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Using CIPP Model Evaluation Data to Drive School Innovation Management: A Case Study of Technical Senior High School in Taiwan

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ABSTRACT

Despite the growing importance of evaluation in educational management, technical high schools often struggle to effectively utilize evaluation data for innovation. This study examines how evaluation data influence the innovative management of technical high schools using the CIPP model (Context, Input, Process, Product). Employing a qualitative case study approach, this research integrates document analysis, field interviews, and observations to explore how schools leverage evaluation data for educational decision-making, resource allocation, and curriculum reform. Findings indicate that evaluation mechanisms play a crucial role in optimizing faculty development, strengthening industry-academia collaboration, and enhancing data-driven decision-making. Technical high schools that effectively apply evaluation data demonstrate improvements in student advancement rates, skills competition performance, and graduate employability. However, challenges persist, including the limited adaptability of evaluation frameworks tailored primarily for academic high schools, as well as the insufficient capacity of administrators and teachers to interpret and utilize evaluation results. To address these issues, this study suggests implementing a PDCA (Plan-Do-Check-Act) cycle to refine policy adjustments and strengthen data-driven decision-making processes. Furthermore, expanding external collaboration networks and adopting international evaluation practices can enhance school adaptability and competitiveness. Rather than being merely a performance monitoring tool, evaluation should serve as a key driver for continuous school innovation and sustainable development.

Keywords: technical high schools, educational evaluation, CIPP model, innovation, data-driven decision-making, PDCA cycle.

INTRODUCTION

Research Background

In the face of globalization and rapid technological advancements, technical high schools must continuously innovate to remain competitive. However, the application of evaluation data in driving school improvement remains a major challenge. While school evaluation is widely implemented, its effectiveness in informing strategic decision-making and fostering innovation is often limited. Many technical high schools struggle to translate evaluation results into actionable insights due to rigid evaluation frameworks, resource constraints, and a lack of data literacy among administrators and educators. This raises a critical question: How can technical high schools effectively utilize evaluation data to enhance educational quality and institutional sustainability?

Educational Challenges Under Globalization and Declining Birth Rates:

Given the urgent need for technical high schools to leverage evaluation data for innovation, it is crucial to examine the broader educational challenges they face. Globalization has driven industrial upgrading and technological innovation, leading to a growing demand for skilled professionals. However, Taiwan's declining birth rate has intensified challenges in school enrollment and management, particularly for technical high schools, which serve as key institutions for vocational education and skill development. The continuous decline in the school-age population has placed unprecedented pressure on technical high schools regarding enrollment stability, resource allocation, and educational effectiveness. According to the latest population statistics released by the Ministry of the Interior (2025) [1], Taiwan recorded a historic low in newborns in 2023, indicating that demographic shifts are directly affecting the sustainability of technical high schools. Under these circumstances, technical high schools must maintain competitiveness despite limited resources to ensure high-quality education and equitable learning opportunities for students. Educational evaluation has been recognized as a crucial mechanism for improving education quality, allowing schools to assess their management models, teaching effectiveness, and resource allocation in response to development needs [2]. Moreover, innovative management strategies enable schools to adapt to changes and strengthen their competitive advantages. Tan (2024) emphasized that effective management strategies can enhance schools' responsiveness to market demands, ensuring their continued development in a dynamic environment [3]. Innovation in technical high school management extends beyond teaching and administrative adjustments; it also involves leadership and strategic management, fostering an open learning culture to enhance school competitiveness. Therefore, educational evaluation should not be merely a monitoring tool but should serve as a strategic driver for continuous improvement and innovation in technical high schools. This study explores how evaluation mechanisms influence the management and educational quality of technical high schools and analyzes their practical value in school development.

The Necessity of Educational Evaluation for School Innovation and Management:

Despite the pivotal role TSHSs play in developing skilled workers, they continue to face multiple challenges in practice. First, the use of evaluation data remains suboptimal: although schools collect large volumes of administrative data, they often struggle to convert these data into concrete decisions, leading to subpar resource distribution and directional planning. Second, insufficient integration of internal and external resources hampers cooperation with industry and community partners, limiting the sharing of educational resources and broader collaborative development [2]. Moreover, gaps persist between school policy and industry needs, undermining TSHSs' evolution. If policy cannot be aligned with the unique requirements

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of technical–vocational education, it becomes difficult to leverage evaluation data for effective reforms. In this context, understanding how school evaluation can facilitate cross-department and cross-organizational resource integration is crucial for enhancing school operations and driving educational reforms [7]. An effective evaluation system must align with the institution's governance structure, using evaluation indicators not just for performance monitoring but also as a basis for strategy adjustments. This alignment ensures that administrative and teaching staff can make evidence-based decisions [8]. By refining administrative efficiency, promoting industry–academia collaboration, and enhancing students' career competencies, a robust evaluation mechanism helps TSHSs manage resources effectively and achieve dual aims: organizational innovation and sustainable development.

Existing Challenges and Research Motivation:

Despite the pivotal role TSHSs play in developing skilled workers, they continue to face multiple challenges in practice. First, the use of evaluation data remains suboptimal: although schools collect large volumes of administrative data, they often struggle to convert these data into concrete decisions, leading to subpar resource distribution and directional planning. Second, insufficient integration of internal and external resources hampers cooperation with industry and community partners, limiting the sharing of educational resources and broader collaborative development [2]. Moreover, gaps persist between school policy and industry needs, undermining TSHSs' evolution. If policy cannot be aligned with the unique requirements of technical–vocational education, it becomes difficult to leverage evaluation data for effective reforms. In this context, understanding how school evaluation can facilitate cross-department and cross-organizational resource integration is crucial for enhancing school operations and driving educational reforms [7]. An effective evaluation system must align with the institution's governance structure, using evaluation indicators not just for performance monitoring but also as a basis for strategy adjustments. This alignment ensures that administrative and teaching staff can make evidence-based decisions [8]. By refining administrative efficiency, promoting industry–academia collaboration, and enhancing students' career competencies, a robust evaluation mechanism helps TSHSs manage resources effectively and achieve dual aims: organizational innovation and sustainable development.

