

The Mediating Role of Adaptive Strategies in the Relationship between Work-Related Challenges and Teaching Effectiveness and Job Satisfaction of TVL (Technical - Vocational-Livelihood) Teachers: A Basis for a Professional Development Program

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Abstract

This study examined the mediating role of adaptive strategies in the relationship between work-related challenges and teaching effectiveness and job satisfaction among Technical-Vocational-Livelihood (TVL) teachers as a basis for developing a professional development program. Anchored in the Job Demands–Resources Model, Transactional Theory of Stress and Coping, and Herzberg’s Two-Factor Theory, the study employed a quantitative descriptive-correlational research design with mediation analysis. Using universal sampling, 40 TVL teachers from five public secondary schools in Bilar, Batuan, and Carmen, Bohol, participated in the study. Data were collected through a modified and expert-validated questionnaire using a four-point Likert scale and analyzed using descriptive statistics, Pearson correlation, and regression-based mediation analysis at a 0.05 significance level. Results revealed high levels of work-related challenges ($M = 3.05$), adaptive strategies ($M = 3.43$), and teaching effectiveness ($M = 3.56$), while job satisfaction was moderate ($M = 3.17$). Student-related concerns and resource adequacy emerged as the major challenges, whereas technology and artificial intelligence-assisted teaching received the highest adaptive strategy rating. Work-related challenges showed no statistically significant relationships with adaptive strategies, teaching effectiveness, or job satisfaction. Adaptive strategies were significantly associated with teaching effectiveness ($r = .392$, $p = .012$) but not with job satisfaction ($r = .003$, $p = .986$). Moreover, no significant mediating effects were established for either professional outcome. The findings informed the proposed Adaptive and Industry-Responsive Professional Development Program, emphasizing instructional innovation, professional collaboration, institutional support, and teacher well-being. The study aligns with Sustainable Development Goals 3 (Good Health and Well-Being), 4 (Quality Education), and 8 (Decent Work and Economic Growth). Its potential sustainability contribution lies in strengthening educational quality, institutional responsiveness, teacher welfare, and industry-relevant workforce preparation through evidence-based professional development.

Keywords: Adaptive Strategies; Job Satisfaction; Mediation Analysis; Professional Development; Teacher Well-Being; Teaching Effectiveness; Work-Related Challenges; Descriptive Correlational Research Design

1. Introduction

Technical-Vocational-Livelihood (TVL) education is an essential component of the Philippine educational system, preparing learners with practical competencies, occupational skills, and opportunities for employment, entrepreneurship, and further technical education. However, the effective delivery of TVL instruction depends on teachers' capacity to manage workplace demands while maintaining instructional competence, professional adaptability, and job satisfaction. Recent research emphasizes that workload pressures, resource limitations, administrative responsibilities, and changing instructional requirements can influence teachers' professional performance and well-being (Agyapong et al., 2022; Arbia et al., 2023; Eryilmaz et al., 2025). Accordingly, understanding the adaptive strategies employed by TVL teachers is essential for identifying appropriate interventions that support sustainable teaching effectiveness and professional fulfillment. This study examines the mediating role of adaptive strategies in the relationship between work-related challenges and teaching effectiveness and job satisfaction among TVL teachers in selected public secondary schools in Bilar, Batuan, and Carmen, Bohol. Specifically, it investigates how occupational challenges relate to teachers' adaptive practices and professional outcomes, providing an empirical basis for developing an Adaptive and Industry-Responsive Professional Development Program for TVL Teachers.

Teaching requires continuous adjustment to curricular requirements, technological developments, learner diversity, and institutional expectations. These demands have become increasingly complex as educational institutions pursue instructional innovation while addressing limitations in human, financial, and instructional resources. Agyapong et al. (2022) identified occupational stress, burnout, anxiety, and depression as major concerns affecting educators, while Morris et al. (2025) demonstrated the growing relevance of job demands and reduced occupational autonomy to teachers' mental health. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2025) emphasized the importance of manageable workloads, institutional support, and professional collaboration in sustaining teacher effectiveness and well-being. These challenges are particularly relevant to TVL teachers, whose responsibilities extend beyond conventional classroom instruction to competency-based training, practical demonstrations, equipment management, skills assessment, and industry-oriented learning. Mesuwini and Mokoena (2024) highlighted the difficulties experienced by technical and vocational educators in adapting to instructional technologies, supporting practical learning, and addressing inequalities in access to educational resources. In the Philippines, Frianeza et al. (2024) identified systemic educational challenges affecting teachers' instructional strategies and professional growth, while Tarraya (2023) emphasized the implications of excessive workload for public school teachers. Despite these difficulties, teachers employ adaptive strategies such as problem-focused coping, emotional regulation, professional collaboration, continuing professional development, and instructional innovation. Such practices can support professional resilience and instructional improvement, although their effectiveness may depend on institutional resources and working conditions (Brooks et al., 2022; Yang & Du, 2024). Consequently, examining whether these adaptive strategies mediate the relationships between occupational challenges, teaching effectiveness, and job satisfaction is necessary for developing context-responsive professional interventions.

