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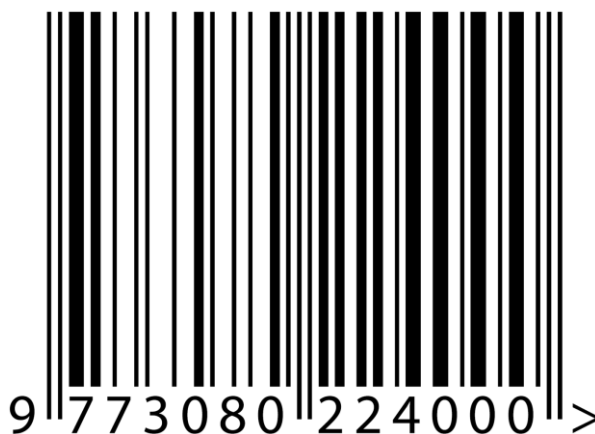
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# The Chain Mediation Model of External Accountability and Social Recognition among Vocational High School Teachers in Mainland China: The Role of a Sense of Calling and Living a Calling

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# The Chain Mediation Model of External Accountability and Social Recognition among Vocational High School Teachers in Mainland China: The Role of a Sense of Calling and Living a Calling

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## Abstract

Vocational and professional education and training (VPET) plays an increasingly crucial role in supplying a skilled labor force in mainland China. However, the poor social reputation and insufficient financial support of VPET have led to the loss of high-quality teachers. Drawing on the concept of calling, this study proposed a chain mediation model to examine the relationships among external accountability, calling, and teacher social recognition among VPET teachers in Chinese vocational high schools. In this study, 204 vocational high school teachers across mainland China were invited to complete online questionnaires that measured external accountability, a sense of calling, living a calling, and teacher social recognition. The findings revealed that external accountability was positively associated with teacher social recognition. This relationship was mediated by living a calling and further strengthened through the chain-mediating effect of a sense of calling and living a calling, whereas the mediating role of a sense of calling alone was not significant.

**Keywords:** *external accountability, a sense of calling, living a calling, teacher social recognition*

Vocational and professional education and training (VPET) is becoming increasingly important in mainland China because it can provide a technically skilled and trained labor force to sustain and enhance social and economic development (Yu et al., 2025). Therefore, the government of the People's Republic of China (PRC) has reformed the VPET system in an attempt to improve educational quality (Liu & Hardy, 2023; Wu & Ye, 2018). Li et al. (2024) note that the VPET reform has addressed two themes, namely, tertiarization—upgrading and elevating the status of VPET—and academization—incorporating VPET into academic education. In other words, the PRC government has set the academic qualifications and standards for VPET and academic education at the same level. Nevertheless, VPET is still positioned at the bottom of the education system and faces considerable social prejudice in mainland China (Wang & Wang, 2022). Social prejudice—VPET as the pathway for underachievers to learn low-skilled and manual labor (Stewart, 2015)—causes VPET to disproportionately attract low-performing students with weak self-efficacy and learning motivation (Chu et al., 2015; Coledam & Frotta, 2022; Wang & Guo, 2019; Wang & Wang, 2022). Moreover, the public expenditure on VPET is significantly lower than

that allocated to academic education in mainland China (Yu et al., 2025), thereby keeping the salary level of VPET teachers low (Liao, 2024). All of these situations make it difficult for the VPET to attract and retain mission-driven, professional, and high-quality teachers (Wu & Ye, 2018; Yu et al., 2025).

According to Zhang et al. (2023), fostering teacher social recognition can be an approach to address this problem because social recognition, which involves public acknowledgment and appreciation of one's positive aspects, has been identified as a significant factor positively associated with teacher commitment (Movessian, 2018), professionalism (Zhang, 2024), and quality of teaching (OECD, 2012). Therefore, understanding the factors that can cultivate the social recognition of VPET teachers in mainland China is crucial. Taking the impacts of external accountability into account may help answer this question because external accountability, which is defined as the formal measures holding teachers responsible and answerable for their performance to stakeholders such as students and parents (Rosenblatt & Wubbels, 2021), has been used to ensure teacher quality and professionalism, but it may institutionally shape how teachers perceive being recognized (Burns, 2016; Li & Tsang, 2023; Zhang & Tsang, 2021). Moreover, calling, which is commonly referred to as *shiming* (mission as direct translation) in Chinese societies (Zhang, Herrmann, et al., 2015), can also be an important factor affecting teacher social recognition. This is because calling embodies human subjectivity, enabling teachers to reflexively exercise their professional autonomy in enacting the moral values and purposes of teaching (Tsang et al., 2025) and, in turn, cultivating public acknowledgment and appreciation for their competence and merits (Zhang et al., 2025). Nevertheless, few empirical studies have examined the effects of external accountability and calling on teacher social recognition, especially in the VPET setting. Consequently, the understanding of how VPET teachers gain social recognition remains limited. Accordingly, this study contributes to the literature by investigating the relationships among external accountability, calling, and teacher social recognition among VPET teachers in Chinese vocational high schools.

## Literature Review

### *Teacher Social Recognition*

In general, social recognition refers to the act of publicly acknowledging one's positive aspects. In the context of teaching, it particularly signifies the acknowledgment and appreciation of teachers' performance and achievements (Andrews, 2011). According to Honneth's (1995) theory, social recognition comprises three distinct forms, namely, love or care (emotional concerns for one's well-being and needs), respect (recognition of equality, basic rights, and dignity), and social esteem (the acknowledgment of one's achievements and contributions). Applying this theory, Zhang et al. (2023) report that teacher social recognition in Chinese societies primarily consists of care and social esteem. In other words, being recognized implies (1) teachers receiving significant concern for their needs and well-being and (2) experiencing acknowledgment and appreciation for their teaching excellence and competence. Thus, social recognition can manifest positive effects on teachers' identity (Adams, 2013), self-efficacy (Bandura, 1993), commitment (Mackenzie & Nwafor, 2020), satisfaction (Ellis & Bernhardt, 1992), professionalism (Zhang, 2024), and well-being (Zhang et al., 2024).

### ***External Accountability and Teacher Social Recognition***

Social recognition serves not only as a fundamental human need but also as a key organizational means for motivating and rewarding teachers (Honneth, 2012; Zhang et al., 2023). There are various organizational measures to give recognition to teachers, such as monetary awards and promotions (Chism, 2006). These organizational measures have been tightly coupled with external accountability in the education system of mainland China (Zhang et al., 2023). For instance, in the Chinese education system, performance pay and an honorable title are awarded to teachers who meet key performance indicators, such as achieving high student test scores, winning teaching competitions, and publishing articles (Song et al., 2013; Wang et al., 2014). Receiving the performance pay and honorable title can signify a teacher's professional competence, thereby enhancing his or her professional status and authority in the Chinese education system (Lo et al., 2015).

In mainland China, external accountability functions not only as a coercive mechanism for teachers but also as an enabling force that enhances teachers' social recognition, promoting their self-monitoring to uphold prescribed professional standards and social expectations (Qin, 2019; Zhang & Tsang, 2021). For example, when Li and Tsang (2023) observe reduced job burnout among teachers in mainland China under external accountability, they attribute this effect to accountability measures such as performance pay and honorary titles, which can explicitly recognize professional competence and merits. Similarly, Zhang and Tsang (2021) report that teachers in mainland China generally view external accountability measures positively because they perceive the measures as pathways through which they can achieve social recognition. Accordingly, external accountability is likely to foster teacher social recognition in mainland China. Therefore, the following hypothesis is proposed.

**Hypothesis 1 (H1): External accountability is positively associated with teacher social recognition.**

### ***Roles of Calling: The Mediating Effects of a Sense of Calling and Living a Calling***

The concept of calling has its own religious roots, especially in Christianity. In the religious sense, calling refers to receiving and answering God's summons (Madero, 2020). However, in modern societies, people secularly use the concept to refer to a sense of duty and life purpose arising from social expectations or personal desires (Willemse & Deacon, 2015). Thus, Dik and Duffy (2009, p. 427) define calling as "a transcendent summons, experienced as originating beyond the self, to approach a particular life role in a manner oriented toward demonstrating or deriving a sense of purpose or meaningfulness and that holds other-oriented values and goals as primary sources of motivation." This definition highlights three core elements of calling, namely, transcendent summons, purposeful work, and prosocial orientation (Dik et al., 2012). In Chinese societies, calling is translated into shiming as the perceived need to fulfill a mission or an expectation from a higher power, such as family, superior authorities, or a transcendent power (Zhang, Dik, et al., 2015). According to Zhang, Herrmann, et al. (2015), in Chinese societies, calling consists of altruism (the tendency to help others and make a difference in society through work and career), guiding forces (the subjective feelings of a guiding reference for career development), and meaning and purpose (the connection between a calling and a broader sense of meaning in life).

To some extent, calling serves as a factor affecting teacher social recognition. Research indicates

that when teachers have a sense of calling, i.e., perceiving a calling to the teaching profession, they tend to find their work meaningful and personally significant (Willemse & Deacon, 2015; Zhang et al., 2025). This perception can enhance their teaching motivation and commitment (Bullough & Hall-Kenyon, 2011, 2012), leading teachers to exhibit greater passion and devotion toward fostering students' holistic development (Rampa, 2012). Moreover, they may demonstrate heightened resilience in overcoming challenges to achieve high-quality teaching (Wen et al., 2024). These qualities, such as passion, devotion, resilience, and the pursuit of excellence, are socially recognized as hallmarks of professional teaching excellence (Day, 2018). In other words, a sense of calling can be positively associated with teacher recognition.

A sense of calling is distinct from living a calling, which is defined as the actualization of one's calling in his or her current career (Duffy et al., 2018). Research demonstrates that individuals who perceive a calling but fail to live it out may not fully attain its associated benefits (Duffy et al., 2013; Duffy & Autin, 2013; Duffy et al., 2012). This occurs because living a calling enables teachers to authentically verify and actualize the professional self (Bloom et al., 2021; Madero, 2021), resulting in enhanced job performance, profound positive emotions, and occupational well-being (Duffy et al., 2012; Duffy et al., 2018; Zhang et al., 2025). These outcomes may collectively serve as tangible evidence by which the public assesses teachers' competence and contributions (Fauziah et al., 2021). Therefore, like a sense of calling, living a calling may be positively related to teacher social recognition.

