantitative approaches for a more comprehensive assessment. These perspectives support the present study's use of descriptive statistics, regression analysis, structural equation modeling, and thematic analysis to evaluate training satisfaction and effectiveness.

## *2.5 Synthesis and Literature Gaps*

The reviewed literature indicates that motor vehicle safety inspection requires a technically competent workforce supported by clear standards, appropriate equipment, regulatory alignment, certification mechanisms, and continuous professional development (Alonso et al., 2021; Gierl et al., 2022; Liu et al., 2022; Rohmani, 2024). In parallel, the training literature shows that effective training depends on needs analysis, job-relevant content, adequate resources, trainer competence, learning support, and evaluation systems that measure more than immediate participant reaction (Gupta et al., 2024; Kirkpatrick & Kirkpatrick, 2016; McGehee & Thayer, 1961; Sahoo & Mishra, 2018). Theoretical perspectives such as Human Capital Theory, Adult Learning Theory, Training Transfer Theory, and the Technology Acceptance Model further suggest that training should develop job-relevant competencies, support workplace application, and enable trainees to engage meaningfully with learning technologies (Davis, 1989; Knowles, 1970; Schultz, 1961; Venkatesh & Davis, 2000).

However, gaps remain in the literature. First, much of the training effectiveness literature is general and does not directly address motor vehicle safety and technical inspection as a specialized regulatory occupation. Second, while several evaluation models exist, fewer studies apply these models to compare training effectiveness across vocational institutions. Third, the role of institutional context in shaping satisfaction and perceived effectiveness remains underexplored, particularly in Chinese vocational training settings. Fourth, there is a need for mixed-method evidence that integrates quantitative predictors with qualitative explanations of training experience. The present study addresses these gaps by examining training content relevance, resource and support adequacy, institutional context, and satisfaction and effectiveness among motor vehicle safety and technical inspectors at QVTU and ZIST.

## **3. Methodology**

### *3.1 Research Design*

This study employed a mixed-methods research design to evaluate the effectiveness of training programs for motor vehicle safety and technical inspectors at Quanzhou Vocational and Technical University (QVTU) and Zhangzhou Institute of Science and Technology (ZIST). The quantitative component examined respondents' perceptions of training content relevance, adequacy of training resources and support, and satisfaction and effectiveness of training. The qualitative component used interview data to explain how trainees and trainers

experienced the training programs in terms of relevance, usefulness, resource adequacy, effectiveness, and job satisfaction.

The mixed-methods approach was appropriate because the study required both numerical assessment of training-related constructs and qualitative explanation of training experiences. The two institutional sites were examined comparatively to identify shared patterns and institution-specific differences in training effectiveness.

### *3.2 Research Setting and Case Selection*

The study was conducted at QVTU and ZIST, two vocational institutions in Fujian, China involved in training motor vehicle safety and technical inspectors. QVTU was selected because of its longer history in automotive safety inspection training, regulatory engagement, and practical training facilities. ZIST was included as a comparative site because of its vocational orientation, regional relevance, and adoption of more flexible and technology-oriented training approaches.

The use of two institutional cases allowed the study to compare training effectiveness across different vocational training environments. This comparative design was intended to identify not only the overall predictors of satisfaction and effectiveness but also institutional differences that may inform future improvement strategies.

### *3.3 Respondents and Participants*

The quantitative respondents were trainees from the Motor Vehicle Safety and Technical Inspector Training Programs of QVTU and ZIST. Respondents included male and female trainees across age groups from 18–25 to 56 years and above. Educational attainment ranged from high school or below to postgraduate level, while years in current position ranged from less than one year to ten years or more. A total of 384 responses were analyzed quantitatively across both institutions, with data collected over six months from November 2023 to April 2024. Of these, 204 respondents were graduates, representing a notable subgroup within the combined sample.

For the qualitative component, data were drawn from two sources. First, six in-depth interviews were conducted with selected participants to obtain deeper explanatory insights into training relevance, usefulness, resource adequacy, effectiveness, and job satisfaction. Second, the survey questionnaire included open-ended items that allowed respondents to provide additional comments. A number of these responses were substantive in length and content, offering meaningful qualitative perspectives beyond the closed-scale items. These open-ended survey responses were therefore included in the qualitative analysis alongside the interview data, providing a broader base of participant voices for thematic interpretation.