Recent literature identifies several interconnected themes concerning occupational demands, teacher well-being, adaptive strategies, instructional effectiveness, and professional satisfaction. These themes provide a basis for understanding the mechanisms through which TVL teachers respond to workplace challenges. First, work-related challenges and occupational well-being remain significant concerns across educational contexts. Arbia et al. (2023) found that challenging work environments influence teachers' professional experiences and well-being. Similarly, Morris et al. (2025) identified the relationship between increasing job demands, reduced autonomy, and declining teacher mental health. Eryilmaz et al. (2025), using international evidence, demonstrated that school leadership, student behavior, and perceived workload are associated with teacher job satisfaction. These findings indicate that occupational challenges should be examined alongside institutional conditions rather than treated exclusively as individual difficulties. Second, adaptive coping and professional resilience are important responses to occupational pressures. Brooks et al. (2022) documented how teachers employed problem-focused and emotion-focused coping strategies when confronted with uncertain and demanding working conditions. Likewise, Celis et al. (2023) examined the relationships among classroom management, job satisfaction, coping mechanisms, and teacher performance in Philippine senior high schools. Wang et al. (2024) further demonstrated the relevance of teacher self-efficacy, resilience, and teaching satisfaction to professional well-being. Collectively, these studies suggest that adaptive strategies may help educators manage challenges, although the strength of their relationships with professional outcomes varies across educational settings. Third, teaching effectiveness and instructional innovation are influenced by teachers' professional competencies, available resources, and capacity to respond to changing educational demands. Liang et al. (2025) demonstrated significant relationships between teachers' work concerns and instructional effectiveness, particularly in instructional planning, assessment, and learning environments. Li et al. (2025) also found that emotional competence is associated with innovative teaching behaviors through teaching efficacy and work vitality. Furthermore, Lin and Liu (2025) identified adaptability and autonomy support as relevant factors in beginning teachers' innovative work behavior and responses to educational change. These findings emphasize that instructional effectiveness involves not only

technical competence but also psychological readiness and supportive professional environments. Fourth, job satisfaction and institutional support are closely associated with teachers' experiences of workplace demands and opportunities for professional fulfillment. Chen (2025) demonstrated the relationships among perceived organizational support, teacher self-efficacy, work engagement, and job satisfaction. Similarly, Ertaş and Pekmezci (2025) established the mediating roles of teacher innovativeness and instructional practices in the relationship between career motivation and job satisfaction. Wu and Wu (2026) further highlighted the relevance of collaborative professional learning and self-efficacy to teacher job satisfaction. These findings suggest that supportive leadership, professional collaboration, and meaningful instructional engagement can contribute to sustaining teachers' professional commitment. Finally, technology integration and continuing professional development have emerged as important dimensions of adaptive teaching. Yang and Du (2024) examined the relationships among digital teaching competence, emotional regulation, teacher self-efficacy, and digital burnout. Likewise, Lu et al. (2025) demonstrated the importance of teacher well-being and supportive leadership in promoting innovative work behavior. International guidance also emphasizes the need for responsible artificial intelligence integration and professional competency development among teachers (Miao & Holmes, 2023; Miao & Cukurova, 2024). For TVL educators, these developments reinforce the importance of combining pedagogical innovation with industry-relevant competencies, continuous skills upgrading, and appropriate technological support. Taken together, the reviewed literature indicates that work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction are interconnected. However, the relationships are not necessarily uniform, and evidence concerning the mediating role of adaptive strategies within Philippine TVL education remains limited.

At the global level, teacher effectiveness and professional well-being are recognized as important conditions for sustainable educational development. UNESCO and the International Task Force on Teachers for Education 2030 (2024) emphasized that improving teachers' working conditions, professional preparation, and institutional support is essential to sustaining quality education. Similarly, the OECD (2025) identified workload, professional collaboration, teacher confidence, and instructional adaptation as significant dimensions of contemporary teaching environments. These international perspectives establish the importance of examining teachers' occupational experiences and professional outcomes. Within technical and vocational education, changing technologies and labor market requirements create additional demands for instructional innovation and continuous competency development. Mesuwini and Mokoena (2024) emphasized the need for professional development and appropriate technological support among vocational educators. Moreover, the increasing use of artificial intelligence in education requires teachers to develop competencies in the ethical, pedagogical, and effective application of emerging technologies (Miao & Cukurova, 2024). At the national level, the Philippine education system recognizes technical-vocational education as a pathway toward workforce preparation and socio-economic development. The Technical Education and Skills Development Authority (TESDA, 2023), through the National Technical Education and Skills Development Plan 2023–2028, emphasizes industry responsiveness, lifelong learning, workforce development, and the modernization of technical-vocational education. These priorities reinforce the responsibility of TVL teachers to maintain competencies aligned with changing occupational standards. Furthermore, the Department of Education (DepEd, 2024a) issued DepEd Order No. 002, s. 2024, directing the immediate removal of administrative tasks from public school teachers. This was complemented by DepEd Order No. 005, s. 2024, which rationalizes teacher workloads and provides guidelines for teaching overload (DepEd, 2024b). These policy developments demonstrate institutional recognition of the relationship between teachers' working conditions, welfare, and instructional responsibilities. Nevertheless, Philippine research continues to identify concerns involving inadequate educational resources, workload demands, and professional development opportunities (Frianeza et al., 2024; Tarraya, 2023). At the local level, the present study focuses on TVL teachers in selected public secondary schools within the districts of Bilar, Batuan, and Carmen in Bohol. The investigation considers challenges associated with workload demands, resource adequacy, administrative support, industry alignment pressures, and student-related concerns. These dimensions are particularly relevant to TVL instruction, which requires adequate equipment, instructional materials, appropriate facilities, and opportunities for practical skill development. By examining teachers' reported experiences within these districts, the study provides localized evidence that may inform professional development initiatives appropriate to the participating schools.