The literature suggests that extrinsic factors such as job stability and long holidays, rather than a calling, are primary motivations for becoming VPET teachers in mainland China (Li, 2017). However, this dynamic may shift when external accountability is structured to enable teachers to identify and enact the core values and purposes of their work (Lee et al., 2024). The PRC government has implemented accountability measures designed to ensure that teachers understand and commit to the shide as a framework of professional ethics and moral values that serve as a guide for self-regulation. These measures not only punish violations but also reward those who exemplify high standards of shide. Therefore, accountability may act as a positive guiding force, helping Chinese teachers cultivate altruism and recognize the connection between their work and their personal sense of meaning and purpose. Furthermore, it can provide a mechanism for them to achieve a sense of duty and life purpose through teaching. This function of accountability is particularly critical given what Green (2023) describes as the "rational chaos" of the Chinese education system, characterized by vague, ambiguous, and frequently changing rules and procedures. This environment can undermine teachers' sense of safety and certainty in teaching, discouraging them from striving for their values and purposes. By providing clearer goals, direction, and regulations, external accountability may create the structured, safe, and certain conditions necessary for teachers to enact their calling in alignment with systemic requirements (Li & Tsang, 2023). Therefore, under these specific conditions, external accountability may actively foster both a sense of calling and the ability to live it out among teachers in mainland China.

Given that a sense of calling and living a calling may predict teacher social recognition and be impacted by external accountability, they may function as mediators in the relationship between external accountability and teacher social recognition. Accordingly, the following hypotheses are formulated.

**Hypothesis 2 (H2): A sense of calling will mediate the relationship between external accountability and teacher social recognition.**

**Hypothesis 3 (H3):** Living a calling will mediate the relationship between external accountability and teacher social recognition.

### ***Chain Mediating Effect of a Sense of Calling and Living a Calling***

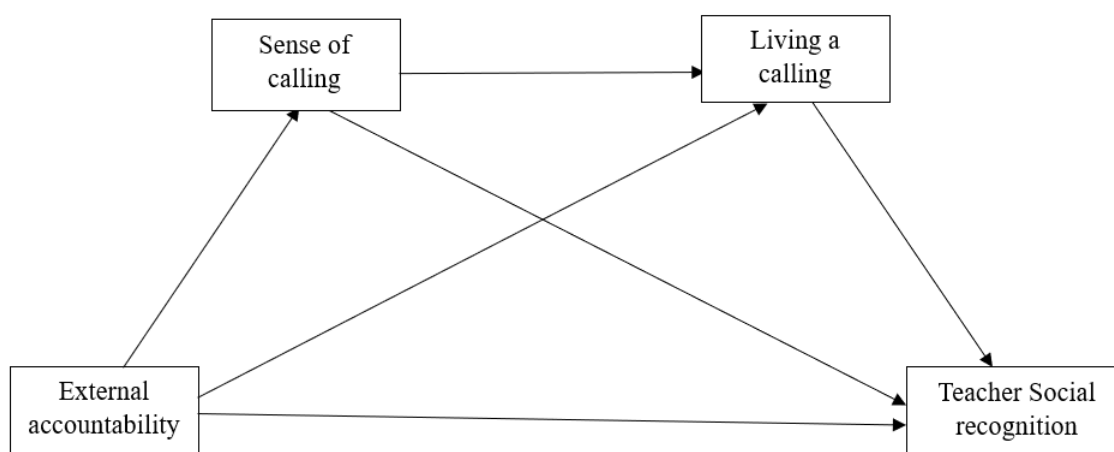
Duffy et al. (2018) emphasize that a sense of calling and living a calling are interdependent constructs, asserting that “to live out a calling one must perceive a calling” (p. 426). It positions a sense of calling as an antecedent of living a calling. To some extent, the literature provides support for this claim, as research has demonstrated that living a calling can significantly mediate the effects of a sense of calling on outcomes such as job satisfaction and well-being (e.g., Duffy et al., 2012; Duffy et al., 2017). Extending this logic to the teaching context, it can be inferred that living a calling can mediate the effects of a sense of calling on teacher social recognition. In other words, when teachers have a sense of calling, they are more likely to receive greater social recognition because their ability to live out the calling is increased. This suggests that a sense of calling and living a calling are likely serial mediators in the relationship between external accountability and teacher social recognition. Therefore, the following hypothesis is proposed.

**Hypothesis 4 (H4):** A sense of calling and living a calling play a chain mediating role between external accountability and teacher social recognition.

On the basis of this review of the literature, the research framework of this study is proposed (see Figure 1).

**Figure 1**

*Hypothesized chain mediation model*



## **Method**

### ***Participants***

The study sampled participants via the social network of the research team. The research team created an online survey and sent the web link to vocational high school teachers whom the team members knew. The research team invited these teachers to complete the survey and share it with other vocational high school teachers. A total of 210 vocational high school teachers completed the

questionnaire. Among them, 6 questionnaires were excluded from the data analysis because they were incomplete or invalid, resulting in a final sample of 204 teachers. Among this sample, 38.2% were male and 61.8% were female. On average, the participants were 35.62 years old ( $SD = 8.089$ ) and had 10.56 years of teaching experience ( $SD = 7.976$ ). The sample was highly educated, as most of them held a master's degree (59.8%) or a doctoral degree (38.7%), and a small minority held only a bachelor's degree (1.5%). These characteristics suggested that the sample was relatively young and early in their teaching careers but possessed a high level of formal education. In terms of geographical distribution, many of the participants were from Guangdong Province (24.5%), followed by Zhejiang Province (17.6%), Sichuan Province (13.7%), Beijing city (13.2%), and others (31%; including Shandong Province, Shanxi Province, Guangxi Province, Yunnan Province, Tianjin city, Gansu Province, Jilin Province, Anhui Province, Jiangsu Province, Liaoning Province, Hebei Province, Henan Province, Qinghai Province, Guizhou Province, Chongqing city, Shaanxi Province, Hainan Province, Hubei Province, Hunan Province, and Fujian Province).

## Measures

**External Accountability.** External accountability was measured by a subscale of the Chinese version of the personal accountability measure (PAM-Ch) (Tsang et al., 2023). This subscale has 6 items to assess the perceived external accountability of teachers. A sample item was "Give school management a report on the extent to which you reached your goals at work". All the items were rated on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). In this study, the Cronbach's alpha for the PAM-Ch subscale was 0.913.

**A Sense of Calling.** A sense of calling was assessed by Dik et al.'s (2012) Brief Calling Scale (BCS), which consists of 4 items. Each item was rated on a 5-point Likert scale from 1 (not at all true of me) to 5 (totally true of me). A sample item was "I have a calling to a particular kind of work." In this study, the Cronbach's alpha of the BCS was 0.821.

**Living a Calling.** Duffy et al.'s (2012) Living Calling Scale (LCS) was applied to investigate living a calling in this study. There were 6 items, and each item was rated on an 8-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with 8 indicating "not applicable—I don't have a calling". A sample item is "I have regular opportunities to live out my calling". In this study, the Cronbach's alpha of the LCS was 0.911.

**Teacher Social Recognition.** The Teacher Recognition Scale (TRS), developed by Zhang et al. (2023), was adopted to measure teacher social recognition. The TRS contains 10 items assessing two dimensions of teacher social recognition, namely, recognition for care (4 items; a sample item: "At my school, other persons show me their concern and caring to me when I meet difficulty in life"; Cronbach's alpha = 0.969) and recognition for social esteem (6 items; a sample item: "At my school, other people always show me their acknowledgment and praise for my performance"; Cronbach's alpha = 0.967). The Cronbach's alpha of the entire TRS was 0.973 in this study.

## Data Analysis

SPSS 30.0 was used to analyze the data. First, Harman's single-factor test and variance inflation factor (VIF) values were examined to ensure that there was no serious common method deviation or multicollinearity concern. Second, descriptive statistics and Pearson correlation analysis were

computed to preliminarily analyze the relationships between variables. Third, linear regression analysis was conducted to examine the effect of external accountability on teacher social recognition, and PROCESS Model 6 was used to test the mediating effects of a sense of calling and living a calling between external accountability and teacher social recognition.

## Findings

### Description and Correction

Table 1 presents the mean, standard deviation, and correlation among teacher social recognition, external accountability, sense of calling, and living a calling. The results suggested that teacher social recognition was significantly related to external accountability ( $r = 0.633$ ,  $p < 0.001$ ), sense of calling ( $r = 0.460$ ,  $p < 0.001$ ), and living a calling ( $r = 0.526$ ,  $p < 0.001$ ). Moreover, external accountability was significantly related to a sense of calling ( $r = 0.525$ ,  $p < 0.001$ ) and living a calling ( $r = 0.479$ ,  $p < 0.001$ ). The results also indicated a strong positive relationship between a sense of calling and living a calling ( $r = 0.722$ ,  $p < 0.001$ ).

**Table 1**

*Mean, standard deviation, and correlations among the variables*

|     | M     | SD    | TSR      | EA       | SC       | LC |
|-----|-------|-------|----------|----------|----------|----|
| TSR | 3.783 | 0.798 | 1        |          |          |    |
| EA  | 3.891 | 0.664 | 0.633*** | 1        |          |    |
| SC  | 4.412 | 0.823 | 0.460*** | 0.525*** | 1        |    |
| LC  | 5.558 | 1.105 | 0.526*** | 0.479*** | 0.722*** | 1  |

*Note: TR represents teacher social recognition, EA represents external accountability, SC represents a sense of calling, and LC*

*represents living a calling*

*\*\*\*  $p < 0.001$  (2-tailed)*

### Chain Mediation Analysis

To primarily examine the mediating effect of a sense of calling and living a calling on the relationship between external accountability and teacher social recognition, multiple linear regressions were computed. As Table 2 indicates, after controlling for gender, age, and teaching experience, external accountability was significantly related to a sense of calling ( $\beta = 0.527$ ,  $t = 8.710$ ,  $p > 0.001$ ), living a calling ( $\beta = 0.159$ ,  $t = 2.774$ ,  $p > 0.01$ ), and teacher social recognition ( $\beta = 0.506$ ,  $t = 8.037$ ,  $p > 0.001$ ). Moreover, the results suggested that a sense of calling was significantly related to living a calling ( $\beta = 0.630$ ,  $t = 10.967$ ,  $p > 0.001$ ) but was not significantly associated with teacher social recognition ( $\beta = -0.022$ ,  $t = -0.280$ ,  $p < 0.05$ ). In addition, living a calling was

significantly related to living a calling ( $\beta = 0.630$ ,  $t = 10.967$ ,  $p > 0.001$ ) but was not significantly associated with teacher social recognition ( $\beta = -0.022$ ,  $t = -0.280$ ,  $p < 0.05$ ). In addition, living a calling was significantly associated with teacher social recognition ( $\beta = 0.299$ ,  $t = 3.860$ ,  $p > 0.001$ ). These results implied that external accountability was positively related to teacher social recognition and that this relationship was mediated by living a calling and chain mediated by both a sense of calling and living a calling. Therefore, H1 was supported.