### *3.4 Sampling Technique*

The study used a non-random convenience sampling approach, with stratification applied to ensure representation across major demographic groups. The target population consisted of trainees enrolled in the Motor Vehicle Safety and Technical Inspector Training Programs of QVTU and ZIST. Respondents were stratified according to gender, age, education level, and number of years in their current position, after which available and willing participants were selected within each stratum.

The manuscript reports that the final quantitative sample of 384 respondents was considered sufficient based on Krejcie and Morgan's sample-size guideline and a G\*Power calculation. The G\*Power computation indicated a minimum sample size of 261 for the regression model, while the actual sample size of 384 exceeded this requirement.

### *3.5 Research Instrument*

The main quantitative instrument was a structured questionnaire administered to respondents from both institutions. The questionnaire consisted of four parts. The first part gathered demographic information, including gender, age, educational level, and number of years in current position. The second part measured the relevance and applicability of training content. The third part measured the adequacy of training resources and support. The fourth part measured satisfaction and effectiveness of training.

The substantive constructs were measured using a five-point Likert scale, with responses ranging from strong disagreement to strong agreement. The instrument included five items for relevance and applicability of training content, five items for adequacy of training resources and support, and seven items for satisfaction and effectiveness of training.

Construct validity was assessed through exploratory factor analysis using SPSS 23.0. The manuscript reports that all factor loadings were above 0.50 for both QVTU and ZIST, supporting construct validity. Reliability was examined using Cronbach's alpha. The reported Cronbach's alpha values were acceptable for both institutions: relevance and applicability of training content obtained  $\alpha = 0.729$  for QVTU and  $\alpha = 0.742$  for ZIST; adequacy of training resources and support obtained  $\alpha = 0.714$  for QVTU and  $\alpha = 0.730$  for ZIST; and satisfaction and effectiveness of training obtained  $\alpha = 0.726$  for QVTU and  $\alpha = 0.739$  for ZIST.

### *3.6 Data Gathering Procedure*

Data were gathered using standardized questionnaires administered to trainees from QVTU and ZIST. The same instrument was used across both institutions to support comparability, with contextual adjustments made only where necessary to ensure clarity. The questionnaire collected demographic data and respondents' perceptions of training content, training resources and support, and satisfaction and effectiveness.

Prior to full deployment, the instrument underwent pre-testing to determine whether the items were clear, understandable, and capable of capturing the intended data. Feedback from pre-test participants was used to revise unclear or ambiguous items. After the pre-testing stage, the final questionnaire was distributed online to improve efficiency and facilitate data collection across the two institutions.

Qualitative data were collected through interviews with selected participants. These interviews were used to obtain explanatory insights into the survey findings, particularly regarding the perceived relevance of training content, usefulness of training, adequacy of resources, effectiveness of training delivery, and training-related job satisfaction.

### *3.7 Data Analysis*

Quantitative data were analyzed using descriptive statistics, reliability analysis, factor analysis, regression analysis, and structural equation modeling. Descriptive statistics were used to summarize respondent profiles and perceptions of the three major constructs: relevance and applicability of training content, adequacy of training resources and support, and satisfaction and effectiveness of training. Factor analysis and reliability analysis were used to assess the validity and internal consistency of the instrument.

Multiple regression analysis was used to identify significant predictors of satisfaction and effectiveness of training. The predictor variables included gender, age, education level, years in current position, institution, relevance and applicability of training content, and adequacy of training resources and support. Structural equation modeling was then used to examine the relationships among demographic factors, institutional context, training content relevance, resource and support adequacy, and satisfaction and effectiveness of training.

Qualitative interview data were analyzed using thematic analysis. Themes were developed around the major areas of inquiry: relevance of training content to job responsibilities, usefulness of training, adequacy of training resources, effectiveness of training, and training as a source of job satisfaction. The qualitative analysis was used to support and contextualize the quantitative findings.

### *3.8 Ethical Considerations*

The study observed voluntary participation, informed consent, confidentiality, and secure handling of participant data. Participants were informed of the purpose of the study and were allowed to withdraw without penalty. Personal identifiers were removed from the dataset to protect anonymity. Because the study was conducted in China, the manuscript also states that data collection and processing were aligned with the principles of China's Personal

Information Protection Law, including data minimization, participant rights, secure storage, limited retention, and proper disposal.