The study is anchored in three complementary theoretical perspectives: the Job Demands–Resources (JD-R) Model, the Transactional Theory of Stress and Coping, and Herzberg's Two-Factor Theory. These frameworks provide a foundation for understanding the relationships among work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction among Technical-Vocational-Livelihood (TVL) teachers. The Job Demands–Resources Model explains how occupational demands and available resources influence employee motivation, well-being, and professional performance. Bakker et al. (2023) emphasized the interaction among job demands, resources, and individual characteristics, while Demerouti and Bakker (2023) highlighted the importance of personal and organizational resources in managing workplace challenges. In this study, workload demands, resource limitations, administrative support, industry alignment pressures, and student-related concerns represent occupational conditions that may influence teachers' professional outcomes. Adaptive strategies are

considered potential resources for managing these demands and sustaining instructional effectiveness. Furthermore, the Transactional Theory of Stress and Coping explains how individuals assess and respond to stressful situations through cognitive appraisal and coping mechanisms. Brooks et al. (2022) emphasized the relevance of problem-focused and emotion-focused coping in managing occupational stress among teachers. Accordingly, the present study examines adaptive strategies involving problem-focused coping, emotion-focused coping, professional collaboration, continuous professional development, technology and artificial intelligence (AI)-assisted instructional innovation, and recreational and stress-management activities. These strategies are investigated as potential mediating mechanisms between work-related challenges and professional outcomes. Similarly, Herzberg's Two-Factor Theory distinguishes between hygiene factors, such as working conditions and supervision, and motivational factors, including achievement, recognition, and professional growth. Peramatzis and Galanakis (2022) emphasized the relevance of these factors in understanding employee motivation and satisfaction. In this study, job satisfaction encompasses intrinsic satisfaction, extrinsic satisfaction, work environment satisfaction, and career commitment. This perspective explains why teachers may demonstrate strong professional commitment and instructional competence despite experiencing dissatisfaction with certain workplace conditions. Collectively, these theories establish the conceptual framework in which work-related challenges serve as the independent variable, adaptive strategies as the mediating variable, and teaching effectiveness and job satisfaction as the dependent variables. The framework supports the examination of direct relationships and hypothesized indirect associations among these variables. Given the nonexperimental descriptive-correlational design, the findings are interpreted as statistical associations rather than causal relationships. Ultimately, the integrated framework provides a basis for identifying professional development needs and developing the proposed Adaptive and Industry-Responsive Professional Development Program for TVL Teachers.

Although considerable literature addresses teachers' occupational challenges, coping mechanisms, instructional effectiveness, and job satisfaction, several research gaps justify the present investigation. First, existing studies frequently examine these constructs separately or focus on educational populations outside the Philippine TVL context. Research concerning occupational demands and teacher well-being (Agyapong et al., 2022; Morris et al., 2025), teaching effectiveness (Liang et al., 2025), and professional satisfaction (Eryilmaz et al., 2025) provides important evidence, but findings from these populations cannot automatically be generalized to vocational educators whose responsibilities include practical competency development and industry-related instruction. Second, previous investigations have examined selected mediating variables, including work engagement, teaching efficacy, instructional innovation, and collaborative professional learning (Chen, 2025; Ertaş & Pekmezci, 2025; Wu & Wu, 2026). However, these studies do not directly establish whether the combined adaptive strategies examined in the present research mediate the relationships between work-related challenges and both teaching effectiveness and job satisfaction among Philippine TVL teachers. Third, available Philippine research has examined teacher workload, classroom management, coping mechanisms, and TVL instructional practices (Celis et al., 2023; Sumbilon & Valmorida, 2023; Tarraya, 2023). Nevertheless, context-specific evidence integrating workplace challenges, multidimensional adaptive strategies, and the two professional outcomes among TVL teachers in Bilar, Batuan, and Carmen remains insufficiently established within the literature reviewed. Addressing these gaps, the present study examines the levels and relationships of work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction, including the proposed mediating effects of adaptive strategies. The findings provide a context-specific basis for developing an Adaptive and Industry-Responsive Professional Development Program for TVL Teachers. Importantly, the investigation considers the possibility that adaptive strategies may be associated with teaching effectiveness without necessarily producing corresponding improvements in job satisfaction or statistically significant mediation effects.

The study contributes primarily to Sustainable Development Goal 4 (Quality Education) by examining factors affecting teachers' instructional effectiveness, professional competencies, and capacity to deliver relevant technical-vocational education. Strengthening teachers' professional development supports equitable learning opportunities, competency-based instruction, and lifelong learning. The importance of teacher preparation, institutional support, and effective educational systems is emphasized in the global education agenda (UNESCO & International Task Force on Teachers for Education 2030, 2024). The investigation also aligns with SDG 8 (Decent Work and Economic Growth) through its focus on teachers' workplace conditions, occupational satisfaction, and preparation of learners for employment and industry-related competencies. This connection is consistent with TESDA's (2023) emphasis on workforce readiness, lifelong skills development, and industry-responsive technical-vocational education. Furthermore, the study relates to SDG 3 (Good Health and Well-Being) by addressing occupational stress, adaptive coping, recreational and stress-management activities, and workplace factors affecting teachers' psychological well-being (Agyapong et al., 2022; Morris et al., 2025). Its emphasis on instructional innovation, responsible technology integration, and AI-assisted teaching also supports relevant dimensions of SDG 9 (Industry, Innovation and Infrastructure), particularly the development of technological competencies and innovation-oriented educational practices (Miao & Cukurova, 2024). Finally, SDG 17 (Partnerships for the Goals) is relevant to the proposed professional development program through its potential to strengthen collaboration among teachers, school administrators, educational institutions, and industry

stakeholders. Such partnerships can support industry alignment, knowledge sharing, and sustainable competency development.