**Table 2**

*Linear regression analysis of the relationships among external accountability, a sense of calling, living a calling, and teacher social recognition*

| Outcome variables | Independent variables         | R     | R <sup>2</sup> | F         | $\beta$  | SE    | t      |
|-------------------|-------------------------------|-------|----------------|-----------|----------|-------|--------|
| SC                |                               | 0.536 | 0.287          | 19.604*** |          |       |        |
|                   | Constant                      |       |                |           | -0.773   | 0.505 | -1.530 |
|                   | Gender (0 = female, 1 = male) |       |                |           | 0.000    | 0.128 | 0.002  |
|                   | Age                           |       |                |           | 0.031    | 0.018 | 1.712  |
|                   | Teaching experience           |       |                |           | -0.032   | 0.018 | -1.792 |
|                   | EA                            |       |                |           | 0.527*** | 0.061 | 8.710  |
| LC                |                               | 0.740 | 0.547          | 46.892*** |          |       |        |
|                   | Constant                      |       |                |           | -1.004** | 0.408 | -2.462 |
|                   | Gender (0 = female, 1 = male) |       |                |           | 0.145    | .103  | 1.414  |
|                   | Age                           |       |                |           | 0.034*   | 0.145 | 2.337  |

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|     |                                  |       |       |           |          |       |        |
|-----|----------------------------------|-------|-------|-----------|----------|-------|--------|
|     | Teaching<br>experience           |       |       |           | -0.028   | 0.014 | -1.938 |
|     | EA                               |       |       |           | 0.159**  | 0.057 | 2.774  |
|     | SC                               |       |       |           | 0.630*** | 0.057 | 10.967 |
| TSR |                                  | 0.690 | 0.476 | 29.236*** |          |       |        |
|     | Constant                         |       |       |           | -0.053   | 0.447 | -0.119 |
|     | Gender (0 =<br>female, 1 = male) |       |       |           | 0.114    | 0.111 | 1.020  |
|     | Age                              |       |       |           | 0.004    | 0.158 | 0.251  |
|     | Teaching<br>experience           |       |       |           | -0.156   | 0.157 | -0.993 |
|     | EA                               |       |       |           | 0.506*** | 0.063 | 8.037  |
|     | SC                               |       |       |           | -0.022   | 0.079 | -0.280 |
|     | LC                               |       |       |           | 0.299*** | 0.078 | 3.860  |

*Note: TSR represents teacher social recognition, EA represents external accountability, SC represents a sense of calling, and LC represents living a calling*

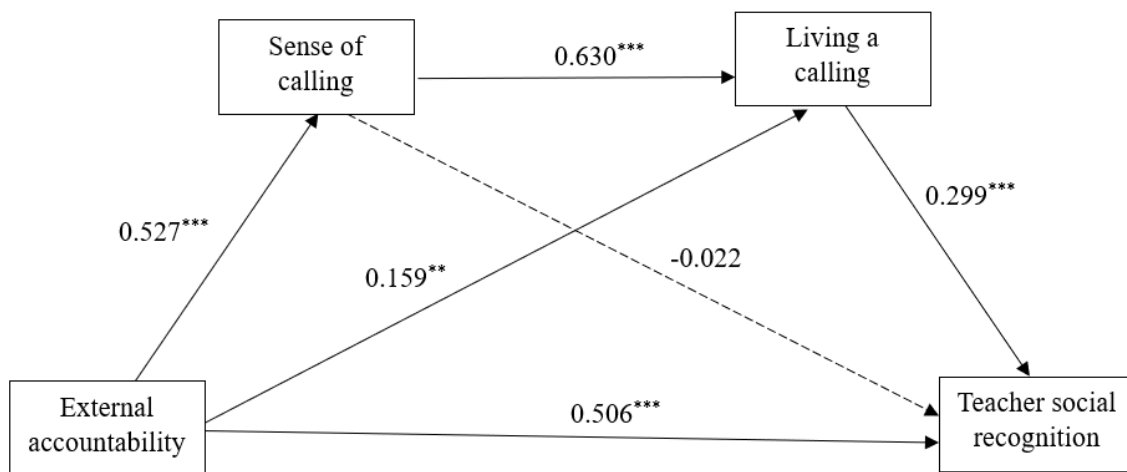
*\*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001*

To further test the mediating effects, PROCESS Macro Model 6 was used, with the application of the biased-corrected percentile bootstrap method (5,000 replications). The results suggested that the direct effect of external accountability on teacher social recognition was 0.506 (95% CI [0.382, 0.630]), whereas the indirect effect was 0.135 (95% CI [0.033, 0.283]). In other words, a sense of calling and living a calling could mediate the effect of external accountability on teacher social recognition. According to Table 3, Path 2 (EA LC TR, effect = 0.047, SE = 0.030, 95% CI = [0.000, 0.115]) and Path 3 (EA SC LC TR, effect = 0.099, SE = 0.049, 95% CI = [0.017, 0.210]) were significant, while Path 1 (EA LC TR, effect = 0.047, SE = 0.030, 95% CI = [0.000, 0.115]) was

insignificant. The results indicated a significant mediating effect of living a calling and a significant chain-mediating effect of sense of calling and living a calling on the effect of external accountability on teacher social recognition (see Figure 2). Accordingly, H3 and H4 were supported, whereas H2 was rejected.

**Figure 2**

*Relationships between external accountability, a sense of calling, living a calling, and teacher social recognition*



*Note: Control variables include gender, age, and teaching experience*

\*\*\* $p < 0.01$  \*\* $p < 0.001$

**Table 3**

*Test of mediating effects*

|                            | Effect | SE    | Bias-corrected 95% CI |       |
|----------------------------|--------|-------|-----------------------|-------|
|                            |        |       | Lower                 | Upper |
| Total Effect               | 0.641  | 0.055 | 0.532                 | 0.749 |
| Direct Effect              | 0.506  | 0.063 | 0.382                 | 0.630 |
| Indirect Effect            | 0.135  | 0.064 | 0.033                 | 0.283 |
| Path 1: EA → SC → TSR      | -0.012 | 0.059 | -0.121                | 0.115 |
| Path 2: EA → LC → TSR      | 0.047  | 0.030 | 0.000                 | 0.115 |
| Path 3: EA → SC → LC → TSR | 0.099  | 0.049 | 0.017                 | 0.210 |

*Note: TSR represents teacher social recognition, EA represents external accountability, SC represents a sense of calling, and LC represents living a calling*

## Discussion

### Participants

In mainland China, the status of VPET has been inferior to that of academic education (Wu & Ye, 2018; Xiong, 2010; Yu et al., 2025). In addition to disproportionately enrolling low-performing students, this inferiority makes it difficult for the VPET to attract and retain mission-driven, professional, and high-quality teachers (Koreshnikova et al., 2018). Therefore, there is an urgent need to increase the social recognition of VPET teachers, thereby enhancing their teaching commitment (Movessian, 2018), professionalism (Zhang, 2024), and quality of teaching (OECD, 2012). Thus, this study aims to determine whether external accountability can foster teacher social recognition in mainland China, as numerous external accountability measures have been implemented to ensure and enhance teacher professional competence and quality through holding them answerable and responsible to stakeholders (Li & Tsang, 2023; Rosenblatt & Wubbels, 2021; Zhang & Tsang, 2021). Although external accountability has been criticized as a cohesive mechanism that is used to control and monitor teachers, leading to teacher disempowerment (Tsang, 2019; Wright, 2020), this study supports Li and Tsang (2023) and Zhang and Tsang (2021), who observe that external accountability can be an enabling force in mainland China. This is because the findings show that external accountability can directly enhance teachers' social recognition and indirectly facilitate them in perceiving and living out a calling.

Although the findings generally support the hypothesized research framework, especially the mediating effect of living a calling and the chain mediating effect of both a sense of calling and living a calling, the results of this study indicate that the mediating effect of a sense of calling is insignificant. These findings are similar to those reported by Duffy and his colleagues (e.g., Duffy et al., 2012; Duffy et al., 2017). Their studies indicate that living a calling can fully mediate the effect of a sense of calling. Accordingly, as Duffy et al. (2018) argue, simply perceiving a calling may not lead to positive outcomes unless teachers can also live it out. Therefore, when living a calling is controlled, a sense of calling alone becomes insufficient for generating positive teacher outcomes. As a result, it is important to create an environment that enables teachers to enact their calling rather than solely focusing on cultivating their sense of calling.

This study has both theoretical and practical implications. Theoretically, it demonstrates the potential for implementing external accountability in the context of China's VPET system by indicating the mechanism through which this promotes teacher social recognition via the chain mediation of a sense of calling and living a calling. It also contributes to enriching the empirical literature on external accountability, teacher social recognition, and calling. Practically, the findings suggest that decisions on administration and educational policies at the school level should prioritize the active provision of supportive environments to help teachers transform their intrinsic sense of calling into daily practice rather than being limited in implementing accountability. Finally, the results highlight the need for institutional designs to provide teachers with sufficient autonomy, resources, and recognition mechanisms to realize their professional values, thereby addressing the challenges of attracting and retaining high-quality vocational teachers and enhancing the status and quality of VPET in China.

Two major limitations of the study are highlighted here. First, the study relies only on participants selected through a nonprobability sampling method, resulting in a small sample size. In other words, the findings may not represent the whole population of vocational high school teachers in mainland China. Thus, further research should replicate the study using a larger sample selected by a probability sampling method. Second, the vocational high school teacher is the only type of VPET teacher in mainland China. Therefore, further research should examine the relationships among external accountability, calling, and social recognition among other types of VPET teachers, such as those teaching in vocational colleges. Moreover, researchers can conduct comparative studies to understand the differences between different types of VPET teachers in mainland China, thereby providing a more comprehensive account of the effects of external accountability on teacher social recognition by calling.