#### 4. Results and Discussion

##### 4.1 Respondent Profile and Sampling Adequacy

The respondents consisted of trainees from Quanzhou Vocational and Technical University (QVTU) and Zhangzhou Institute of Science and Technology (ZIST). The profile variables included gender, age, educational level, and number of years in current position. The manuscript indicates that respondents came from varied demographic and professional backgrounds, with notable differences between the two institutions particularly in age and educational attainment. ZIST reportedly had a comparatively younger respondent profile and a higher proportion of postgraduate trainees, while QVTU reflected a more established institutional training context. These differences are relevant because age, education, and institutional setting may shape training expectations, learning preferences, and perceptions of training effectiveness.

Before proceeding to factor-based and model-based analysis, the suitability of the data for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s Test of Sphericity. As shown in Table 1, both institutions obtained KMO values above 0.80, indicating that the data were suitable for factor analysis. Bartlett’s test was significant for both QVTU and ZIST, further supporting the factorability of the correlation matrix.

**Table 1. KMO and Bartlett’s Test Results**

Institution	KMO Measure of Sampling Adequacy	Bartlett’s Test	Approx. Chi-Square	df	Sig.
QVTU	0.819	Significant	2570.511	136	0.000
ZIST	0.834	Significant	2450.322	136	0.000

The KMO values suggest that the questionnaire data had adequate internal structure for further construct-level analysis. The results also indicate that both institutional datasets were appropriate for examining the underlying dimensions of training content relevance, resource adequacy, and satisfaction and effectiveness. This supports the methodological basis for the subsequent regression and structural equation modeling analyses.

##### 4.2 Relevance and Applicability of Training Content

Respondents from both institutions generally perceived the training content as relevant and useful, although the pattern of responses suggests that content relevance was stronger in some dimensions than others. The original results indicate that, for QVTU, the highest-rated item was the statement that training stimulated new ideas and innovation in work, with a mean of 3.31. The item on coverage of key work issues also obtained a relatively high mean of 3.28. For ZIST, the same pattern was observed: the highest-rated item was stimulation of new ideas and innovation, with a mean of 3.04, followed by coverage of key work issues, with a mean of 2.98.

However, respondents gave lower ratings to items measuring direct closeness to job responsibilities and direct work application. For QVTU, the item on training content being closely related to job responsibilities obtained a mean of 3.13, while direct applicability to work obtained a mean of 3.18. For ZIST, the corresponding means were 2.86 and 2.91. This pattern suggests that while the training was perceived as useful for broad work-related thinking and problem-solving, there may still be a gap between general training value and immediate task-specific applicability.

**Table 2. Selected Descriptive Results for Training Content Relevance and Applicability**

Construct Area	QVTU Indicator	Mean	ZIST Indicator	Mean
Highest-rated indicator	Training stimulates new ideas and innovation	3.31	Training stimulates new ideas and innovation	3.04
Relatively high indicator	Training covered key issues faced at work	3.28	Training covered key issues faced at work	2.98
Lower-rated indicator	Content closely related to job responsibilities	3.13	Content closely related to job responsibilities	2.86
Lower-rated indicator	Training can be applied directly to work	3.18	Training can be applied directly to work	2.91

Table 2 indicates that respondents valued the training as a source of work-related ideas and problem awareness. However, the relatively lower ratings for direct job alignment and direct application suggest that both institutions may need to strengthen the link between training modules and the actual inspection tasks performed by trainees. This is especially relevant for motor vehicle safety and technical inspection, where training effectiveness depends not only on conceptual usefulness but also on precise occupational transfer.

#### 4.3 Adequacy of Training Resources and Support

The results for training resources and support were generally stronger than those for content relevance. For QVTU, the highest-rated item was the statement that respondents felt well supported during training, with a mean of 3.96. Additional resources such as case studies and expert lectures were also rated highly, with a mean of 3.95. For ZIST, respondents likewise rated support during training highest, with a mean of 3.99, followed by training venues and facilities meeting learning and practice needs, with a mean of 3.91.

The lower-rated items concerned the adequacy of training materials and the availability of technical support. For QVTU, training materials obtained a mean of 3.88, while technical support obtained a mean of 3.91. For ZIST, training materials obtained a mean of 3.84, while technical support obtained a mean of 3.82. Although these are still generally positive ratings, they indicate areas where resource provision may be improved, particularly in terms of training materials, technical assistance, and digitally enhanced learning support.