The study contributes to multidisciplinary sustainability by integrating perspectives from education, occupational psychology, human resource development, technological innovation, institutional management, and workforce preparation. Its significance lies in recognizing that sustainable educational outcomes depend not only on teachers' instructional abilities but also on supportive workplace conditions, professional development opportunities, and institutional responsiveness. From the perspective of educational sustainability, the investigation provides evidence for identifying professional development priorities that may strengthen instructional competence, classroom management, student engagement, assessment practices, and industry-relevant skill facilitation. These areas are essential for sustaining quality and relevant technical-vocational education. Regarding public health and institutional sustainability, the study emphasizes teachers' occupational well-being, adaptive coping, job satisfaction, and access to organizational support. Examining these dimensions may help educational administrators develop more responsive support mechanisms while recognizing that individual adaptation cannot substitute for adequate institutional resources and manageable workloads. In terms of technological and innovation sustainability, the study highlights the need for continuous professional development in instructional technologies, AI-assisted teaching practices, and changing occupational competencies. Responsible technology integration can strengthen teachers' ability to adapt to educational and industry developments while supporting the continuing relevance of technical-vocational instruction. Finally, the study contributes to socio-economic and workforce sustainability by supporting the professional preparation of educators responsible for developing learners' employability, technical competencies, and practical skills. Through the proposed Adaptive and Industry-Responsive Professional Development Program for TVL Teachers, the findings may inform initiatives that combine teacher development, institutional support, instructional innovation, and industry responsiveness. In this manner, the study offers a practical foundation for strengthening the long-term quality, relevance, and sustainability of technical-vocational education.

2. Material and methods

2.1 Research Design

The study utilized a quantitative descriptive-correlational research design with mediation analysis to investigate the relationships among work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction of TVL teachers. This nonexperimental approach allowed the researcher to describe the study variables and examine their statistical associations without manipulating the respondents' working conditions. As cited by Salmons (2023), quantitative nonexperimental research examines variables within their natural settings, while descriptive and correlational approaches determine their characteristics and relationships (Putri et al., 2025). Mediation analysis was employed to examine whether an indirect association existed between the independent and dependent variables through a mediating variable (Bhandari, 2021). Work-related challenges served as the independent variable, adaptive strategies as the mediating variable, and teaching effectiveness and job satisfaction as the dependent variables. The descriptive component assessed the levels of these variables, while the correlational and mediation components examined their direct and indirect statistical relationships. Given the nonexperimental design, the findings were interpreted as associations rather than evidence of causation.

2.2 Locale of the Study

The study was conducted in five public secondary schools offering the Technical-Vocational-Livelihood track in the municipalities of Bilar, Batuan, and Carmen, Third Congressional District of Bohol, Philippines, during School Year 2026–2027. These institutions included Campagao National High School and Bilar National High School in the Bilar District; Batuan National High School and Quezon National High School in the Batuan District; and Katipunan National High School in the Carmen District. The participating schools operate under the Department of Education and implement the K to 12 Basic Education Curriculum, including the TVL track in Senior High School. Located in predominantly rural communities, these schools provide instructional environments where TVL teachers undertake competency-based instruction, practical skills training, laboratory and workshop management, and work immersion supervision. Their varying geographical and socioeconomic conditions provided an appropriate setting for examining teachers' occupational challenges, adaptive strategies, instructional effectiveness, and job satisfaction.

2.3 Respondents of the Study

The respondents comprised 40 TVL teachers from the five participating public secondary schools. Specifically, five teachers (12.50%) were from Campagao National High School, 11 (27.50%) from Bilar National High School, 10 (25.00%) from Batuan National High School, two (5.00%) from Quezon National High School, and 12 (30.00%) from Katipunan National High School. The respondents were directly involved in TVL instruction, competency-based skills training, classroom management, learner assessment, and industry-related educational activities. Their professional responsibilities made them appropriate sources of information regarding workplace challenges, adaptive practices, teaching effectiveness, and job satisfaction.

2.4 Sample and Sampling Procedure

The study employed universal sampling, also known as total population sampling, in which all qualified members of the identified population were included. This approach was appropriate because the target population consisted of only 40 TVL teachers across the five participating schools. Rather than selecting a smaller sample, the researcher included all eligible teachers to obtain comprehensive information about their professional experiences. Universal sampling ensured representation of the identified TVL teacher population within the participating institutions and minimized the exclusion of relevant perspectives. However, because the investigation was limited to five public secondary schools in Bohol, the findings were interpreted within the context of these institutions and were not assumed to represent all TVL teachers in other educational settings.