## Discussion

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# Research on the Design and Application of Virtual Simulation Teaching in Secondary Vocational Education Based on the APT Teaching Model—A Case Study of the "Tea Product Marketing" Course

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# Research on the Design and Application of Virtual Simulation Teaching in Secondary Vocational Education Based on the APT Teaching Model—A Case Study of the "Tea Product Marketing" Course

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## Abstract

To enhance students' task completion efficiency and learning outcomes, an increasing number of vocational colleges are gradually introducing information technology-based teaching methods, such as artificial intelligence, virtual simulation, 5G, and others. Notably, many secondary vocational specialties have begun to employ virtual simulation technology to assist in teaching. When selecting virtual simulation technology for instruction, it is essential to consider its appropriateness for the specific professional teaching context. Based on this consideration, this study integrates panoramic VR interactive courseware into secondary vocational classrooms using information technology. Grounded in teaching interaction theory and the theory of multiple intelligences, it constructs a virtual simulation teaching design framework utilizing the APT teaching model as the instructional process, and evaluates the effectiveness of panoramic VR interactive courseware in teaching implementation.

This study employed the action research methodology and selected a natural class from the Tea Art and Tea Marketing program at School L in Guangdong Province to conduct two rounds of action research. By designing teaching content, formulating teaching plans, and developing panoramic VR interactive courseware, adjustments and optimizations were made to address issues identified in the first round of action research, incorporating reflections from the instructor, feedback from peer teachers, and student input. Building upon the first round, modifications were made to the teaching content, plans, and courseware before initiating the second round of action research. Through an analysis of pre- and post-test data from the action research, as well as interviews with teachers and students, the results indicated that the panoramic VR interactive courseware had a positive impact on enhancing students' classroom enthusiasm and participation.

**Keywords:** *APT Teaching Model; Virtual Simulation; Secondary Vocational Education; Teaching Design and Application; Tea Product Marketing*

## Introduction

With the advancement of technologies such as 5G, big data, and artificial intelligence, educational informatization has emerged as a crucial direction for vocational education reform. National

policies, including the "National Implementation Plan for Vocational Education Reform" and the "Opinions on Promoting High-Quality Development of Modern Vocational Education," both underscore the necessity for vocational education to align with technological trends (State of Council, 2019) and facilitate the deep integration of information technology with education and teaching, thereby establishing high-standard practical training bases and innovative educational models (Zhou, Fan and Zhou, 2022). This endeavor not only entails the upgrading of teaching resources and tools but also necessitates the digital transformation of educational philosophies and teaching methodologies.

Vocational education centers on practice, emphasizing the integration of skill development with the workplace environment. Traditional classroom teaching models have found it increasingly difficult to meet these demands. Information-based teaching methods leverage immersive interactive technologies to provide students with learning experiences that closely resemble real-world job scenarios, thereby facilitating the "integration of theory and practice." Exploring the application of information-based teaching in secondary vocational education holds significant importance for enhancing students' technical skills and achieving collaborative school-enterprise education. Against this backdrop, this study is dedicated to exploring virtual simulation technology solutions suitable for normalized teaching practices. Using specialized courses at a certain secondary vocational college as a practical platform, the study conducts two rounds of systematic action research to thoroughly investigate the application effects of virtual simulation technology in secondary vocational classroom instruction. The research primarily focuses on the usability, practicality, and teaching effectiveness of the technology, aiming to provide vocational colleges with replicable and scalable virtual simulation teaching practice models that promote the deep integration of information technology with vocational education.

## Research Objectives

Against the backdrop of the rapid development of educational informatization and in light of the teaching demand for the "integration of theory and practice" in vocational education, systematic literature research and practical investigations have revealed that virtual simulation teaching technology significantly enhances the quality of classroom instruction. However, vocational colleges currently face prevalent practical challenges, such as inadequate training facilities and a shortage of equipment. Coupled with the inherent issues of high development costs and complex operation associated with virtual simulation technology, its effective application and widespread adoption in daily teaching have proven difficult. This practical contradiction constitutes the core issue that this study aims to address. Based on the aforementioned background, this study is dedicated to exploring virtual simulation technology solutions suitable for normalized teaching practices. Using the specialized courses of a certain secondary vocational school as a practical platform, the study conducts in-depth investigations into the application effects of virtual simulation technology in secondary vocational classroom instruction through two rounds of systematic action research. The research primarily focuses on the usability, practicality, and teaching effectiveness of the technology, with the aim of providing vocational colleges with replicable and scalable virtual simulation teaching practice models that facilitate the deep integration of information technology and vocational education. The research objectives are outlined as follows:

I) Select appropriate virtual simulation teaching technologies based on the current state of curriculum instruction and the conditions for virtual simulation teaching at Secondary Vocational School L;

II) Construct a virtual simulation teaching design model tailored to secondary vocational courses, in accordance with the typical APT teaching model, and integrate it with instructional content for teaching design purposes;

III) Implement virtual simulation teaching practices in secondary vocational classrooms, analyze existing issues, and make necessary adjustments;

IV) Investigate the instructional effects of the selected virtual simulation teaching technologies in secondary vocational classrooms and propose corresponding teaching recommendations.

## Literature Review

### *Suggestions on the Construction of Virtual Simulation Teaching Resources*

The research on virtual simulation teaching resources primarily centers on the construction of practical training bases, the enhancement of teachers' application capabilities, and the in-depth integration of technology with teaching. Scholars have highlighted that current virtual simulation practical training bases in vocational colleges face the issues of "three highs and three difficulties," necessitating optimization in terms of overall planning, institutional mechanisms, and the development of a "dual-qualified" teaching staff (Li, Li and Fang, 2023). Meanwhile, although teachers demonstrate a strong awareness of information-based teaching capabilities, they often lack technical proficiency and original school-based resources (Liang, Jiang, and Zhao, 2016). Furthermore, Luo Liping proposed the "work-integrated learning" model, advocating for collaborative development of teaching resources between schools and enterprises (Luo, 2011); Zeng Zhaoxiang et al. emphasized the importance of integrating professional clusters with industrial chains to promote the co-construction and sharing of platforms by schools and enterprises (Zeng, Liu and Li, 2022).

In summary, existing research is problem-oriented, focusing primarily on the construction of practical training bases. However, further exploration is needed regarding teachers' information-based application capabilities and the in-depth integration of virtual simulation technology with practical teaching. In the future, it is essential to strengthen school-enterprise collaboration, enhance the originality and teaching adaptability of resources, and promote the high-quality development of virtual simulation teaching.

### *The Value and Pathways of Virtual Simulation in Vocational Education*

The research on the application value and pathways of virtual simulation technology in vocational education primarily revolves around participating entities, resource construction, and application models. Scholars have pointed out that the current informationization construction in vocational colleges places excessive emphasis on technological updates while neglecting the integration of educational theory and practice (Ren, 2015). Li Wenjing emphasizes the need to strengthen top-level design, promote collaboration among "government, vocational colleges, and enterprises," and establish a new paradigm for digital learning (Li & Wu, 2021); Peng Zihan et al. propose integrating international experiences with regional coordination to facilitate balanced resource development (Peng & Wang, 2019). In terms of application, Yang Hui et al. advocate for the systematic and

intelligent design of practical training resources (Yang & Peng, 2020), while blended teaching models such as the flipped classroom are emerging as a direction for reform (Huang, 2018).

Research indicates that the effective application of virtual simulation technology relies not only on the technology itself but also necessitates policy support, innovation in educational philosophies, and the integration of practical experiences. In the future, it is essential to promote industry-education collaboration, develop scenario-based learning models that combine virtual and real-world elements, and achieve high-quality development in vocational education.

### **Application of VR Technology in Secondary Vocational Education**

Virtual simulation technology is widely applied in vocational education and teaching, encompassing multiple fields such as simulated demonstrations in cultural courses, three-dimensional simulations of tourist attractions, medical technology training, and stereoscopic displays of engineering equipment (Wang & Li, 2011). This technology has effectively enhanced teaching efficiency and improved students' classroom engagement. Currently, the informatization of secondary vocational education primarily employs "computer screen-based virtual simulation technology," with applications predominantly concentrated in engineering disciplines such as automotive repair and computer science, while the use of virtual simulation in liberal arts courses remains relatively inadequate.

**Table 1**

*Current Application Status of Virtual Reality Technology  
in Secondary Vocational Education*

| Major                                        | Course                                                                                                       | Virtual Simulation Technologies Used                                                                                                                                                       |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automobile Application and Maintenance Major | Automobile Maintenance Teaching                                                                              | 3D Interactive Technology (Huang, 2009)<br>Cruze Automobile 3D Virtual Simulation Teaching Software (Li, 2014)                                                                             |
|                                              | New Energy Vehicle Teaching                                                                                  | Computer Simulation: Using software and human-computer interaction to virtualize learning objects, which are mainly displayed in the form of audio, text, images, and videos (Zhang, 2021) |
| Computer Network Major                       | <i>"Building a Small-Scale Financial Enterprise Local Area Network"</i>                                      | "Cisco Packet Trace" Virtual Simulation Software: "Network Topology Structure", "Configuring Routers", "Switching", etc. (Zhou, 2021)                                                      |
| Elevator Major                               | Task 3 "Installation and Maintenance of Door Panels" in Project 4 of Elevator Installation and Commissioning | Zhongxin Zhixue Ti (ETP, Elevator Training Platform) Virtual Simulation Platform (Yuan, 2022)                                                                                              |

Continued From Previous Page

|                                                         |                                                                                  |                                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fashion Design Major                                    | Fashion Design Course                                                            | Computer-Aided Design System (CAD)<br>3D Human Body Modeling Technology<br>3D Garment Virtual Technology<br>Virtual Fitting Room Technology (Li, 2022)   |
| Electrical and Electronic Engineering Major             | Electrical and Electronic Engineering Experiment Course                          | Virtual Test Instruments and Meters in NI Multisim Simulation Software;<br>Integration of Virtual Instrument Design with Simulation Software (Liu, 2023) |
| International Business Major                            | Simulated Training for Cross-border E-commerce Operations                        | Virtual Simulated Market                                                                                                                                 |
| Nursing Major                                           | Internal Medicine Nursing                                                        | Virtual Simulation Software: Virtual Human Model (Dai, 2021)                                                                                             |
| Mold Specialty                                          | Mold Disassembly and Assembly                                                    | Virtual Simulation Software: Virtual Simulation for Mold Disassembly and Assembly (You, 2018)                                                            |
| Unmanned Aerial Vehicle Operation and Maintenance Major | Unmanned Aerial Vehicle Assembly and Debugging                                   | Cinema 4D 3D Modeling Software: 3D Model of Unmanned Aerial Vehicle; Unity 3D (Hou, Tang, and Lu, 2023)                                                  |
| Chemical Engineering Major                              | Methanol Production Process                                                      | Digital Simulation Technology: Establishing digital models to simulate the operation and skills of real chemical plants, etc. (Wu & Peng, 2021)          |
| Pharmacy Major                                          | Pharmaceutical Training                                                          | The virtual simulation software for pharmacology developed by Oubeier Ltd: 3D simulation of production environment and production equipment (Lv, 2020)   |
| Architecture Major                                      | <i>Reinforcement Detailing and Drawing Reading</i>                               | Virtual technologies such as BIM and 3D modeling; MRC Mixed Reality Technology (Wang, Liang, and Lin, 2021)                                              |
| Tourism Service and Management                          | <i>Exploring Revolutionary Heritage Sites, Signature Cuisines, and Souvenirs</i> | Constructing virtual simulation scenarios through AR training labs, VR technology, and AI-powered intelligent robots                                     |