**Table 3. Selected Descriptive Results for Training Resources and Support**

Construct Area	QVTU Indicator	Mean	ZIST Indicator	Mean
Highest-rated indicator	Respondents felt well supported during training	3.96	Respondents felt well supported during training	3.99
Relatively high indicator	Additional resources were valuable	3.95	Venues and facilities met learning/practice needs	3.91
Lower-rated indicator	Training materials were adequate	3.88	Training materials were adequate	3.84
Lower-rated indicator	Necessary technical support was available	3.91	Necessary technical support was available	3.82

Table 3 shows that the institutional support environment was generally favorable in both institutions. Nevertheless, the relatively lower means for training materials and technical support suggest that support adequacy should not be interpreted only in terms of trainer availability or general institutional support. For technical-vocational training, learning materials, practice equipment, digital tools, and real-time technical assistance are important conditions for effective training transfer.

#### 4.4 Satisfaction and Effectiveness of Training

The satisfaction and effectiveness results show a more uneven pattern. In both institutions, respondents rated the usefulness of the training content in work as the highest item. QVTU respondents gave this item a mean of 3.55, while ZIST respondents gave it a mean of 3.36. The second-highest item in both institutions was that the training met expectations and needs, with QVTU obtaining a mean of 3.43 and ZIST obtaining a mean of 3.24. These results indicate that trainees generally recognized the training as useful and responsive to their expectations.

However, the lowest-rated item in both institutions was the statement that overall job satisfaction had increased since the training, with both QVTU and ZIST obtaining a mean of 2.19. For QVTU, the next lower-rated item was the fit between training approach and learning preferences, with a mean of 2.83. For ZIST, the next lower-rated item was the ability to use the knowledge and skills gained effectively in the job, with a mean of 2.52. The coefficient of variation was also highest for job satisfaction-related items, indicating greater variability in respondent perceptions.

**Table 4. Selected Descriptive Results for Satisfaction and Effectiveness of Training**

Construct Area	QVTU Indicator	Mean	ZIST Indicator	Mean
Highest-rated indicator	Training content was useful in work	3.55	Training content was useful in work	3.36
Relatively high indicator	Training met expectations and needs	3.43	Training met expectations and needs	3.24
Lower-rated indicator	Training approach matched learning preferences	2.83	Knowledge and skills can be used effectively in job	2.52
Lowest-rated indicator	Overall job satisfaction increased since training	2.19	Overall job satisfaction increased since training	2.19

The findings suggest that perceived training usefulness does not automatically translate into increased job satisfaction. Respondents may recognize the training as useful while still experiencing limits in workplace transfer, learning-style fit, organizational reinforcement, or broader job conditions. This distinction is important because training satisfaction and job satisfaction are related but not identical constructs. Training can improve knowledge and confidence, but the effect on job satisfaction may depend on post-training support, workload, career pathways, institutional recognition, and opportunities to use newly acquired competencies.

#### 4.5 Predictors of Training Satisfaction and Effectiveness

A multiple linear regression analysis was conducted to identify predictors of satisfaction and effectiveness of training. The dependent variable was satisfaction and effectiveness of training, measured on a scale from 5 to 25. The predictors were gender, age, educational level, years in current position, institution, relevance and applicability of training content, and adequacy of training resources and support.

**Table 5. Regression Results Predicting Satisfaction and Effectiveness of Training**

Predictor	Coefficient	p-value	Interpretation
Intercept	4.83942	—	Baseline predicted value when predictors are set to zero
Gender	-0.15632	0.675216	Not significant
Age	0.24589	0.266658	Not significant
Education level	0.40813	0.263277	Not significant
Years in current position	0.16761	0.522717	Not significant
Institution	0.24212	0.004561	Significant positive effect
Relevance and applicability of training content	0.46815	< 2e-16	Significant positive effect
Adequacy of training resources and support	0.27168	6.15e-06	Significant positive effect

Model summary: residual standard error = 5.325; df = 376;  $R^2 = 0.3369$ ; adjusted  $R^2 = 0.325$ ;  $F = 29.65$ ;  $p < 2.2e-16$ .