2.5 Research Instrument

Data were collected using a modified and adapted survey questionnaire based on instruments developed by Martos and Olores (2025), Sumbilon and Valmorida (2023), Michael et al. (2025), and Cortez et al. (2021). The questionnaire was organized into four parts corresponding to the major study variables. The items were modified to align with the research objectives and were subjected to expert validation to assess their relevance and appropriateness. Necessary revisions were incorporated before administration. The first part measured work-related challenges involving workload demands, resource adequacy, administrative support, industry alignment pressures, and student-related concerns, based on Martos and Olores (2025). The second part assessed adaptive strategies, including problem-focused coping, emotion-focused coping, professional collaboration, continuous professional development, instructional innovation through technology and AI-assisted teaching practices, and participation in recreational, sports, and stress-management activities, adapted from Sumbilon and Valmorida (2023). The third part evaluated teaching effectiveness in terms of instructional competence, classroom management skills, assessment practices, student engagement strategies, and industry-relevant skill facilitation, based on Michael et al. (2025). The fourth part measured job satisfaction through intrinsic satisfaction, extrinsic satisfaction, work environment satisfaction, and career commitment, adapted from Cortez et al. (2021). All questionnaire items employed a four-point Likert scale, with responses ranging from 4 (Strongly Agree) to 1 (Strongly Disagree). Mean scores were interpreted as Very High (3.25–4.00), High (2.50–3.24), Low (1.75–2.49), and Very Low (1.00–1.74). These classifications were applied to determine the reported levels of the four major variables and their respective dimensions.

2.6 Data Gathering Procedure

Data collection followed three sequential stages. Initially, the researcher obtained formal authorization from the Schools Division Superintendent of the Department of Education–Schools Division of Bohol. Upon approval, permission letters were submitted to the principals of the five participating schools, explaining the study's objectives, significance, and procedures. Coordination with school administrators facilitated the scheduling of questionnaire administration. Subsequently, participating teachers were oriented regarding the purpose of the research, questionnaire structure, and response procedures. Informed consent was obtained before administering the modified survey questionnaire. Respondents were provided sufficient time to complete the instrument. After administration, the accomplished questionnaires were retrieved and examined for completeness and accuracy. The responses were encoded, organized, and processed using statistical software. The resulting data were subjected to descriptive statistics, correlation analysis, and regression-based mediation analysis to address the research questions and test the hypotheses. The findings subsequently served as the basis for the proposed professional development program.

2.7 Data Analysis Techniques

The collected data were analyzed using descriptive and inferential statistical techniques. Frequency counts and percentages were employed to determine the distribution of respondents across the participating schools and districts. Means and standard deviations were calculated to describe the levels and variability of work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction, including their respective dimensions. Pearson product-moment correlation coefficients were used to determine the strength, direction, and statistical significance of the linear relationships among work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction. Regression-based mediation analysis was subsequently performed to examine whether adaptive strategies significantly mediated the relationships between work-related challenges and the two professional outcomes. The analysis assessed direct, indirect, and total effects among the variables. All inferential analyses were evaluated at a 0.05 level of significance. The results provided the statistical foundation for determining the relationships among the study variables and identifying areas for the development of an Adaptive and Industry-Responsive Professional Development Program for TVL Teachers.

2.8 Ethical Considerations

The study observed ethical research procedures throughout data collection and processing. Formal authorization was obtained from the appropriate educational authorities and participating school administrators before conducting the investigation. Respondents were informed of the research objectives, procedures, voluntary nature of participation, and confidentiality measures. Informed consent was secured from all participating teachers before

questionnaire administration. The researcher maintained the confidentiality of respondents' information and ensured that collected data were used exclusively for academic purposes. Accomplished questionnaires and encoded responses were securely stored, with access restricted to the researcher, consistent with the data privacy considerations described in the original methodology.

3. Results and Discussion

3.1 Descriptive Findings on Work-Related Challenges and Professional Outcomes

3.1.1 Level of Work-Related Challenges Experienced by TVL Teachers

The findings revealed a high overall level of work-related challenges among TVL teachers ($M = 3.05$). Student-related concerns received the highest mean ($M = 3.38$, $SD = 0.490$), followed by resource adequacy ($M = 3.30$, $SD = 0.608$), both interpreted as very high. Industry alignment pressures ($M = 3.17$, $SD = 0.636$), workload demands ($M = 3.13$, $SD = 0.516$), and administrative support ($M = 2.52$, $SD = 0.716$) were rated high. These results indicate that the respondents experienced challenges primarily involving learner-related concerns and instructional resources, followed by the demands of maintaining industry-relevant instruction, managing workloads, and obtaining administrative support. The findings reflect the occupational demands experienced by teachers in competency-based educational environments. Bakker et al. (2023) explained that job demands and available resources influence employees' professional functioning and well-being. Similarly, Frianeza et al. (2024) identified resource limitations and institutional challenges affecting teachers' instructional practices in the Philippines, while Mesuwini and Mokoena (2024) emphasized the instructional and technological difficulties encountered by vocational educators. The relatively high ratings for student-related concerns and resource adequacy suggest that learner management, differentiated instruction, instructional resource development, and institutional assistance should be considered in professional development planning. However, these descriptive findings do not establish that such challenges directly reduce teaching effectiveness or job satisfaction.