## Model Construction

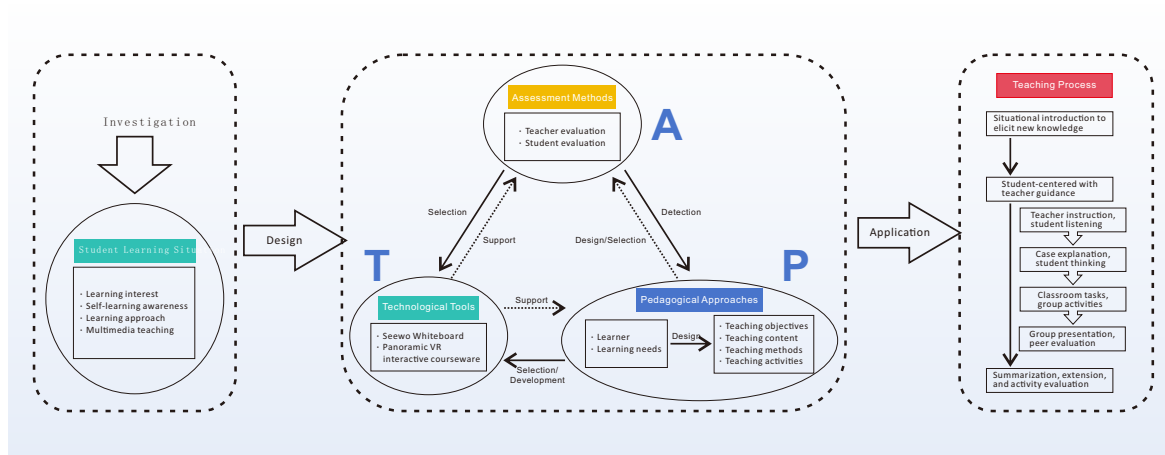
### ***APT Teaching Model in the Information Environment***

The APT teaching model is an instructional paradigm that underscores the integration of assessment methods, pedagogical approaches, and technological tools. With the advent of the 21st century, there has been a surge in the incorporation of information technology into classroom instruction. Fan Fulan et al. proposed an information-based teaching model within the context of information technology-enhanced education, which is assessment-led and integrates pedagogical strategies with technological tools (Wang & Li, 2021). This model is also referred to as the APT teaching model. Through empirical research, they discovered that the APT teaching model can effectively enhance students' classroom engagement and foster their autonomous learning capabilities. Within the APT teaching model, assessment methods, pedagogical approaches, and technological tools form an inseparable entity, with each component interacting and influencing the others. Assessment methods and pedagogical approaches serve as the prerequisites for determining the technological tools employed, while technological tools, in turn, provide technical support for the implementation of assessment methods and pedagogical approaches.

Based on the APT teaching model, this study constructed a three-stage teaching framework model of "investigation-design-application" by integrating virtual simulation technology, as illustrated in Figure 1. During the investigation stage, questionnaire surveys are employed to analyze students' learning conditions, encompassing their learning interests, autonomous learning awareness, and acceptance of multimedia instruction. This provides a foundation for instructional design. In the design stage, systematic planning is conducted from three dimensions: assessment methods, technological tools, and pedagogical approaches. Panoramic VR interactive courseware and Seewo Whiteboard are utilized as instructional technological tools throughout the entire classroom session. For assessment methods, a combination of teacher evaluation and student evaluation is selected. Regarding pedagogical approach selection, grounded in learners and their learning needs, instructional objectives, content, methods, and activities are meticulously designed. During the application phase, relying on information technology tools such as panoramic VR interactive courseware and Seewo Whiteboard, a six-step teaching process of "scenario introduction—new knowledge explanation—case discussion—task-driven learning—achievement presentation—summary and evaluation" is adopted. This process facilitates the transformation to a "student-centered" teaching paradigm through teaching activities including role-playing and group discussions. By systematically integrating teaching methods (such as situational teaching approach and lecture method), evaluation means, and technological tools (e.g., panoramic VR interactive courseware), this model effectively promotes students' autonomous, cooperative, and inquiry-based learning in the course of "Tea Product Marketing."

### **Figure 1**

*Virtual Simulation Instructional Design Based on the APT Teaching Mode*



### Analysis of Design Elements

Based on the established framework for virtual simulation instructional design grounded in the APT model, and taking into account the characteristics of panoramic VR interactive courseware, an analysis of the instructional design elements for panoramic VR interactive courseware is conducted. These elements are categorized into three dimensions: assessment methods, pedagogical approaches, and technological tools, as presented in Table 2.

**Table 2**

*Table of Instructional Design Elements for Virtual Simulation Based on the APT Model*

| Dimension              | Design Elements      | Design Requirements                                                                                                                                                                                                                                           |
|------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assessment Methods (A) | Immediate Evaluation | Teachers should collect real-time feedback from students during the teaching process to promptly adjust teaching strategies, utilizing methods such as in-class Q&A sessions and quizzes.                                                                     |
|                        | Peer Assessment      | Evaluation of learning outcomes and performance among students through peer assessment.                                                                                                                                                                       |
|                        | Teacher Observation  | Teachers should systematically record and analyze students' performance, behavior, and participation levels during the teaching process, such as documenting the rate of hand-raising in class, participation in Q&A sessions, and group discussion dynamics. |
|                        | Teacher Evaluation   | Teachers should conduct a comprehensive assessment of students' learning outcomes.                                                                                                                                                                            |

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|                            |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | Formative Evaluation               | The assessment conducted by teachers during students' learning process aims to promote continuous improvement in students' learning by providing feedback and suggestions on their academic progress.                                                                                                                                                                                                                                                                                |
| Pedagogical Approaches (P) | Learning Needs Analysis            | It is crucial to clarify learners' learning status and classroom engagement so as to adjust teaching strategies, set learning objectives, and design learning activities accordingly.                                                                                                                                                                                                                                                                                                |
|                            | Learner Analysis                   | The primary focus is on understanding the learning characteristics, professional traits, knowledge foundation, and practical abilities of secondary vocational school students.                                                                                                                                                                                                                                                                                                      |
|                            | Formulation of Teaching Objectives | This will be elaborated from three dimensions: knowledge, ability, and literacy.                                                                                                                                                                                                                                                                                                                                                                                                     |
|                            | Design of Teaching Content         | Several aspects require attention: First, teaching objectives should serve as the core, ensuring that the teaching content aligns with the requirements of course objectives and learning outcomes. Second, the content should uphold principles of scientificity, accuracy, and logicity. Third, it is essential to integrate theory with practice by designing authentic scenarios or case studies to assist learners in transforming theoretical knowledge into practical skills. |
|                            | Design of Teaching Methods         | Teaching methods should be selected based on the teaching content. Specifically, the instructional design may incorporate methods such as situational                                                                                                                                                                                                                                                                                                                                |
|                            |                                    | teaching, lecture-based teaching, and the flipped classroom approach.                                                                                                                                                                                                                                                                                                                                                                                                                |
|                            | Design of Learning Activities      | The design should adhere to a learner-centered principle, tailored according to the course teaching objectives and specific teaching content. It should take full account of learners' cognitive characteristics, foundational knowledge, and learning needs.                                                                                                                                                                                                                        |
| Technological Tools (T)    | Hardware                           | Seewo Whiteboard                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                            | Software                           | Nibiru creator, panoramic VR interactive courseware                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## **Evaluation Approaches**

Teacher evaluation encompasses two dimensions: self-assessment and peer evaluation. Teacher self-assessment involves a systematic reflection on key elements such as teaching objectives, methods, and student performance. This process facilitates professional development and the optimization of teaching strategies, often allowing for real-time adjustments based on classroom observation data. Peer evaluation, on the other hand, enables the sharing of experiences and the innovation of teaching methods through observation and feedback among teachers. It offers diverse perspectives for enhancing teaching practices.

Student evaluation encompasses peer assessment, real-time evaluation, teacher evaluation, teacher observation, and formative assessment. Peer assessment is conducted through group collaboration, enabling students to enhance their collaborative and reflective abilities by providing mutual feedback. Real-time evaluation leverages classroom interactive tools to dynamically adjust teaching strategies on the fly. Teacher evaluation takes a comprehensive approach, assessing both students' mastery of knowledge and their development of abilities. Teacher observation involves recording behavioral data to support personalized instruction tailored to individual students' needs. Formative assessment, meanwhile, promotes the optimization of the learning process through periodic feedback. This evaluation system underscores the principles of diversity, dynamism, and developmental orientation, aligning with the overarching goal of "learner-centered" teaching.

## **Teaching Methodology**

### ***Learning Needs Analysis***

The instructional design of this study primarily aims to enable students to gain a clearer understanding of the teaching content in Tea Product Marketing through panoramic VR interactive courseware, actively participate in classroom activities, and enhance their enthusiasm. The key focus lies in students learning the theoretical knowledge of the 4P marketing mix, developing a profound comprehension of the teaching content presented in case studies. The challenge, however, is for students to apply the 4P marketing mix to design group marketing plans. Teachers should pay attention to establishing a well-defined learning framework and guiding students through a transition from knowledge comprehension to practical application by designing progressive tasks. Meanwhile, students should be encouraged to engage in critical thinking and innovative practices, thereby cultivating their comprehensive abilities to solve real-world marketing problems.

### ***Learner Analysis***

This course is primarily targeted at secondary vocational school students. While they possess a certain foundation of general cultural knowledge, they still lack an in - depth understanding of the specialized knowledge and practical skills related to tea product marketing. Secondary vocational school students generally demonstrate a strong interest in practical operations and detailed case analyses. The introduction of panoramic VR interactive courseware can effectively stimulate their learning enthusiasm and enhance their level of participation. Panoramic VR interactive courseware not only offers an immersive learning experience but also creates authentic practical scenarios for students. This enables them to actively explore various aspects of tea product marketing through interaction. Such a learning approach not only aids students in better comprehending theoretical

knowledge but also strengthens their adaptability to practical operations.