The regression model was statistically significant and explained approximately 33.69% of the variance in satisfaction and effectiveness of training. The strongest predictor was relevance and applicability of training content, followed by adequacy of training resources and support. Institutional affiliation also had a significant effect, suggesting that respondents from one institution reported higher satisfaction and effectiveness than those from the other. In contrast, gender, age, educational level, and years in current position were not statistically significant predictors.

These results indicate that training satisfaction and perceived effectiveness are shaped more by training design and institutional support than by respondent demographics. This finding is important for improvement planning because it points to modifiable institutional factors: curriculum-job alignment, practical applicability, training materials, facilities, technical support, and trainer support.

#### 4.6 Structural Equation Modeling Results

Structural equation modeling was conducted to examine the relationships among demographic variables, institutional context, training content relevance, resource and support adequacy, and satisfaction and effectiveness of training. The SEM used data from 384 respondents across QVTU and ZIST. The dependent construct was satisfaction and effectiveness of training, while the predictors included gender, age, education level, years in current position, institution, relevance and applicability of training content, and adequacy of training resources and support.

**Table 6. Structural Equation Modeling Results**

SEM Indicator / Path	Result	Interpretation
Chi-square	10.34	Indicates acceptable model-data correspondence
df	7	Degrees of freedom reported for the model

SEM Indicator / Path	Result	Interpretation
p-value	0.17	Non-significant result suggests acceptable model fit
RMSEA	0.03	Good fit
CFI	0.99	Good fit
TLI	0.98	Good fit
Relevance and applicability of training content -> Training satisfaction/effectiveness	Significant positive effect	Higher content relevance predicts stronger satisfaction/effectiveness
Adequacy of training resources/support -> Training satisfaction/effectiveness	Significant positive effect	Better resources and support predict stronger satisfaction/effectiveness
Institution -> Training satisfaction/effectiveness	Significant effect	Institutional context affects training outcomes
Demographic variables -> Training satisfaction/effectiveness	Not consistently supported	Regression results do not support strong demographic effects

The SEM results supported the main structure of the regression findings. Training content relevance and adequacy of support were significant direct predictors of satisfaction and effectiveness. Institutional context also remained important. The model fit indices were acceptable, with RMSEA = 0.03, CFI = 0.99, and TLI = 0.98. These values suggest that the proposed model adequately represented the observed data.

The regression results explicitly indicate that gender, age, education level, and years in position were not statistically significant predictors. Because the available coefficient interpretation does not provide clear evidence of significant demographic effects, the revised article avoids claiming strong demographic influence unless the full SEM path coefficients confirm it. For this journal version, demographic variables are *treated as control variables rather than major explanatory predictors*.

#### 4.7 Qualitative Themes on Training Effectiveness

The qualitative findings reinforced the quantitative results by showing how trainees interpreted training relevance, usefulness, resource adequacy, effectiveness, and job satisfaction. Interview responses from both institutions indicated that training content was generally perceived as relevant to work responsibilities. Respondents described the training as directly applicable to daily responsibilities and useful in addressing practical challenges.

The interviews also suggested that training improved problem-solving ability, confidence, and readiness to handle complex tasks. However, the qualitative data also revealed institution-specific nuances. QVTU respondents tended to emphasize practical relevance, industry experience, and the connection between training and actual work. ZIST respondents recognized the usefulness of the training but also suggested the need for more interactive sessions and additional hands-on activities.

**Table 7. Qualitative Themes on Training Effectiveness across QVTU and ZIST**

Theme	QVTU Pattern	ZIST Pattern	Interpretation
Relevance of training content	Training was described as directly applicable to daily	Practical examples reflected daily work challenges	Both institutions provided relevant training, but

Theme	QVTU Pattern	ZIST Pattern	Interpretation
	inspection-related responsibilities		QVTU appeared stronger in perceived job alignment
Usefulness of training	Respondents reported improved problem-solving and immediately usable tools	Respondents reported greater readiness to handle complex tasks	Training was perceived as beneficial beyond theoretical instruction
Adequacy of resources	Materials were viewed as extensive and sufficient	Materials were generally adequate, but respondents requested more interactivity	ZIST may need stronger interactive and hands-on learning resources
Effectiveness of training	Training bridged theory and practice and improved practical skills	Training structure encouraged active learning and engagement	Both institutions showed effectiveness, but through slightly different strengths
Training and job satisfaction	Training improved confidence, personal growth, and perceived performance	Training increased confidence and satisfaction in handling complex tasks	Training contributed to confidence, although quantitative results showed limited effect on overall job satisfaction