3.1.2 Level of Adaptive Strategies Employed by TVL Teachers

The respondents demonstrated a high overall level of adaptive strategies ($M = 3.43$). Instructional innovation through technology and artificial intelligence (AI)-assisted teaching obtained the highest mean ($M = 3.67$, $SD = 0.474$), followed by problem-focused coping and professional collaboration, which received identical means ($M = 3.52$, $SD = 0.506$). Emotion-focused coping ($M = 3.40$, $SD = 0.496$), continuous professional development ($M = 3.30$, $SD = 0.516$), and participation in recreational, sports, and stress-management activities ($M = 3.25$, $SD = 0.588$) were likewise rated high. These findings indicate that the teachers reported frequent utilization of technological innovation, problem-solving approaches, collaboration, emotional regulation, and professional learning, although wellness-related activities received the lowest rating. The results are consistent with contemporary perspectives emphasizing adaptability and professional resources in managing occupational demands. Brooks et al. (2022) highlighted the relevance of problem-focused and emotion-focused coping among educators, while Yang and Du (2024) examined the relationships among teachers' digital competence, emotion regulation, and occupational well-being. Furthermore, Wu and Wu (2026) emphasized the importance of collaborative professional learning and teacher self-efficacy in professional outcomes. The high ratings for technology integration and collaboration suggest that these practices are prominent components of the respondents' adaptive approaches. Nevertheless, the findings establish only the reported extent of strategy utilization and do not independently demonstrate improvements in teaching performance, psychological well-being, or job satisfaction.

3.1.3 Level of Teaching Effectiveness of TVL Teachers

The findings showed a high overall level of self-reported teaching effectiveness ($M = 3.56$). Student engagement strategies obtained the highest mean ($M = 3.80$, $SD = 0.405$), followed by classroom management skills ($M = 3.63$, $SD = 0.490$), assessment practices ($M = 3.58$, $SD = 0.501$), industry-relevant skill facilitation ($M = 3.40$, $SD = 0.496$), and instructional competence ($M = 3.38$, $SD = 0.540$). All five dimensions were interpreted as high, indicating that respondents positively assessed their instructional practices, particularly their efforts to promote learner participation and maintain effective classroom management. The findings emphasize the importance of student-centered instruction and classroom management in technical-vocational education, where practical demonstrations and competency development require active learner participation. Sumbilon and Valmorida (2023) highlighted the relevance of instructional strategies to learning experiences among TVL learners, while Liang et al. (2025) demonstrated the relationships between teachers' professional concerns and instructional effectiveness. Similarly, Li et al. (2025) emphasized the relevance of emotional competence and teaching efficacy to innovative teaching practices. Although the respondents reported high teaching effectiveness, these self-assessments do not independently establish actual learner competency attainment or objectively measured instructional performance. Nevertheless, the results identify instructional strengths that may be sustained through continuous professional development and industry-responsive teaching practices.

3.1.4 Level of Job Satisfaction of TVL Teachers

The overall level of job satisfaction was moderate ($M = 3.17$), despite the high ratings obtained for career commitment ($M = 3.52$, $SD = 0.506$) and intrinsic satisfaction ($M = 3.38$, $SD = 0.490$). Extrinsic satisfaction ($M = 3.05$, $SD = 0.552$) and work environment satisfaction ($M = 2.73$, $SD = 0.751$) were rated moderate, with the latter receiving the lowest mean. These results indicate that respondents expressed relatively strong professional commitment and personal fulfillment in teaching but comparatively lower satisfaction with external employment conditions and their working environment. The findings may be understood through Herzberg's Two-Factor Theory, which differentiates motivational factors from workplace conditions associated with dissatisfaction. Peramatzis and Galanakis (2022) emphasized that professional achievement and growth can contribute to motivation, whereas working conditions and organizational policies influence dissatisfaction. Similarly, Chen (2025) identified perceived organizational support and work engagement as important factors associated with teacher job satisfaction, while Eryilmaz et al. (2025) demonstrated the relevance of leadership, workload, and school working conditions. The present findings suggest that strong professional commitment does not necessarily correspond to equally high satisfaction with the work environment. Consequently, professional development initiatives may need to be complemented by institutional assistance, recognition, and appropriate working conditions rather than relying exclusively on individual adaptive skills.

3.2 Relationships Among Work-Related Challenges, Adaptive Strategies, and Professional Outcomes

3.2.1 Relationship Between Work-Related Challenges and Adaptive Strategies

Pearson correlation analysis revealed a weak positive relationship between work-related challenges and adaptive strategies ($r = .207$, $df = 38$, $p = .199$). Since the p -value exceeded the .05 significance level, the relationship was not statistically significant, and the null hypothesis was not rejected. This indicates that the study did not establish a significant linear association between the challenges experienced by TVL teachers and the extent to which they employed adaptive strategies. The finding does not confirm the expectation that greater workplace difficulties necessarily correspond to increased use of adaptive strategies. Within the Job Demands–Resources framework, occupational responses may depend on the availability of personal and organizational resources (Bakker et al., 2023; Demerouti & Bakker, 2023). Brooks et al. (2022) likewise demonstrated that teachers employ different coping approaches when responding to occupational pressures. Although the respondents reported high levels of adaptive strategies, their use was not significantly associated with the level of reported workplace challenges. This suggests that the proposed professional development program should support adaptive competencies without assuming that exposure to greater challenges automatically increases teachers' adaptive responses.