Through the study of this course, it is anticipated that students will acquire fundamental knowledge and pivotal skills in tea product marketing, and cultivate the ability to engage in marketing and service activities within the tea industry and related product sales sectors. The ultimate objective is to equip students with the capacity for independent thinking and problem - solving, thereby laying a solid foundation for their future career development.

### ***Formulation of Teaching Objectives***

**a.Knowledge Mastery and Deepening.** By utilizing panoramic VR interactive courseware, students will systematically learn the fundamental concepts, theoretical frameworks, and core elements of Tea Product Marketing, such as the ten business models of tea and their connotations, as well as the marketing approaches for gift teas. The virtual scenarios within the courseware will facilitate the integration of theoretical knowledge with practical applications for students. Through teacher-led instruction and classroom activities, students will gain an in-depth understanding of how marketing strategies are applied in real-world contexts, thereby strengthening the connection between theory and practice.

**b.Skill Enhancement and Expansion.** The assistance of panoramic VR interactive courseware in classroom teaching significantly helps students immerse themselves in the scenarios created by the teacher. In these settings, they can learn relevant concepts and knowledge of tea product marketing and apply what they've learned to collaborate with group members on completing in-class tasks, such as formulating marketing plans. During group collaboration, students acquire the ability to communicate effectively, divide tasks among team members, and work together to solve marketing problems, thereby enhancing their teamwork and interpersonal skills.

**c.Cultivation of Literacy and Shaping of Values.** The use of panoramic VR interactive courseware to assist classroom teaching serves to stimulate students' innovative thinking, encouraging them to explore new methods and approaches in marketing strategies. During classroom activities, students learn to abide by industry norms and laws and regulations, establishing correct professional ethics and contributing to upholding a positive image for the tea product marketing industry. By gaining insights into tea culture and marketing strategies, students will enhance their sense of identity and pride in Chinese tea culture, thereby promoting cultural heritage and innovation.

### ***Design of Teaching Content***

Based on the course teaching schedule and students' learning progress, the teaching content as presented in the table has been selected and will be delivered in combination with panoramic VR interactive courseware. The course materials employed for this teaching content are sourced from Tea Marketing and Marketing Chinese Tea: Understanding Tea Marketing in 2 Hours, as well as through online data collection. This section of the content aims to familiarize students with the existing sales models and relevant tea sales strategies in the current tea market. It helps students gain a comprehensive understanding of the marketing ecosystem in the tea market, master the core strategies of modern tea marketing, and lay a solid professional foundation for their future careers in the tea industry.

**Table 3**

*Teaching Content of the Panoramic VR Interactive Courseware*

| Course Theme                                                         | Course Content                                                                                                                                                                                                                                     | Classroom Teaching                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Ten Business Models and the 4P Marketing Mix in the Tea Industry | Tea Business Models:<br>Category Brands, Channel Brands, Packaging Brands, Teahouse Brands, Tea Art Brands, Concentrated Tea Beverage Brands, Freshly-Brewed Concentrated Tea Brands, Gift Tea Brands, Tea-Infused Food Brands, and Teashop Brands | Introduce ten tea business models, covering their basic concepts, characteristics, advantages, and applicable scenarios, with a focus on category brands, channel brands, tea art brands, gift tea brands, and tea shop brands. Analyze real-world applications of these models in the tea industry, such as traditional retail stores, e-commerce platforms, and branded chain specialty stores. Guide students in evaluating the strengths, weaknesses, and suitability of each model under different market conditions. |
|                                                                      | 4P Marketing Strategy<br>Product, Price, Promotion, Place                                                                                                                                                                                          | Introduce the concepts and components of the Product, Price, Promotion, and Place strategies, using examples to enhance student comprehension. Examine marketing case studies from leading tea brands (e.g., CHAGEE) to discuss their success factors and shortcomings. Conduct group discussions where students simulate the process of developing and implementing a marketing plan, improving their practical skills and teamwork abilities.                                                                            |

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|                                                                   |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marketing Approaches for Gift Teas: A Case Study of XIAO GUAN TEA | 4P Marketing Strategy of XIAO GUAN TEA: Product Strategy, Pricing Strategy, Promotion Strategy, Place Strategy                                                                                                                       | After screening a XIAO GUAN TEA promotional video, facilitate a student-led discussion on its 4P marketing strategy, analyzing its successes and areas for improvement. This session aims to cultivate critical thinking and collaborative skills.                                                             |
|                                                                   | <p>In-depth Marketing Strategy of XIAO GUAN TEA</p> <p>Who: Target Audience</p> <p>What: The Connection Between the Product and Its Target Audience</p> <p>How: Pain Points in Product Communication (How to Market the Product)</p> | Using panoramic VR courseware, the instructor enables students to virtually experience XIAO GUAN TEA's contextual marketing. By simulating supermarket or mall environments, students identify the brand's product displays and promotional elements, assessing their impact on consumer purchasing decisions. |
|                                                                   | Reflection and Discussion: Marketing Strategy for Qimen Zong Tea                                                                                                                                                                     | After completing discussions on Qimen Zong Tea's marketing strategy, each student group delivers a presentation showcasing their proposed strategies and creative solutions, followed by peer and instructor feedback. This segment enhances public speaking skills and confidence.                            |

### ***Design of Teaching Methodologies***

In alignment with the teaching content, this instructional session has selected questionnaires, research-based teaching, lecture method, situational teaching, and flipped classroom as the pedagogical approaches to be employed in the classroom. The specific details of the teaching methods utilized during the class are outlined in the table below.

**Table 4**

*Teaching Methodologies Employing Panoramic VR Interactive Courseware*

| Teaching Methodologies | Instructional Phases | Instructional Functions                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lecture Method         | During-Class         | The instructor provides students with foundational knowledge by elucidating the fundamental concepts, characteristics, advantages, and applicable scenarios of tea business models. Additionally, a theoretical basis is established through an in-depth explanation of XIAO GUAN TEA's sophisticated marketing strategies.                                                                                                                                                 |
| Situational Teaching   | During-Class         | Leveraging the scene simulation capabilities of panoramic VR courseware, students are immersed in a lifelike marketing environment for XIAO GUAN TEA. This immersive learning approach significantly enhances students' comprehension of scenario-based marketing implantation.                                                                                                                                                                                             |
| Case-Based Teaching    | During-Class         | By analyzing practical application cases from traditional retail stores, e-commerce platforms, and branded chain stores, along with conducting in-depth examinations of brands such as XIAO GUAN TEA and BAMA TEA, the instructor facilitates discussions on successful strategies and areas for improvement. This approach bridges theoretical knowledge with real-world applications, enabling students to grasp the practical implementation of diverse business models. |

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|                     |              |                                                                                                                                                                     |
|---------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Group Collaboration | During-Class | Through group discussions, students simulate the process of formulating and executing marketing plans, thereby cultivating their teamwork and communication skills. |
| Flipped Classroom   | During-Class | Students, working in small groups, discuss and formulate marketing strategies for Qimen Zong Tea, followed by presenting and showcasing their plans on stage.       |

### ***Design of Learning Activities***

This instructional design incorporates two practical activity segments: "Scenario Simulation" and "Group Collaboration and Presentation." These segments are designed to assist students in consolidating their knowledge retention after learning theoretical concepts, either through teacher-posed questions or classroom activities. Moreover, they facilitate the translation of theoretical knowledge into practical application, thereby embodying a teaching approach that integrates theory with practice.

**a.Scenario Simulation.** In the teaching module focused on an in-depth analysis of Xiaoguantea's innovative scenario-based marketing strategies, this study fully leverages the technological advantages of panoramic VR interactive courseware to create a multi-dimensional immersive learning environment. Through virtual simulation software, instructors can seamlessly transition between various virtual scenarios, such as an "ordinary airport VIP lounge" and a "teahouse-style airport VIP lounge," guiding students to deeply experience the unique atmospheres of different marketing scenarios from a first-person perspective. Within the "teahouse-style VIP lounge," students assume the role of "VIP guests," allowing them to appreciate the marketing artistry in high-end social settings.

**b.Group Collaboration and Presentation.** During the thinking and discussion session, after students watch videos related to Qimen Zongcha, the instructor organizes them into groups to engage in collaborative discussions on marketing strategies for Qimen Zongcha. Students are required to integrate the marketing theories they have learned previously to develop practical and feasible marketing plans. Subsequently, each group presents their marketing strategies and creative proposals, receiving feedback and evaluations from both their peers and the instructor.

## **Technological Tools**

### ***Introduction to Technological Tools***

Nibiru Creator, as an AR/VR cloud design editor, offers developers an efficient and user-friendly platform for creating AR/VR content, thanks to its rich functionality and intuitive operational interface. Widely applied across various sectors such as education, entertainment, and healthcare, Nibiru Creator provides robust technical support for the development of AR/VR content. For

instance, in the educational sphere, Nibiru Creator can be utilized to construct virtual laboratories and virtual classrooms, offering students a more intuitive and engaging learning experience.