The Value of Applying Evaluation Data:

In recent years, data-driven educational decision-making has gained significant attention. By integrating evaluation data, schools can better assess institutional performance and quickly identify areas for improvement [9]. When principals and school teams receive real-time feedback from evaluation results, they can dynamically adjust resource allocation and curriculum structures to enhance school performance. Furthermore, evaluation data fosters teaching innovation, helping schools identify gaps in subject development, teaching inefficiencies, and administrative bottlenecks. By incorporating emerging technologies and industry case studies, schools can enhance students' employability [6]. An effective evaluation framework should integrate both quantitative data analysis and qualitative inquiry, ensuring its practical application in educational decision-making [10, 11]. By combining quantitative and qualitative evaluation methods, schools can develop more precise strategies to maximize the value of evaluation mechanisms. For technical high schools, evaluation data can also be leveraged to optimize internship programs and career counseling, bridging the gap between education and industry needs. This approach enhances students' workplace adaptability and contributes to the long-term sustainability of technical education. Additionally, evaluation data

serves as a crucial tool for driving organizational change and improving decision-making processes. Through cross-departmental collaboration and continuous feedback mechanisms, schools can transform evaluation results into concrete actions, enhancing overall operational efficiency and ensuring sustained school development.

Research Objectives

School evaluation has become a core mechanism for ensuring educational quality and driving innovation in global education systems [5, 6]. In the field of technical high schools, evaluation not only enhances administrative management and teaching effectiveness but also serves as a driving force for continuous school improvement by optimizing resource allocation and adjusting strategic directions [4]. Taiwan's technical high schools face dual challenges from declining birth rates and global competition. Effectively utilizing evaluation data to align school operations with market demands has become a critical issue in the development of vocational education [14, 15]. Previous studies have indicated that the effectiveness of evaluation mechanisms lies in their close integration with school development strategies [3, 16]. If schools adopt internationally recognized evaluation frameworks such as the CIPP (Context, Input, Process, Product) model, they can not only improve decision-making quality but also ensure that evaluation results translate into concrete action plans [5].

Current evaluation frameworks are primarily designed for general high schools, often overlooking the distinct characteristics and needs of vocational education. This misalignment limits the ability of evaluation results to accurately reflect the teaching effectiveness and industry linkages of technical high schools, ultimately constraining their capacity for meaningful innovation and improvement [17]. Given this, the present study focuses on how evaluation data can drive innovative management in technical high schools by applying the CIPP model. Specifically, it examines the extent to which evaluation data informs administrative decision-making, optimizes resource allocation, fosters teaching innovation, and strengthens industry-academia collaboration.

To address these concerns, this study explores the role of evaluation data in shaping school governance and the allocation of financial and human resources. It further investigates the challenges technical high schools encounter when integrating evaluation results into strategic planning, including limitations in data interpretation, policy constraints, and infrastructural barriers. Additionally, this research analyzes how evaluation-driven insights can be leveraged to enhance teaching methodologies, improve student learning outcomes, and support the development of industry-relevant curricula. Finally, it examines how schools can transform evaluation findings into actionable strategies for fostering innovative management models that ensure long-term institutional sustainability and responsiveness to evolving workforce demands.

To address these research questions, this study adopts a case analysis approach to examine the substantive impact of evaluation data on school administration and teaching development in technical high schools. Additionally, it explores the key factors and barriers in translating data into action. The primary objectives of this study are as follows:

1. To explore the role of evaluation data in administrative management and resource allocation in technical high schools.

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2. To examine the challenges and limitations that technical high schools may face in applying evaluation data.
3. To inquiry how evaluation data can promote teaching innovation and improve student learning outcomes in vocational education.
4. To apply how evaluation results can be leveraged to strengthen innovative management models in technical high schools.

This study contributes to academic discussions on the application of evaluation data and organizational innovation. Through practical analysis, it proposes actionable strategies to support school administration and enhance teaching quality in the context of enrollment challenges and educational transformation. As evaluation mechanisms continue to evolve, effectively utilizing data-driven decision-making will become a crucial aspect of school self-improvement [13, 19].

In particular, the study measures the impact of evaluation on student learning outcomes, employment competitiveness, and school administration, while analyzing how evaluation fosters the sustainable development of vocational education. The value of the CIPP model lies in its systematic and continuous improvement framework, which helps school leaders make policy adjustments and optimize resource allocation based on evaluation data [19]. Through the CIPP model, the study explores how technical high schools can enhance educational quality and competitiveness amid demographic decline and industrial transformation, ultimately developing innovative management strategies aligned with industry demands.