The thematic results help explain why training content relevance and resource adequacy emerged as significant predictors in the quantitative analysis. Trainees valued training when it connected to actual job responsibilities, provided practical tools, and helped them perform technical tasks with greater confidence. At the same time, the low quantitative rating for job satisfaction suggests that training may improve competence and confidence without necessarily transforming broader job satisfaction. This distinction should be emphasized in the discussion and recommendations.

#### 4.8 Discussion

The findings indicate that training effectiveness among motor vehicle safety and technical inspectors is primarily associated with modifiable training-system factors rather than demographic characteristics. Across the descriptive, regression, SEM, and qualitative results, the two most consistent determinants were the relevance and applicability of training content and the adequacy of training resources and support. This aligns with training needs analysis theory, which emphasizes that training should be based on organizational, task, and individual needs (McGehee & Thayer, 1961; Sahoo & Mishra, 2018). It also supports demand-driven vocational education approaches that call for training programs to be aligned with actual work responsibilities and performance objectives (Aljohani et al., 2022; Gupta et al., 2024).

The descriptive results show that respondents valued training content that stimulated new ideas, addressed work-related issues, and proved useful in their work. However, the lower ratings for direct job alignment and immediate work application suggest that the programs may still require tighter integration with real inspection tasks. This is important because motor vehicle safety and technical inspection is a competency-based field where training transfer is essential. Training that is useful in a general sense may not be sufficient if trainees cannot immediately connect it to inspection procedures, equipment use, regulatory interpretation, and quality-control decisions.

The findings on resources and support were generally positive. Respondents from both institutions felt supported during training and recognized the value of additional resources. Nevertheless, the relatively lower ratings for training materials and technical support indicate that the training environment can still be improved. This is consistent with literature showing that training effectiveness is influenced by course design, learning environment, support systems,

and program resources (Bécue et al., 2021; Bernardino & Curado, 2020; Islam et al., 2020). For technical-vocational institutions, resource adequacy should include updated manuals, case-based materials, simulation tools, inspection equipment, digital modules, expert lectures, and accessible technical assistance.

The satisfaction and effectiveness results show a crucial distinction between perceived training usefulness and overall job satisfaction. Respondents recognized that the training content was useful and generally met expectations, but they did not strongly agree that their overall job satisfaction increased after training. This implies that training may improve perceived competence without necessarily improving broader job attitudes. Job satisfaction may depend on additional workplace factors such as role clarity, workload, recognition, career development, compensation, supervision, and post-training application opportunities. Therefore, institutions should not assume that training alone will improve job satisfaction unless it is connected to workplace reinforcement and professional development pathways.

The regression and SEM results provide stronger evidence for the centrality of content relevance and support adequacy. The regression model explained 33.69% of the variance in satisfaction and effectiveness, which may be interpreted as a moderate explanatory level for a perception-based training study. The strongest predictor was relevance and applicability of training content, followed by adequacy of resources and support. Institutional context was also significant, indicating that training effectiveness is shaped by institutional history, resources, curriculum design, trainer expertise, and industry linkage. QVTU's longer history and stronger regulatory or industry connections may help explain its relatively higher satisfaction, while ZIST's strength appears to lie in adaptability and openness to interactive learning approaches.

The demographic variables were not significant in the regression model. This is analytically important because it suggests that improving training effectiveness should focus less on demographic segmentation and more on strengthening the design and delivery of the training system. While demographic characteristics may influence learning preferences, the findings do not support treating gender, age, educational level, or years in position as major predictors of satisfaction and effectiveness in this dataset. The manuscript's original SEM hypothesis summary should therefore be revised cautiously to avoid overstating demographic effects.

The qualitative findings support and deepen the quantitative results. Respondents from both institutions emphasized relevance, usefulness, practical application, and confidence-building. QVTU appeared to benefit from stronger practical alignment and institutional experience, while ZIST respondents expressed interest in more interactive and hands-on training activities. These findings suggest that both institutions can learn from each other. QVTU may further modernize its delivery through interactive and digitally enhanced tools, while ZIST may strengthen its industry linkage and practical inspection alignment.