3.2.2 Relationship Between Work-Related Challenges and Teaching Effectiveness

The relationship between work-related challenges and teaching effectiveness was very weak and positive ($r = .112$, $df = 38$, $p = .493$). The correlation was not statistically significant at the .05 level, resulting in the non-rejection of the null hypothesis. This finding indicates that the reported level of workplace challenges was not significantly associated with differences in self-reported teaching effectiveness among the participating TVL teachers. The result differs from findings in other educational contexts where professional concerns and workplace conditions have been associated with instructional outcomes. Liang et al. (2025) identified significant relationships between teachers' work concerns and selected dimensions of teaching effectiveness, while Frianeza et al. (2024) discussed how educational challenges affect instructional strategies and professional development. However, the absence of a significant relationship in the present study does not establish that workplace challenges have no influence on instructional performance. Rather, the evidence was insufficient to demonstrate a statistically significant linear association within the sample. The finding supports the importance of examining workplace conditions and instructional competence as related but distinct areas of professional development.

3.2.3 Relationship Between Work-Related Challenges and Job Satisfaction

The correlation between work-related challenges and job satisfaction was very weak and negative ($r = -.108$, $df = 38$, $p = .505$). Since the relationship was not statistically significant at the .05 level, the null hypothesis was not rejected. Although the direction of the correlation suggests that higher challenge scores were associated with slightly lower job satisfaction scores, the magnitude was negligible, and the study did not establish a statistically significant relationship between these variables. The finding should be considered alongside contemporary research demonstrating that teacher satisfaction is associated with multiple professional and organizational factors. Eryilmaz et al. (2025) reported that school leadership, student behavior, and workload conditions were related to teacher job satisfaction, while Chen (2025) emphasized the roles of organizational support and professional engagement. The present result does not contradict these findings but indicates that the hypothesized relationship was not statistically supported among the participating TVL teachers. Accordingly, the moderate level of job satisfaction observed in the descriptive analysis cannot be attributed directly to the measured workplace challenges without additional supporting evidence.

3.2.4 Relationship Between Adaptive Strategies, Teaching Effectiveness, and Job Satisfaction

The findings revealed a moderate positive and statistically significant relationship between adaptive strategies and teaching effectiveness ($r = .392$, $df = 38$, $p = .012$). Accordingly, the null hypothesis of no significant relationship

was rejected for these variables. In contrast, the relationship between adaptive strategies and job satisfaction was negligible and statistically nonsignificant ($r = .003$, $df = 38$, $p = .986$), resulting in the non-rejection of the corresponding null hypothesis. These results indicate that greater reported utilization of adaptive strategies was associated with higher self-reported teaching effectiveness but was not significantly associated with job satisfaction. The significant positive association between adaptive strategies and teaching effectiveness is consistent with research emphasizing professional adaptability, instructional innovation, and psychological resources in teaching. Lin and Liu (2025) identified adaptability and autonomy support as important factors associated with teachers' innovative work behavior, while Li et al. (2025) demonstrated the relevance of emotional competence and teaching efficacy to instructional innovation. However, the nonsignificant relationship with job satisfaction suggests that adaptive teaching practices and professional fulfillment are not interchangeable outcomes. Chen (2025) and Wu and Wu (2026) further emphasized the importance of organizational support and collaborative professional learning in teacher satisfaction. Therefore, strengthening adaptive strategies may be relevant to teaching effectiveness, but the present findings do not establish that such interventions alone will improve job satisfaction.

3.3 Mediating Effects of Adaptive Strategies on Professional Outcomes

3.3.1 Mediating Effects of Adaptive Strategies Between Work-Related Challenges and Job Satisfaction

Regression-based mediation analysis examined 30 indirect pathways involving five dimensions of work-related challenges and six adaptive strategies. The findings revealed that none of the indirect effects on job satisfaction was statistically significant at the .05 level. All 95% bootstrap confidence intervals included zero, and all reported p -values exceeded .05. For example, the indirect effect of workload demands through continuous professional development was 0.08291 (95% CI $[-0.0510, 0.3756]$, $p = .210$), while the indirect effect through recreational, sports, and stress-management activities was -0.09395 (95% CI $[-0.3672, 0.0215]$, $p = .150$). Similarly, the indirect effects involving resource adequacy, administrative support, industry alignment pressures, and student-related concerns were nonsignificant across the examined adaptive strategies. Consequently, the null hypothesis of no significant mediation was not rejected. These findings indicate that the study did not establish adaptive strategies as statistically significant mediating mechanisms between workplace challenges and job satisfaction. The result may be interpreted through the Job Demands–Resources framework, which recognizes that employee well-being and satisfaction are associated with both personal resources and organizational conditions (Demerouti & Bakker, 2023). Similarly, Eryilmaz et al. (2025) and Chen (2025) emphasized the importance of school working conditions and perceived organizational support in teacher satisfaction. Although adaptive strategies may contribute to teachers' professional functioning, the present findings do not establish that they explain the association between occupational challenges and satisfaction. Furthermore, the sample of 40 teachers limits the precision of indirect-effect estimation, indicating that the nonsignificant results should not be interpreted as conclusive evidence that mediation is absent in other educational populations.