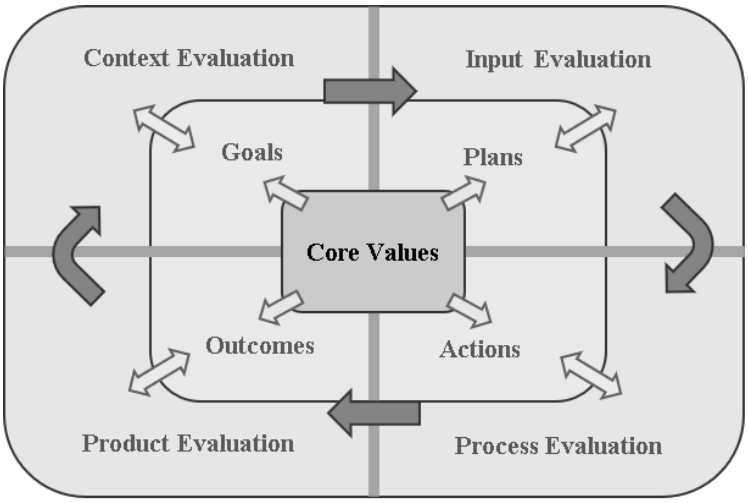

Figure 1: Key components of the CIPP evaluation model and associated relationships with programs

D. L. Stufflebeam, "The CIPP model for evaluation," in *The International Handbook of Educational Evaluation*, T. Kellaghan and D. L. Stufflebeam, Eds., Dordrecht, The Netherlands: Kluwer Academic Publishers, 2003, pp. 31–62, doi: 10.1007/978-94-010-0309-4_4.

LITERATURE REVIEW

The CIPP Model: Definition and Applications

The CIPP model (Context, Input, Process, Product), developed by Stufflebeam [5], serves as a comprehensive framework for evaluating educational effectiveness by integrating multiple dimensions of assessment. Unlike traditional evaluation approaches that focus solely on outcomes, the CIPP model provides a holistic perspective by incorporating contextual analysis, resource evaluation, implementation monitoring, and outcome assessment. Context evaluation examines the external and internal conditions that shape school operations, including demographic shifts, economic factors, and workforce demands. For technical senior high schools (TSHSs), this dimension is particularly relevant, as it ensures that institutional strategies align with evolving industry requirements [18]. Input evaluation, on the other hand, focuses on assessing the adequacy of resources such as faculty qualifications, curriculum design, financial investments, and technological infrastructure. Studies suggest that resource quality significantly influences the effectiveness of vocational education programs, as it determines whether schools can support practical, skill-based learning experiences [15].

Beyond resource availability, process evaluation plays a critical role in tracking the implementation of educational policies, instructional methodologies, and administrative strategies. A well-structured evaluation mechanism allows schools to refine their curriculum, integrate technological advancements, and strengthen partnerships with industry stakeholders [16]. Finally, product evaluation assesses educational outcomes, including student employability, skills competition performance, and the effectiveness of industry-academia collaboration. Research has demonstrated that institutions adopting the CIPP model in vocational education exhibit higher levels of institutional adaptability and innovation capacity [22].

While the CIPP model has been extensively applied in higher education and teacher training programs [7, 10], its adoption in technical high schools remains relatively underexplored. Given the unique operational challenges faced by these institutions, it is essential to investigate how CIPP-based evaluation frameworks can enhance strategic decision-making, resource optimization, and institutional innovation in vocational education settings.

School Innovation Management and Evaluation Data Utilization

Educational innovation is increasingly recognized as a critical factor in enhancing institutional effectiveness, particularly in the context of technical and vocational education. Innovation management, broadly defined as the strategic implementation of new policies, technologies, and administrative practices, is essential for maintaining teaching quality, optimizing resource allocation, and fostering a culture of continuous improvement [3]. However, despite widespread acknowledgment of its importance, many technical high schools struggle to translate evaluation data into meaningful strategic actions due to limitations in analytical capacity and systemic rigidity [8].

One of the key challenges in vocational education management is the underutilization of evaluation data. Although schools routinely collect substantial amounts of data through evaluation mechanisms, administrators and educators often lack the necessary expertise to analyze and apply these findings effectively [8]. Furthermore, existing evaluation frameworks are predominantly designed for academic high schools, making it difficult for technical institutions to derive actionable insights that align with skill-based education models [14].

Without a tailored evaluation approach, schools may fail to identify areas for improvement, leading to stagnation in program development and curriculum design.

In addition to methodological constraints, the absence of strong industry-academia collaboration further hinders innovation in vocational education. Many technical high schools struggle to establish long-term partnerships with industry stakeholders, limiting opportunities for students to engage in real-world training and skill development [23]. This lack of integration not only affects students' career readiness but also reduces the institution's ability to adapt its curriculum to evolving industry demands. Furthermore, inefficient resource allocation remains a persistent issue, as fragmented budgeting and administrative bottlenecks often prevent schools from effectively deploying financial and human resources [21].

Recent studies suggest that data-driven decision-making can help overcome these challenges by enabling schools to develop evidence-based strategies for curriculum enhancement, faculty development, and institutional planning [13]. Additionally, integrating international best practices, such as the PDCA cycle (Plan-Do-Check-Act), has been shown to improve evaluation system sustainability, ensuring that schools continuously refine their educational models based on empirical findings [9]. By examining how CIPP-based evaluation data can drive school innovation, this study aims to bridge the gap between evaluation practices and effective school management strategies. A structured approach to utilizing evaluation data could significantly enhance resource allocation, interdisciplinary collaboration, and engagement with external stakeholders, ultimately contributing to the long-term sustainability and competitiveness of technical high schools.