Overall, the study shows that effective training for motor vehicle safety and technical inspectors requires more than the delivery of technical content. It requires a coherent training system built around job-relevant curriculum, adequate learning resources, trainer competence, institutional support, practical application, feedback mechanisms, and continuous improvement. The findings support a training improvement strategy that prioritizes content-work alignment, resource adequacy, interactive delivery, trainer development, and post-training evaluation.

## **5. Conclusions, Recommendations, and Implications**

### **5.1 Conclusions**

This study evaluated the effectiveness of training programs for motor vehicle safety and technical inspectors at Quanzhou Vocational and Technical University (QVTU) and Zhangzhou Institute of Science and Technology (ZIST). The findings indicate that both institutions provide training programs that are generally perceived as relevant, useful, and supportive of technical competency development. However, the results also show that training effectiveness is shaped less by respondent demographic characteristics and more by the quality of the training system itself, particularly the relevance of training content, adequacy of resources and support, and institutional context.

First, the respondents' demographic profile showed variation in gender, age, education level, and years in current position across the two institutions. These differences provided useful descriptive context, particularly because ZIST appeared to have a younger and more academically advanced respondent profile. However, the regression findings showed that demographic variables were not significant predictors of satisfaction and effectiveness of training. This suggests that improvement strategies should prioritize training design and institutional support rather than demographic segmentation.

Second, the findings show that training content relevance and applicability are central to perceived training effectiveness. Respondents valued training that addressed key work issues, stimulated new ideas, and provided content useful to their professional responsibilities. However, the lower ratings for direct alignment with job responsibilities and immediate work application suggest that both institutions may still need to strengthen the connection between training modules and actual inspection tasks.

Third, the adequacy of training resources and support was generally rated positively in both institutions. Respondents felt supported during training and recognized the value of additional resources. Nevertheless, training materials, technical support, and interactive learning tools remain areas for improvement. This is particularly relevant for technical-vocational programs where practical learning, simulation, equipment familiarity, and real-time support are essential to training transfer.

Fourth, the satisfaction and effectiveness results suggest that trainees recognized the usefulness of the training, but the training did not strongly increase overall job satisfaction. This indicates that training may improve competence, confidence, and perceived usefulness without necessarily changing broader job attitudes. Overall job satisfaction is likely influenced by factors beyond the training program itself, including work conditions, recognition, career progression, workload, and opportunities to apply newly acquired skills.

Fifth, the regression and SEM results confirmed that the relevance and applicability of training content and the adequacy of training resources and support are significant predictors of satisfaction and effectiveness of training. Institutional context also had a significant effect, with QVTU associated with higher satisfaction than ZIST. This may reflect QVTU's longer history in motor vehicle safety inspection training, stronger industry linkages, and deeper regulatory experience. ZIST, however, demonstrated strengths in adaptability, flexible curriculum design, and openness to innovative delivery approaches.

Finally, the qualitative findings supported the quantitative results by showing that respondents from both institutions perceived the training as relevant, useful, and confidence-building. QVTU was associated with stronger practical and industry alignment, while ZIST respondents emphasized the need for more interactive, engaging, and hands-on training activities. Taken together, the findings suggest that effective training for motor vehicle safety and technical inspectors requires continuous alignment between training content, occupational tasks, institutional support, trainer capability, and evolving industry standards.

## ***5.2 Recommendations***

Based on the findings, both QVTU and ZIST should strengthen the alignment between training content and the actual work responsibilities of motor vehicle safety and technical inspectors. Training modules should be reviewed regularly to ensure that they reflect current inspection procedures, regulatory requirements, equipment use, calibration practices, safety protocols, environmental standards, and quality-control expectations. Real-world cases, inspection scenarios, problem-solving exercises, and task-based simulations should be incorporated more deliberately into the curriculum.

Both institutions should improve the practical applicability of training by increasing hands-on activities. Since respondents rated general usefulness more favorably than direct job application, the training design should move beyond conceptual instruction and provide more opportunities for trainees to practice inspection-related tasks. Practical workshops, supervised equipment use, diagnostic exercises, scenario-based assessments, and field-based demonstrations may improve the transfer of training to actual inspection work.