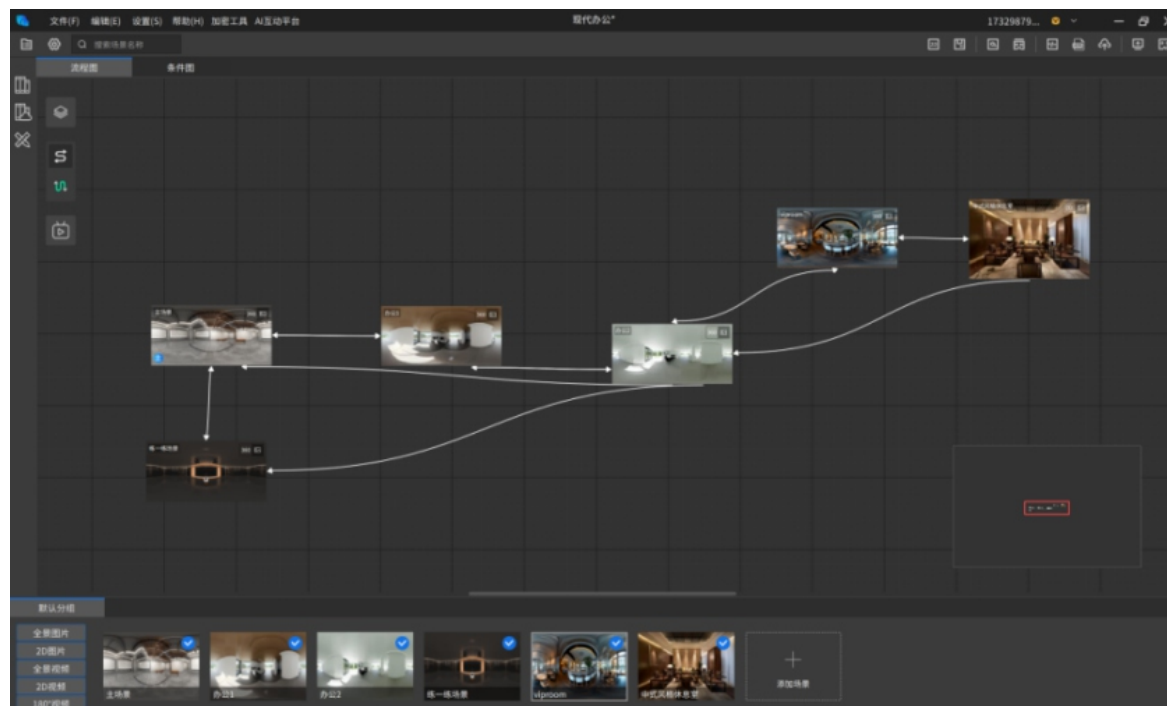
**Figure 2**

*Homepage of the Official Nibiru Creator Website*



**Figure 3**

*Operational Interface of the Nibiru Creator Software*



### **Technical Usability**

**a. Multi-Device Compatibility.** The panoramic VR interactive courseware created using Nibiru Creator can be generated as H5 interactive courseware, namely, web-based courseware. This type of courseware is not restricted by device limitations and can run smoothly in various browsers that support HTML5. Whether on computers, tablets, or smartphones, users can access and experience the courseware anytime, anywhere. This flexibility significantly enhances the convenience of learning, enabling educational resources to be disseminated and utilized more widely. Additionally, if the source file (NPT file) is exported, offline usage becomes possible. This means that users can access course content without an internet connection, making it highly suitable for environments with unstable or unavailable network connectivity. The offline mode ensures the continuity of learning, guaranteeing the sustained progression of learning activities in diverse settings such as schools, corporate training, or outdoor educational scenarios.

**b. Achieving Interactive Effects.** The diverse interactive effects realized through panoramic VR interaction encompass functionalities such as clicking, jumping, dragging, and text input on the screen. These interactive methods offer students an immersive learning experience, enabling them to actively engage in the learning process. For instance, students can click on different elements to acquire more information and conduct in-depth exploration, or drag objects to comprehend complex concepts and structures. This approach not only stimulates students' curiosity but also enhances their operational skills and spatial imagination. Furthermore, the interactive effects facilitate real-time feedback and communication among students in the classroom, such as through educational games, quizzes, and other classroom activities, thereby strengthening classroom interactivity. Teachers can leverage these interactive features to adjust teaching content and pace more flexibly, gaining timely insights into students' levels of understanding and areas of confusion. This instant feedback mechanism aids teachers in making corresponding adjustments during instruction to better cater to students' learning needs.

**c. Achieving Panoramic Effects.** Unlike conventional courseware, panoramic VR interactive courseware boasts a unique advantage by enabling a 720-degree rotational view of the courseware screen, a feature that offers users an immersive learning experience. In traditional courseware, the viewpoint is typically fixed, restricting students to observing content from a specific position and lacking flexibility and interactivity. In contrast, panoramic VR interactive courseware allows users to freely explore content in any direction through operations such as mouse or touchscreen swiping, creating the sensation of being immersed in a genuine three-dimensional environment.

In addition, real-world images captured through photography can be transformed into panoramic visuals and subsequently developed into panoramic VR interactive courseware. Within these courseware materials, users have the freedom to insert plugins, enabling them to access related content or switch scenes with a simple click. This technology is particularly well-suited for vocational training, especially in secondary vocational education, where it can offer students in fields such as hotel management and tourism management a virtual, immersive vocational training experience. For instance, students can simulate tasks like making hotel room reservations, delivering museum commentaries, or conducting scenic spot tours. Through such immersive practices, students can acquire authentic vocational skills training, which is instrumental in enhancing their practical abilities and professional qualities.

### **Teaching Implementation and Application**

### **Action Research Plan**

The study was conducted in a naturally formed class of 40 students from the Tea Art and Tea Marketing program at School L in Guangzhou. It integrated panoramic VR interactive courseware into teaching with the aim of enhancing students' classroom engagement and improving teaching effectiveness.

This action research will be conducted in two rounds. Prior to the first round, a questionnaire and interview survey will be carried out to investigate the current state of virtual simulation teaching at the school and for the specific course in question. Additionally, a pre-test questionnaire will be distributed to the students in the target class before the first round of action research to gain insights into their daily learning conditions. After the conclusion of the first round, adjustments and modifications will be made to the instructional design based on the identified issues, as well as feedback and suggestions from other teachers. Subsequently, the second round of action research will be implemented. Following the completion of the second round, a post-test questionnaire will be administered to the students. An objective and comprehensive evaluation of the teaching effectiveness of the panoramic VR interactive courseware will then be conducted, taking into account peer evaluations, classroom observations, and teacher reflection records. The specific action research plan is presented in the table below.

**Table 5**  
*Teaching Action Research Plan*

|                                | Planning                                                                                                                                                                 | Action                                                                                                                                                                    | Observation                                                                                                                    | Reflection                                                                                              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| First Round of Action Research | Initially, students will utilize panoramic VR interactive courseware to learn tea product marketing methods, with the teaching content focusing on the 4P marketing mix. | The teacher guides students through the 4P marketing strategies and prompts them to refine their group's tea product marketing plan using the 4P marketing mix framework. | The primary focus is on observing the outcomes of students' group projects and their collaborative dynamics within the groups. | Reflect on the effectiveness of students' group proposals and their enthusiasm for group collaboration. |

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|                                 |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                   |                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Second Round of Action Research | The second round aims to enhance scenario creation, thereby boosting students' learning enthusiasm and improving the effectiveness of group collaboration, as well as cultivating their ability to devise tea product marketing plans. | Subsequently, the teacher leads students into the business context of "XIAO GUAN TEA," utilizing case studies to explore the success factors in-XIAO GUAN TEA's marketing approach. Students then engage in collaborative group discussions to brainstorm innovative marketing strategies for "Qimen Zong Tea," further elaborating and detailing their group's tea product marketing plan. | The main emphasis is placed on evaluating the results of students' group projects and monitoring the revisions made to their group's tea product marketing plans. | Reflect on the outcomes of group proposals and the quality of revisions made to the group's tea product marketing plans. |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|

## Process of Action Research

### *First Round of Action Research*

The primary objective of the first round of action research is to assist students in mastering the business models and marketing strategies within the tea industry, while cultivating their market analysis and practical application capabilities. The instructor employs panoramic VR interactive courseware for teaching, guiding students through the relevant knowledge by following the pedagogical sequence of "introduction to new lessons, delivery of new content, knowledge consolidation, and summarization."

Through observations of classroom teaching dynamics and feedback from both teachers and students, this study has identified the following issues: The introduction of panoramic VR interactive courseware has indeed brought novelty to the teaching process; however, there exists a gap between its actual application effects and the anticipated outcomes. Given the characteristic of weak academic foundations among secondary vocational school students, teaching approaches need to be more meticulous, with content that is straightforward and easily comprehensible. Additionally, students should be granted more time for independent exploration to facilitate their understanding and mastery, thereby aligning with the practical needs of secondary vocational students. Moreover, student activities can be integrated with the panoramic VR interactive

courseware to design more interactive teaching segments.

### Second Round of Action Research

The primary objective of the second round of action research is to facilitate students' in-depth understanding of XIAO GUAN TEA's marketing strategies, including its underlying tactics, and enable them to develop innovative marketing plans through group collaboration. Furthermore, this round aims to cultivate students' innovative thinking and problem-solving abilities, empowering them to generate novel marketing ideas and solutions.

In this round of action research, students demonstrated notably better performance and enthusiasm in class compared to the first round, with specifics as follows: The proportion of theoretical knowledge within the teaching content was relatively reduced from that of the first round; the instructional material was presented in greater detail, with an in-depth exploration of a particular teaching case; the teaching process flowed more smoothly, with a well-balanced arrangement of content delivery and activity segments; less time was devoted to lecturing on theoretical knowledge, allowing more time for students' independent exploration; the effectiveness of interactive sessions was enhanced, leading to increased student engagement and a higher willingness to participate in answering questions.

## Research Findings

To evaluate the implementation effectiveness of the panoramic VR interactive courseware, this study designed 25 questions focusing on two dimensions: learning interest and learning engagement. Following the two rounds of action research, students' learning changes were measured and analyzed, with a subsequent scientific assessment of the measurement results. The survey was conducted among students from Class 2206 of the Tea Art and Tea Culture major at Guangzhou L School. In both the initial and follow-up surveys, 40 questionnaires were distributed, with all 40 being returned and deemed valid, achieving a 100% response rate. The collected data were entered and analyzed using SPSS 27 software.