METHODOLOGY

Theoretical Framework

School evaluation plays a crucial role in promoting institutional and instructional innovation, which relies on a well-established theoretical foundation and robust evaluation models. This study adopts the CIPP (Context, Input, Process, Product) evaluation model as the analytical framework to examine how technical high schools utilize evaluation data to enhance administrative efficiency, optimize resource allocation, drive teaching innovation, and strengthen industry linkages [6]. The CIPP model, proposed by Stufflebeam, emphasizes a four-dimensional analysis—Context, Input, Process, and Product—to provide educational institutions with a foundation for continuous improvement. The core value of this model lies in transforming evaluation results into actionable plans, enabling schools to make data-driven strategic adjustments to enhance educational effectiveness and ensure rational policy decision-making [4]. As illustrated in Figure 1, the four evaluation dimensions of the CIPP model—Context Evaluation, Input Evaluation, Process Evaluation, and Product Evaluation—are interconnected, forming a comprehensive evaluation structure that revolves around core values. This figure visually represents the interactions between Goals, Plans, Actions, and Outcomes, offering decision-makers a holistic perspective in educational evaluation. In the analytical framework of this study, the application of the CIPP model is divided into four dimensions [16, 18]: Context: Examines the social and economic environment of technical high schools, including the impact of declining birth rates, global competition, and regional industrial development trends, to assess the appropriateness of school development strategies. Input: Analyzes faculty allocation, equipment resources, and financial distribution to evaluate whether schools possess sufficient conditions to support teaching innovation and skills

development. Process: Documents and evaluates teaching and administrative operations, including curriculum design, industry-academia collaboration, teacher professional development, and student internship opportunities, ensuring schools can dynamically adjust their strategies to enhance educational quality.

Research Design

This study employs qualitative research methods, combining a case study approach with content analysis to examine the function of evaluation data in the innovative management of a technical senior high school. Case studies are particularly suited for "how" and "why" research questions, enabling an in-depth exploration of the processes and contexts that shape organizational innovation under the dual pressures of demographic decline and globalization [10]. To ensure a robust theoretical foundation, the study draws on the CIPP model (Context, Input, Process, Product) as its principal analytical framework [5]. This model offers a systematic evaluation approach in which findings do more than merely measure performance; they support continuous improvement and evidence-based decision-making [6]. Schools conduct dynamic assessments across the four CIPP dimensions—Context, Input, Process, and Product—ensuring that management and teaching practices evolve in response to evaluation outcomes. For example, based on background data, a TSHS can identify current enrollment and industry-cooperation challenges and then adjust resource allocation. In the process dimension, evaluation feedback helps refine curriculum design, ultimately boosting student competitiveness in the job market. To fully capture the complexities of school operations, this research draws on multiple data sources, including interviews, on-site observations, and document analysis [10]. Triangulation (i.e., cross-verifying findings from different data sources) enhances the validity and reliability of the results, reducing potential bias from reliance on any single source [11].

Research Sample

This study selects a representative technical senior high school (TSHS) in Taiwan as the case study to examine its current operational status. When organizations transition from traditional models to strategic resource management, they often encounter both challenges and opportunities in student recruitment, institutional operations, and curriculum planning [20]. How TSHSs drive innovation under limited resources and utilize evaluation data for strategic adjustments and optimization is the core issue explored in this study.

The selected case school is a long-established institution with a distinctive focus on innovation. It offers multiple technical and vocational disciplines and actively develops on-campus industry-academia collaboration projects, such as the "Student Internship Hotel," where students engage in practical training to cultivate professional workplace competencies. Against the backdrop of global industrial transformation and declining birth rates, technical high schools shoulder the critical responsibility of cultivating skilled professionals while simultaneously facing significant challenges in student enrollment and resource allocation. If evaluation data can effectively support institutional management and educational reform, it will not only impact the survival and development of technical high schools but also serve as a model for broader vocational education reforms. Thus, the selected case school is representative in both teaching innovation and evaluation mechanisms. It features a well-defined and structured learning community with distinct characteristics, making its

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institutional model and evaluation data utilization practices an ideal analytical case for this study.

Additionally, to ensure a diverse range of perspectives, this study adopts purposive sampling, selecting key stakeholders who play critical roles in evaluation and innovative school management as interview participants. A total of 12 participants were interviewed, categorized into three groups:

- Administrative Management (3 participants): Principal, Secretary, and Academic Director, responsible for administrative decision-making, resource allocation, and overall school management.
- Teacher Representatives (6 participants): Teachers from diverse academic and vocational fields, including Industrial Technology, Business, Humanities, Arts, Mathematics, and Physical Education, providing first-hand insights into the application of evaluation data in teaching innovation.
- Evaluation Staff (3 participants): Document Supervisor, Vocational Department Head, and General Affairs Director, responsible for managing evaluation workflows, data collection, and analysis, with expertise in implementing evaluation strategies and facilitating internal-external coordination mechanisms.

Through cross-observation and feedback from participants across different roles, this study provides a comprehensive analysis of the function of evaluation mechanisms in innovative school management. The diverse perspectives enhance the reliability and richness of the research findings.

Data Collection

To ensure the reliability of the research findings, this study utilizes document analysis and on-site observations as data collection methods. The collected data is systematically organized based on the CIPP model (Context, Input, Process, and Product) to ensure data integrity and verifiability.

Document Analysis:

This study collects various types of documents to examine the application value of evaluation data in institutional management and teaching reforms in technical senior high schools (TSHSs). Document analysis plays a crucial role in school evaluation research, as it effectively links policy frameworks with school practices, ensuring that evaluation data can be transformed into concrete management decisions. The categories of collected data are as follows:

Policy-Level Documents:

Includes the "Senior High School Evaluation Regulations" and other educational policy documents, providing insights into the government's evaluation standards and requirements for TSHSs.