QVTU should consider integrating more modern and digitally enhanced learning tools into its established training system. Its strengths in industry linkage and regulatory experience can be further enhanced through online modules, interactive simulations, virtual inspection exercises, digital assessment tools, and blended learning formats. This would allow QVTU to preserve its practical strengths while modernizing the learning experience for trainees.

ZIST should strengthen its industry engagement and practical inspection alignment. While ZIST appears to benefit from innovation-oriented teaching and flexible curriculum design, the findings suggest that it may further improve training satisfaction by deepening collaboration with inspection agencies, industry experts, regulatory bodies, and technical practitioners. Industry lectures, field immersion, joint training activities, and case-based learning drawn from actual inspection problems may help close the gap between training and work application.

Both institutions should improve the adequacy and accessibility of training materials. Manuals, slides, online resources, case studies, inspection checklists, procedural guides, and equipment-related learning materials should be updated regularly and made available in formats that trainees can access before, during, and after training. Training materials should be practical, concise, visually clear, and directly tied to inspection competencies.

Technical support systems should also be strengthened. Trainees should have access to trainers, technical assistants, peer mentors, and digital help channels during and after training. This is especially important when training involves equipment operation, regulatory interpretation, software systems, and inspection procedures that may require guided practice.

Trainer development should be institutionalized. Trainers should receive continuing professional development in updated vehicle inspection standards, emerging automotive technologies, environmental compliance requirements, adult learning strategies, assessment design, and technology-enhanced instruction. Cross-institutional trainer exchanges between QVTU and ZIST may also help both institutions learn from each other's strengths.

Both institutions should establish stronger feedback and monitoring mechanisms. Trainee feedback should be gathered not only at the end of training but also during training and after trainees have returned to their work roles. Post-training evaluation should examine whether trainees were able to apply the acquired knowledge and skills in actual inspection settings. This would allow the institutions to move from satisfaction-based evaluation toward evidence-based continuous improvement.

Future research should examine the long-term effects of training on job performance, inspection accuracy, regulatory compliance, career progression, and professional confidence. Comparative studies involving additional vocational institutions, regions, or inspection agencies may also determine whether the findings from QVTU and ZIST are institution-specific or applicable to broader technical-vocational training contexts.

### *5.3 Implications of the Study*

Theoretically, the study supports the view that training effectiveness is best understood as a multidimensional construct shaped by content relevance, resource adequacy, institutional support, and transfer potential. The findings are consistent with training evaluation perspectives that emphasize the need to examine not only trainee reactions but also learning conditions, behavioral application, and institutional outcomes.

Methodologically, the study demonstrates the value of combining descriptive analysis, regression, SEM, and thematic analysis in evaluating training programs. The quantitative results identified significant predictors of satisfaction and effectiveness, while the qualitative findings explained how trainees experienced relevance, usefulness, resources, and confidence-building. This mixed-methods approach provides a more complete understanding of training effectiveness than either survey data or interview data alone.

Practically, the findings imply that vocational institutions should focus on modifiable training-system factors. Since demographic variables were not significant predictors, institutional improvement should concentrate on curriculum-job alignment, practical application, learning materials, technical support, trainer capability, and feedback

mechanisms. This has direct relevance for institutions seeking to improve technical training quality in safety-sensitive occupational fields.

Institutionally, the study suggests that QVTU and ZIST can benefit from complementary learning. QVTU may strengthen its already established training system by adopting more interactive and digitally enhanced delivery methods. ZIST may improve its training outcomes by strengthening industry linkage, practical exposure, and inspection-specific content alignment. Collaboration between the two institutions may therefore produce a stronger shared model for motor vehicle safety inspector training.

From a policy and regulatory perspective, the study highlights the importance of standardized yet adaptive training systems for motor vehicle safety and technical inspectors. Because inspection work affects road safety, environmental compliance, and public accountability, training programs should be regularly evaluated and updated. Regulatory agencies and vocational institutions may use the findings to support competency-based training standards, certification-linked assessment, and continuous professional development systems for inspectors.

Overall, the study implies that effective inspector training must be treated as an ongoing institutional and regulatory responsibility rather than a one-time instructional activity. A stronger training system should integrate needs assessment, job-relevant content, adequate resources, trainer development, technology-supported learning, practical application, feedback, and long-term impact evaluation.

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