3.3.2 Mediating Effects of Adaptive Strategies Between Work-Related Challenges and Teaching Effectiveness

The mediation analysis likewise examined 30 indirect pathways linking the five work-related challenge dimensions with teaching effectiveness through the six adaptive strategies. None of the tested indirect effects was statistically significant at the .05 level, and all reported 95% bootstrap confidence intervals contained zero. For instance, the indirect effect of workload demands through instructional innovation involving technology and AI-assisted teaching was 0.07083 (95% CI $[-0.0542, 0.3513]$, $p = .282$), while the indirect effect through recreational, sports, and stress-management activities was -0.10135 (95% CI $[-0.4970, 0.0224]$, $p = .153$). The remaining indirect effects involving workload demands, resource adequacy, administrative support, industry alignment pressures, and student-related concerns were likewise statistically nonsignificant. Therefore, the null hypothesis of no significant mediation was not rejected. The findings demonstrate that although adaptive strategies were significantly associated with teaching effectiveness, their hypothesized mediating role was not statistically supported. This distinction is important because a significant association between a mediator and an outcome does not independently establish a significant indirect effect. Bakker et al. (2023) emphasized the complex relationships among occupational demands, resources, and professional functioning, while Wang et al. (2024) demonstrated that psychological resources may operate through different pathways in explaining teachers' well-being. Similarly, Yang and Du (2024) identified mediation relationships involving teachers' self-efficacy and emotion regulation in another educational context. However, the present study did not establish comparable indirect relationships involving adaptive strategies and teaching effectiveness. These findings underscore the need to distinguish professional practices associated with teaching effectiveness from statistically demonstrated mediating mechanisms.

3.4 Implications for the Proposed Professional Development Program

The combined findings identified student-related concerns and resource adequacy as the most highly rated workplace challenges, while instructional innovation through technology and AI-assisted teaching was the most frequently reported adaptive strategy. Student engagement strategies received the highest rating for teaching

effectiveness, whereas work environment satisfaction obtained the lowest mean among the job satisfaction dimensions. Furthermore, adaptive strategies demonstrated a significant positive relationship with teaching effectiveness but not with job satisfaction, and neither hypothesized mediation model yielded statistically significant indirect effects. These findings informed the development of the proposed Adaptive and Industry-Responsive Professional Development Program for TVL Teachers, emphasizing learner management, instructional resource development, technological innovation, industry alignment, professional collaboration, continuous competency development, and teacher well-being. The proposed program reflects the need to strengthen teachers' adaptive and instructional competencies while considering the organizational conditions affecting their professional experiences. Mesuwini and Mokoena (2024) emphasized the importance of appropriate technological and institutional support in vocational education, while Miao and Cukurova (2024) identified professional competencies necessary for responsible AI integration in teaching. Likewise, Wu and Wu (2026) highlighted collaborative professional learning, and Eryilmaz et al. (2025) emphasized the relevance of supportive working environments. Accordingly, the proposed program provides a research-informed framework for addressing identified professional development needs. However, because the program was formulated from the study findings rather than evaluated through implementation, its effectiveness in improving adaptability, teaching effectiveness, or job satisfaction remains to be established through subsequent assessment.

4. Conclusion & Recommendations

The study concludes that Technical-Vocational-Livelihood (TVL) teachers demonstrated high levels of adaptive strategies and teaching effectiveness despite experiencing substantial work-related challenges, particularly student-related concerns and inadequate instructional resources. However, their moderate job satisfaction indicates that professional competence and adaptability do not necessarily correspond to greater workplace satisfaction. Work-related challenges showed no statistically significant relationships with adaptive strategies, teaching effectiveness, or job satisfaction. Although adaptive strategies were positively and significantly associated with teaching effectiveness, they were not significantly associated with job satisfaction and did not significantly mediate the relationships between work-related challenges and either professional outcome. These findings highlight the importance of strengthening teachers' adaptive competencies alongside institutional support and provide a basis for developing an Adaptive and Industry-Responsive Professional Development Program for TVL Teachers.

Based on the findings, the study recommends the adoption and implementation of the proposed Adaptive and Industry-Responsive Professional Development Program for TVL Teachers in the participating schools. The program should focus on differentiated instruction, learner engagement, instructional resource development, technology and artificial intelligence integration, industry-relevant skills enhancement, professional collaboration, and teacher wellness. Its implementation should involve school administrators, TVL teachers, and industry partners to ensure responsiveness to identified professional needs and workplace challenges. Furthermore, participating institutions should provide appropriate resources, administrative assistance, and continuous professional development opportunities to sustain teaching effectiveness and promote a supportive working environment. The implementation and outcomes of the program should be systematically monitored and evaluated to determine whether its objectives are achieved.

The study was limited to 40 TVL teachers from five public secondary schools in the Bilar, Batuan, and Carmen Districts of Bohol, restricting the generalizability of the findings to other educational settings. Additionally, the nonexperimental descriptive-correlational design and reliance on self-reported questionnaire responses limit causal interpretation. The relatively small sample size may also have affected the precision of the mediation estimates, particularly given the multiple indirect relationships examined. Consequently, the nonsignificant mediation findings should not be interpreted as conclusive evidence that adaptive strategies have no mediating role in other educational contexts.

5. Compliance with ethical standards

The author declares no conflicts of interest in relation to this study. The research was conducted in accordance with accepted ethical principles for human-participant research, ensuring voluntary participation, informed consent, confidentiality, and protection of respondents' information. Formal authorization was obtained from the Department of Education–Schools Division of Bohol and the administrators of the participating public secondary schools in Bilar, Batuan, and Carmen before data collection. The 40 Technical-Vocational-Livelihood (TVL) teachers were informed of the study's objectives, procedures, and academic purpose before completing the survey questionnaires. As the investigation focused on work-related challenges, adaptive strategies, teaching effectiveness, and job satisfaction, data collection involved non-invasive, self-reported assessments. All collected information was treated confidentially, securely stored, and accessed exclusively by the researcher. Responses were analyzed and presented in aggregated form to protect participants' identities, and the data were used solely for academic and research purposes.

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