Internal School Documents:

Encompasses evaluation reports, school administrative plans, and teaching plans, serving as a basis for analyzing how schools utilize evaluation data for decision-making.

Informal Documents:

Includes past school newsletters, teacher meeting records, and other internal communications, offering a deeper understanding of school culture and administrative operations.
Using content analysis, this study codes and systematically categorizes evaluation reports and related documents to identify the relationship between innovative school management and evaluation data applications [10]. Additionally, to further investigate policy implementation, this study compares government-issued evaluation standards with school-submitted evaluation reports, identifying gaps between policy expectations and actual practices, and exploring possible improvements. Through systematic textual analysis and multi-level interpretation, the researcher gains a more precise understanding of the impact of evaluation data on innovative school management and further examines its application in institutional governance, resource allocation, and teaching reforms.

On-Site Observations:
To complement document analysis, the study also conducted on-site observations, capturing situational nuances not always evident in written records. Observations focused on:

- School Administrative Operations: Monitoring resource allocation, evaluation-related meetings, and decision-making procedures to understand how evaluation data guide school management.
- Classroom Dynamics: Documenting how teachers integrate evaluation findings into their teaching strategies and gauging student responses to reforms.
- Industry–Academia Collaborations: Tracking adjustments in corporate partnerships, student internships, and curriculum planning informed by evaluation results [15].

On-site observations allowed a deeper look into real-time application of evaluation data, ensuring the research findings reflect authentic interactions between administrative processes and teaching practices.

Research Ethics, Reliability, and Validity
All procedures adhered to academic ethics, safeguarding participants' rights and privacy. Interviewees signed informed consent forms, and all data were anonymized to protect personal information [12]. Before data collection, researchers explained the study objectives, the interview process, and potential data usage, ensuring minimal burden or pressure on participants.

To strengthen trustworthiness, the study triangulated data across interviews, document analysis, and observations. By validating themes through multiple sources, we minimized single-source bias [11]. We also conducted member-checking with selected participants, verifying whether preliminary findings aligned with their understanding. This iterative feedback enriched the robustness and academic rigor of the final analysis.

RESULTS AND DISCUSSION

Context
The chosen case school, located in southern Taiwan, has faced recruitment challenges due to both local population outflow and declining birth rates—issues that affect many technical–vocational programs nationwide. According to data from the Ministry of Education (2016), the nationwide drop in school-age populations forces multiple programs to merge or adjust

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curricula, threatening the stability of TSHSs. Moreover, to keep curricula aligned with local industry demands, TSHSs must collaborate closely with regional businesses [15]. Our findings indicate that the school leverages administrative evaluations to track curriculum development trends and modify teaching strategies. For instance, the departments of electrical engineering, electronics, and information technology have integrated cross-disciplinary curricula to meet rising needs for automation and programming expertise. Meanwhile, the hospitality department partners with local hotels and tourist sites to offer hands-on experience, bridging gaps between classroom instruction and industry requirements [16, 18]. These measures show that a well-structured evaluation framework can guide targeted use of both internal and external resources, reinforcing the competitiveness of technical–vocational education. From the perspective of the CIPP model, the Context component offers a structured approach to understanding external and internal factors affecting school development [5]. Rather than merely serving as a performance check, evaluation dynamically informs decision-makers about demographic and industrial shifts, which, in turn, drive timely curriculum redesign and resource redistribution. Evaluation also shapes organizational culture by clarifying priorities and motivating collective effort among staff and students. For example, recognizing the need for faculty to upgrade industry-relevant competencies, the school has initiated in-service training and academic–industry internship programs—an ongoing outcome of its evaluation insights [17]. These efforts underscore the role of evaluation data in keeping TSHSs competitive and adaptable to shifting social and economic contexts.

Storage of Semantic Tags on Web Pages

In the push for educational reform in TSHSs, evaluation data are crucial for managing financial, human, and material resources. Far from being a mere administrative obligation, evaluation guides school leaders in securing external funding and allocating budgets more effectively. For instance, over a three-year period following evaluations, the school successfully applied for government subsidies—such as the “Quality Enhancement Program,” “Resource Equalization Project,” and “Indigenous Skills Initiative”—totaling millions of dollars. This funding was allocated toward upgrading internship facilities and renovating dormitories [17]. Such accomplishments illustrate how data from evaluations underpins well-defined annual planning and budgeting, aligning institutional growth with policy objectives and educational needs.

Faculty Professional Development:

Teacher stability and professional growth are critical to educational quality in TSHSs. Evaluation reports revealed that while over 60% of faculty at the case school hold master’s degrees or higher, some subject areas experience high teacher turnover [15]. To address this, the school introduced a mentorship system for new teachers and collaborated with nearby universities for advanced training and cross-department seminars. These efforts helped retain faculty and avoid instructional gaps. Additionally, limited data literacy among some teachers hindered deeper use of evaluation results. Consequently, the school implemented training sessions on tools like Google Workspace, enhancing teachers’ administrative efficiency and data-driven decision-making [9].

Infrastructure Improvement:

Evaluations indicated that some training facilities had high utilization rates, whereas electronics workshops and computing labs needed better maintenance and higher usage efficiency [17]. By aligning facility upkeep with evaluation data on usage rates, the school has

optimized equipment allocation and updates, ensuring resources match the needs of each subject area. Recognizing the importance of digital transformation, the school built a dedicated programming lab and partnered with corporations to create environments simulating smart manufacturing and automation, thereby improving students' readiness for contemporary workplaces.

Process

The evaluation process not only requires coordination between administrative and teaching units but also influences how institutions improve overall efficiency and instructional quality [18]. In recent years, the school introduced blended learning, combining synchronous and asynchronous modes to offer greater flexibility for students [21]. Such changes intensified the need for robust digital infrastructure and resource allocation, prompting proactive planning for stable online platforms and learning technologies.

Strengthening Digital Infrastructure:

In a recent administrative evaluation, the school was advised to enhance its wireless network and adopt digital teaching tools. In response, administrators expanded network coverage and consolidated digital learning resources. These steps proved vital during pandemic-related disruptions, as the school rapidly scaled up distance-learning solutions, minimizing interruptions and highlighting the forward-looking benefits of systematic evaluation.

Cross-Department Collaboration and Industry Linkages:

Interdepartmental teamwork and industry–academia partnerships are pivotal for innovation in technical–vocational education. The case school coordinated efforts among IT, hospitality, and other departments to develop courses reflecting real-world skills in fields such as automated systems and tourism [2]. These collaborations broaden students' professional horizons and boost the school's overall competitiveness. Evaluation data facilitate ongoing monitoring and adjustment of these partnerships, ensuring curricular offerings align with market demands.

Teacher Professional Growth and Innovative Pedagogy:

Feedback from evaluations significantly drives teaching innovation and professional development. When teachers systematically incorporate evaluation findings into lesson planning, they can refine instructional approaches and redesign course structures for more diverse, forward-looking pedagogy [15]. However, excessive paperwork risks demotivating teachers from actively engaging in instructional innovation. To prevent evaluations from becoming purely bureaucratic, the school holds regular meetings to review data and integrate insights into operational plans, ensuring that evaluation results guide not just administrative actions but also tangible improvements in classroom teaching [18].

Teacher learning communities and peer observation systems evolve alongside evaluation data, aiding new faculty integration and promoting the exchange of expertise. By linking evaluation data with the PDCA model, the school fosters continuous refinement in teaching and student support strategies [3]. This approach highlights the centrality of evaluation in organizational management and lays the groundwork for sustainable innovation.

Product

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From the Product perspective of the CIPP model, the school has improved student achievement, administrative efficiency, and external collaborations [16, 17]. Systematic evaluation contributed to rising college admission rates in specialized fields, stronger showings in skills competitions, and deeper industry partnerships. These outcomes validate the importance of data-driven insights for continuous curricular refinement and strategic resource distribution.

As shown in Table 1, the school has made notable progress since the institutional evaluations conducted between 2016 and 2018. For instance, college admission rates through the Star Program have steadily increased, with students gaining acceptance into prestigious universities. In national skills competitions, the school has achieved multiple top awards, including the Golden Hand Award, and even set national records in sports. Additionally, efforts in campus internationalization—such as participation in international invention exhibitions and immersive English teaching—reflect the school's expanding global vision. These achievements highlight how evaluations have directly supported both academic and extracurricular development, showcasing the school's ability to adapt to diverse educational demands.

Still, the study identifies a gap between current evaluation frameworks—primarily designed for academic high schools—and the practical and industry-focused demands of TSHSs [16]. Skill development and hands-on industry engagement remain underrepresented in standard indicators, limiting how effectively schools can demonstrate their technical strengths. Faculty also highlighted the need for additional data-literacy training to fully embed evaluation insights into everyday teaching and management. Although sharing evaluation data openly has drawn increased community and corporate interest, policy-level refinements are needed to incorporate more TSHS-specific measures. These findings underscore the importance of adjusting existing indicators to better capture TSHS performance in areas such as practical training and industry linkages [13]

Table 1: School Development After Institutional Evaluations (2016–2018)

Item	2016	2017	2018	Comprehensive Interpretation
University Admissions through Star Program	7 students admitted through the vocational Star Program	8 students admitted through the vocational Star Program	11 students admitted through the vocational Star Program, 9 students from the general program	Shows a steady increase in admission rates, with students accepted into prestigious domestic universities, reflecting educational achievements.
National Skills Competitions	Won the National First Place Golden Hand Award	Golden Hand Awards and other honors in culinary arts and baking	Set a new national record in track and field competitions; first place in the Southern Region Honor Guard Contest	Outstanding achievements in national competitions, demonstrating the school's ability to cultivate students' professional skills.

Campus Internationalization	Collaboration with local industries (e.g., internships in tourism programs)	Won a silver medal at the Malaysia Invention Exhibition	Recognition in English immersive teaching and scientific exhibitions	Achievements in international invention competitions and English learning highlight the school's global vision and collaboration potential.
Sports and Arts Achievements	Won multiple medals in track and field and swimming	9 gold, 7 silver, and 9 bronze medals at the Pingtung County Sports Games	Broke a national record in track and field competitions; achieved results in newly added dance competitions	Balanced focus on sports and arts, showcasing students' diverse development and improved non-academic skills.
Innovative and Diverse Activities	Promoted community service and subject-based competitions	Over 200 students participated in the third Heng-Shang Cup	Added new competition categories in the fourth Heng-Shang Cup, attracting 87 students from other schools	Continued expansion of influence, close collaboration with the local community, and enhanced social value of the school.

CONCLUSIONS AND LIMITATIONS

Identifying the Practical Impact of Evaluation Data on TSHS Administration and Teaching

By analyzing a single TSHS case through qualitative methods (interviews, document analysis, on-site observation), this study integrates the CIPP model to investigate how evaluation data drive innovative management [5]. From the four CIPP dimensions—Context, Input, Process, and Product—we see that evaluation data function not only as a performance check but also as a vital tool for data-driven decision-making, guiding strategic planning and development in TSHSs [3, 16].

Contextual assessments enable schools to monitor external factors—such as demographic shifts and local industry trends—and adapt institutional strategies accordingly [14, 15]. Meanwhile, input evaluations offer detailed information on faculty structures, budgeting, and infrastructure, helping administrators secure external funds and forge partnerships [2, 17, 18]. Evaluation data further underpin improvements in school administration and teaching quality, ensuring dynamic policy adjustments. They also enable teachers to refine instruction and incorporate industry demands, thereby enhancing students' employability and future prospects [22].

Critical Factors and Potential Barriers in Translating Evaluation Data into Action

The effective translation of evaluation findings into school reforms hinges on leadership and organizational synergy [3, 18]. When principals and administrative leaders act as change

agents—integrating PDCA cycles with the evaluation process—schools can strengthen continuity and execution in reform initiatives [4, 16]. Yet, many existing evaluation systems are calibrated for academically oriented high schools and do not fully address specialized skill training and industry collaborations vital in TSHSs [14]. Additionally, limited data-literacy skills among faculty and staff can impede the full utilization of evaluation reports [11].

A lack of transparent and timely feedback loops also constrains the real-time application of evaluation findings [7]. Effective evaluations should include iterative improvement mechanisms, allowing policymakers, teachers, and administrators to respond to new data dynamically. Inadequate consideration of local economic conditions and cultural contexts in the evaluation design can further hinder TSHS alignment with regional industry needs [2, 23].

Proposed Strategies for Innovation and Practical Recommendations for Addressing Declining Enrollment

This research shows that TSHSs can bolster their adaptability to low birth rates by enhancing evaluation-driven planning and establishing robust internal review systems [2, 16]. Through continuous monitoring of student performance, teacher development, and industry collaborations, schools can make iterative modifications to resource allocation. Cross-department cooperation and knowledge sharing are also essential to cultivating institutional innovation [24]. By tapping into evaluation data to drive reforms—adopting new technologies, revising curricula, and deepening relationships with external partners—TSHSs can ensure students acquire the skills demanded by the marketplace, thus strengthening institutional competitiveness [15]. Effectively leveraging evaluation data accelerates alignment between vocational education and evolving industry landscapes, improving graduates' employability.

Policy and Systemic Adjustments

Current evaluation frameworks lean heavily toward academic metrics, offering limited insight into hands-on skills and real-world partnerships crucial in TSHSs [6, 14]. Policymakers should revise and expand these indicators, allowing them to more accurately reflect the distinct outcomes of technical–vocational programs [23]. Moreover, increasing data transparency can help connect evaluation findings with policy decisions and public engagement [12, 19]. When evaluation data are accessible and comprehensible, administrators, government officials, and local communities have clearer insights into resource allocation and policy implementation, driving more effective decision-making processes [13].

Strengthening organizational capacity for data-driven decision-making is also indispensable. As schools adopt systematic data management, they can develop more flexible strategies for coping with enrollment declines and industry disruptions [16]. Ultimately, refining evaluation frameworks and institutional data practices can preserve and enhance TSHSs' competitiveness, enabling them to navigate demographic shifts and industrial transformations successfully.

Research Limitations and Future Research

Because this study is based on a single TSHS case, the findings may have limited external validity. Future research could broaden the scope through multi-case or cross-institutional comparisons, extending the generalizability of the results [16, 18]. Although this study employs multiple qualitative methods to depict the school context accurately, the absence of quantitative statistical analysis limits the capacity to establish causal relationships. Mixed-

method approaches, incorporating indicators such as certification pass rates, employment outcomes, and admission rates, could offer more robust models of how evaluation data shape innovation in TSHSs [3].

The development of more targeted evaluation indicators also deserves attention. Techniques like the Delphi Method or the Analytic Hierarchy Process (AHP) could refine the selection of key metrics, while Principal Component Analysis (PCA) could validate them [6]. Extending research to include urban, rural, and industry-specific TSHSs could further illuminate how evaluation data can be employed to foster innovation [2]. Such findings would guide policymakers in allocating resources more equitably and adjusting regulations to meet local needs.

Moreover, integrating PDCA (Plan-Do-Check-Act) cycles into evaluation processes could enhance the long-term advantages of data utilization [3]. Evaluation involves multiple stakeholders—administrators, faculty, students, parents, and industry partners—so future research might use action research or participant observation to capture more nuanced interactions [15]. When evaluation aligns with industry needs and community engagement, it not only strengthens students' hands-on skills but also yields a context-sensitive framework adaptable to changing environments.

In sum, this study underscores the importance of anchoring evaluation data in broader school strategies [19]. By embracing the CIPP model and advocating policy refinements and resource optimization, TSHSs can convert evaluation findings into tangible action plans [7]. Evaluation should function not merely as a static assessment tool but as a driver of faculty development and school-wide innovation [22]. Through data-driven decision-making, schools can systematically enhance curricula and teaching, aligning educational offerings with industry demands while producing graduates equipped for fast-evolving workplaces [13]. Finally, a well-designed evaluation mechanism, combined with external resources and ethical considerations [12], can broaden the horizons of TSHS innovation [23]. Adapting international best practices [6] to local contexts [18] will support the evolution of technical–vocational education systems. Thus, evaluation goes beyond merely verifying and correcting existing practices; it should be a catalyst for transformative learning, guiding TSHSs toward sustained competitiveness and social relevance.

References

[1] Ministry of the Interior, "2024 Population Statistics Data," 2025. [Online]. Available: https://www.moi.gov.tw/

[2] H. R. Badawy, F. M. Al Ali, A. G. Y. Khan, S. H. Dashti, and S. A. Al Katheeri, "Transforming education through technology and school leadership," in Cutting-Edge Innovations in Teaching, Leadership, Technology, and Assessment, IGI Global, pp. 182–194, 2024, doi: 10.4018/979-8-3693-0880-6.ch013.

[3] B. Tan, "Value, dilemmas and innovative strategies of educational management clustering in the internet era," Applied Mathematics and Nonlinear Sciences, vol. 9, no. 1, 2024, doi: 10.2478/amns-2024-1127.

[4] S. Sopha and A. Nanni, "The CIPP model: Applications in language program evaluation," Journal of Asia TEFL, vol. 16, no. 4, p. 1360, 2019, doi: 10.18823/asiatefl.2019.16.4.19.1360.

[5] D. L. Stufflebeam, "The CIPP model for evaluation," in The International Handbook of Educational Evaluation, T. Kellaghan and D. L. Stufflebeam, Eds., Dordrecht, The Netherlands: Kluwer Academic Publishers, 2003, pp. 31–62, doi: 10.1007/978-94-010-0309-4_4.

[6] A. G. Dizon, "Historical development of CIPP as a curriculum evaluation model," History of Education, vol. 52, no. 1, pp. 109–128, 2023, doi: 10.1080/0046760X.2022.2098390.

[7] R. L. Astramovich and J. K. Coker, "Program evaluation: The accountability bridge model for counselors," Journal of Counseling & Development, vol. 85, no. 2, pp. 162–172, 2007, doi: 10.1002/j.1556-6678.2007.tb00459.x.

[8] E. C. Clark, T. Burnett, R. Blair, R. L. Traynor, L. Hagerman, and M. Dobbins, "Strategies to implement evidence-informed decision making at the organizational level: A rapid systematic review," BMC Health Services Research, vol. 24, no. 1, p. 405, 2024, doi: 10.1186/s12913-024-10841-3.

[9] C. Igbokwe, "Application of artificial intelligence (AI) in educational management," International Journal of Scientific and Research Publications, vol. 13, no. 3, pp. 300–307, 2023, doi: 10.29322/IJSRP.13.03.2023.p13536.

[10] G. A. Bowen, "Document analysis as a qualitative research method," Qualitative Research Journal, vol. 9, no. 2, pp. 27–40, 2009, doi: 10.3316/QRJ0902027.

[11] U. H. Graneheim and B. Lundman, "Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness," Nurse Education Today, vol. 24, no. 2, pp. 105–112, 2004, doi: 10.1016/j.nedt.2003.10.001.

[12] D. Haggerty, "Ethics creep: Governing social science research in the name of ethics," Qualitative Sociology, vol. 27, no. 4, pp. 391–414, 2004, doi: 10.1023/B:QUAS.0000049239.15922.a3.

[13] O. Furrer, D. Sudharshan, R. H. Tsiotsou, and B. S. Liu, "A framework for innovative service design," The Service Industries Journal, vol. 36, pp. 452–471, 2016, doi: 10.1080/02642069.2016.1248420.

[14] Ministry of Education, "Implementation plan for senior secondary school evaluations," Taipei, Taiwan: Ministry of Education, 2015. [Online]. Available: https://goo.gl/QAIWA2

[15] C. Winberg and S. Hollis-Turner, "Enhancing vocational education through research-driven curriculum design," Journal of Vocational Education & Training, vol. 73, no. 4, pp. 521–540, 2021, doi: 10.1080/13636820.2019.1661446.

[16] H. Wu, "Path analysis of innovative models of higher education management," Applied Mathematics and Nonlinear Sciences, vol. 9, pp. 1–18, 2024, doi: 10.2478/amns-2024-1782.

[17] Ministry of Education, "Evaluation results for National Hengchun Industrial & Commercial High School," Taipei, Taiwan: Ministry of Education, 2016.

[18] Leithwood and D. Jantzi, "Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices," School Effectiveness and School Improvement, vol. 17, no. 2, pp. 201–227, 2006, doi: 10.1080/09243450600565829.

[19] C. W. Choo, "The knowing organization: How organizations use information to construct meaning, create knowledge and make decisions," International Journal of Information Management, vol. 16, no. 5, pp. 329–340, 1996, doi: 10.1016/0268-4012(96)00020-5.

[20] B. Rasmussen, "From collegial organization to strategic management of resources: Changes in recruitment in a Norwegian university," Sage Open, vol. 5, no. 3, pp. 1–11, 2015, doi: 10.1177/2158244015603904.

[21] J. Wang, et al., "Hybrid learning and innovation strategies in higher education," Educational Management Journal, vol. 18, no. 2, pp. 75–95, 2022.

[22] R. E. West and M. J. Hannafin, "Learning to design collaboratively: Participation of student designers in a community of innovation," Instructional Science, vol. 39, pp. 821–841, 2011, doi: 10.1007/s11251-010-9156-z.

[23] A. G. Canen and A. Canen, "Innovation management education for multicultural organisations: Challenges and a role for logistics," European Journal of Innovation Management, vol. 5, no. 2, pp. 73–85, 2002, doi: 10.1108/14601060210428177.

[24] N. Anderson, K. Potočnik, and J. Zhou, "Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework," Journal of Management, vol. 40, no. 5, pp. 1297–1333, 2014, doi: 10.1177/0149206314527128.