**Table 6**

*Paired-Samples t-Test Results for Pre-test and Post-test Overall Performance*

| Paired-Samples Test |                     |                               |                                     |                                                 |   |                                          |                                      |                |
|---------------------|---------------------|-------------------------------|-------------------------------------|-------------------------------------------------|---|------------------------------------------|--------------------------------------|----------------|
|                     | Pairwise Difference |                               |                                     |                                                 | t | De<br>gre<br>es<br>of<br>Fre<br>ed<br>om | Signific<br>ance<br>(Two-t<br>ailed) |                |
|                     | Mean                | Stand<br>ard<br>Deviasi<br>on | Mean<br>Standar<br>d Error<br>(SEM) | 95% Confidence<br>Interval of the<br>Difference |   |                                          |                                      |                |
|                     |                     |                               |                                     | Lower<br>Bound                                  |   |                                          |                                      | Upper<br>Bound |

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|        |                                                                                       |        |       |       |        |        |        |    |       |
|--------|---------------------------------------------------------------------------------------|--------|-------|-------|--------|--------|--------|----|-------|
| Pair 1 | Pre-test<br>Learning<br>Interest -<br>Post-test<br>Learning<br>Interest               | -0.300 | 0.729 | 0.115 | -0.533 | -0.067 | -2.603 | 39 | 0.013 |
| Pair 2 | Pre-test<br>Concentratio<br>n - Post-test<br>Concentratio<br>n                        | 0.100  | 0.909 | 0.144 | -0.191 | 0.391  | 0.696  | 39 | 0.491 |
| Pair 3 | Pre-test<br>Relevance -<br>Post-test<br>Relevance                                     | -0.506 | 1.076 | 0.170 | -0.850 | -0.162 | -2.976 | 39 | 0.005 |
| Pair 4 | Pre-test<br>Confidence -<br>Post-test<br>Confidence                                   | -0.542 | 1.015 | 0.160 | -0.866 | -0.217 | -3.376 | 39 | 0.002 |
| Pair 5 | Pre-test<br>Learning<br>Engagement<br>- Post-test<br>Learning<br>Engagement           | -0.493 | 0.831 | 0.131 | -0.758 | -0.227 | -3.747 | 39 | 0.001 |
| Pair 6 | Pre-test<br>Cognitive<br>Involvement<br>- Post-test<br>Cognitive<br>Involvement       | -0.306 | 0.928 | 0.147 | -0.603 | -0.010 | -2.088 | 39 | 0.043 |
| Pair 7 | Pre-test<br>Behavioral<br>Participation<br>- Post-test<br>Behavioral<br>Participation | -0.592 | 1.319 | 0.209 | -1.014 | -0.170 | -2.836 | 39 | 0.007 |

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|         |                                                                               |        |       |       |        |        |        |    |       |
|---------|-------------------------------------------------------------------------------|--------|-------|-------|--------|--------|--------|----|-------|
| Pair 8  | Pre-test<br>Emotional<br>Engagement<br>- Post-test<br>Emotional<br>Engagement | -0.642 | 0.926 | 0.146 | -0.938 | -0.346 | -4.384 | 39 | 0.000 |
| Pair 9  | Pre-test<br>Learning<br>Motivation -<br>Post-test<br>Learning<br>Motivation   | -0.475 | 0.796 | 0.126 | -0.730 | -0.220 | -3.773 | 39 | 0.001 |
| Pair 10 | Pre-test<br>Overall<br>Performance<br>- Post-test<br>Overall<br>Performance   | -0.423 | 0.593 | 0.094 | -0.612 | -0.233 | -4.504 | 39 | 0.000 |

### ***Analysis of the Learning Interest Dimension***

As indicated by the table, the significance value for the pre-test and post-test of learning interest is 0.013, suggesting that the use of panoramic VR interactive courseware in teaching has a certain positive impact on enhancing students' classroom enthusiasm. From a sub-dimensional perspective, the significance values for relevance and confidence are 0.005 and 0.002, respectively, while the significance value for concentration is 0.491. These findings demonstrate that the panoramic VR interactive courseware, based on the APT teaching model, can effectively attract students' attention to a certain extent during the teaching process, stimulate their learning curiosity, and enhance their eagerness to explore and engage with the course content. Additionally, it provides timely learning feedback to students, thereby contributing to the improvement of learning outcomes.

However, with regard to the concentration dimension, the significance value stands at 0.491, failing to reach a statistically significant level. This indicates that there remains substantial room for improvement in students' levels of concentration in the classroom. Potential influencing factors may encompass the format of classroom activities designed by teachers, the practicality of the course content, as well as individual differences among students. The specific reasons affecting learning concentration are outlined as follows:

1. Content Adaptability: The course content focuses on tea product marketing, which leans more heavily towards theoretical knowledge transmission. The practical components are relatively scarce and monotonous, primarily consisting of case studies, with insufficient opportunities for students to experience the panoramic VR interactive courseware firsthand.

2. Classroom Activity Formats: In this instructional design, classroom activities mainly involve answering questions and group collaboration, lacking a diverse range of teaching activities. Further exploration is needed on how to leverage panoramic VR interactive courseware to design richer and

more engaging classroom activities, thereby enhancing students' learning concentration.

3. Individual Student Differences: Some students lack prior background knowledge in marketing and show limited interest in learning about tea product marketing, leading to a decline in their classroom comprehension.

In response to the aforementioned issues, future teaching practices can be improved from the following aspects: Firstly, teachers can further optimize classroom activity designs, such as incorporating more interactive tasks or gamified elements, to enhance students' sense of participation and concentration. Secondly, panoramic VR interactive courseware should be more extensively applied in practical classroom sessions, enabling students to deepen their understanding and application of knowledge through immersive experiences. Finally, teachers can flexibly adjust teaching strategies based on students' learning characteristics, such as adopting differentiated instruction or personalized guidance, to meet the diverse learning needs of different students.

### ***Analysis of the Learning Engagement Dimension***

In terms of learning engagement, the significance values for cognitive engagement, behavioral engagement, and emotional engagement are 0.054, 0, and 0.001, respectively. These data indicate that the use of panoramic VR interactive courseware in the classroom teaching of the secondary vocational course Tea Product Marketing facilitates students' more active participation in classroom activities and encourages deeper thinking. Compared to previous learning approaches, students demonstrate stronger self-directed learning abilities in the classroom, actively engaging in activities and successfully completing assigned tasks. Additionally, there is a noticeable increase in the frequency of interactions between students and teachers, as well as enhanced collaborative exchanges among peers, which further promotes the depth and breadth of learning.

### ***Analysis of the Learning Motivation Dimension***

From the results, the significance value of the pre-test and post-test on learning motivation is 0.001, indicating that the use of panoramic VR interactive courseware in teaching yields superior outcomes compared to traditional multimedia instruction. This approach not only stimulates students' learning interest and intrinsic motivation but also provides a more intuitive and vivid learning experience, thereby enhancing their comprehension and mastery of course knowledge.

### ***Teaching Reflection and Recommendations***

Following two rounds of action research, and incorporating the results of data analysis as well as interviews with both students and teachers, the following recommendations are proposed for the instructional implementation of panoramic VR interactive courseware.

**1. Showcase the Diverse Functions of the Software to Enhance the Integration of Teaching and VR.** Building upon the development of additional functionalities within the software, it is crucial to further explore and experiment with demonstrating these new features in the classroom. This approach serves to enrich teaching content and improve the degree of integration between panoramic VR interactive courseware and the curriculum. By judiciously utilizing the software's capabilities, teachers can create a more vivid and interactive learning environment, enabling students to gain a more comprehensive understanding and mastery of classroom knowledge. Furthermore, introducing new functionalities during classroom demonstrations can stimulate students' curiosity and encourage their active participation in the learning process, thereby

facilitating more efficient knowledge transfer and skill development. Examples of such functionalities include the software's quiz feature, the ability to create micro-lessons and animations, among others.

Currently, the panoramic VR interactive courseware is equipped with an in-class quiz feature. Although this function was not fully utilized in the present study, it is recommended that teachers incorporate it to a reasonable extent during regular teaching processes to enhance student learning feedback and interaction. For instance, after explaining each knowledge point, a short quiz can be administered to help students reinforce what they have learned while simultaneously providing teachers with an effective tool to assess students' comprehension levels. Through this approach, teachers can promptly gain insights into students' learning progress and make corresponding instructional adjustments accordingly.

In addition, by leveraging the micro-lesson and animation capabilities of the panoramic VR software, teachers can create concise and impactful instructional videos to serve as materials for pre-class preview or post-class review. These micro-lessons can assist students in swiftly grasping the key points and challenging concepts of the course, thereby stimulating their interest in learning. Moreover, animation production can be employed to visually illustrate complex theories or processes, further enhancing students' comprehension and retention. For example, teachers could develop a series of micro-lesson videos covering the main knowledge points of the course, allowing students to utilize them for pre-class preview or post-class review purposes.

**2.Streamline Classroom Teaching Content and Refine Explanations of Details.** Through the practice of two rounds of teaching action research in secondary vocational classrooms, it has been observed that the content of each lesson should not be overly complex. A rapid teaching pace often prevents students from effectively absorbing the presented knowledge, resulting in a superficial and cursory experience with the panoramic VR interactive courseware. Therefore, it is crucial to streamline teaching content and systematically break down and explain key knowledge points. Simultaneously, moderately slowing down the teaching pace and incorporating a variety of classroom activities can enhance the instructional effectiveness of the panoramic VR interactive courseware, maximizing its potential. This approach not only helps students better absorb and understand knowledge points but also promotes their active participation and deep thinking, thereby improving overall learning outcomes and the depth of knowledge mastery.

Building on this foundation, a phased approach to instructional design can be adopted, where panoramic VR interactive courseware is selectively developed based on the content of each class session. By focusing on explaining a specific scenario or knowledge point in each lesson, this method not only alleviates the workload for teachers but also enables students to gain an in-depth understanding of a particular subject matter during each class. Such a design aligns with the rhythm of modern classrooms and facilitates the gradual construction of students' knowledge systems through each learning experience. For instance, a teacher could concentrate on a specific experiment or operation in a single class session, ensuring that students fully comprehend and master the relevant content.

**3.Prioritize Practice over Explanation and Allow Students Freedom to Explore.** Based on the interview results with both teachers and students, granting students more time for independent exploration proves more effective in secondary vocational classrooms. Traditionally, excessive theoretical explanations by teachers tend to induce boredom among students, thereby dampening their willingness to actively comprehend and learn classroom knowledge. Conversely, providing

students with ample time for mutual communication and free exploration not only effectively enhances their learning interest but also improves their concentration. By encouraging students to actively participate in the learning process through interactive discussions with peers, they can deepen their understanding of knowledge through practical application. Meanwhile, a free exploration environment stimulates students' curiosity, prompting them to autonomously seek solutions to problems. Therefore, throughout the entire process of utilizing panoramic VR interactive courseware to support teaching, it is not necessary to rely solely on this technology. Instead, the optimal approach combines teacher instruction, panoramic VR interactive courseware-assisted classroom interactions, and students' independent exploration.

**4. Expand the Application of Panoramic VR Courseware and Innovate through Interdisciplinary Teaching Practices.** As an innovative teaching tool, panoramic VR interactive courseware boasts broad applicability, spanning nearly all professional domains. However, notable differences exist among various disciplines in terms of teaching content and usage requirements, necessitating careful consideration of each field's distinctive characteristics and practical needs during the courseware development process for customized design. For instance, in medical education, VR technology can be employed to highly replicate surgical scenarios, enabling students to master surgical procedures and operational skills through immersive experiences. In engineering education, virtual laboratories can be constructed to simulate the operational principles and maintenance procedures of mechanical equipment, thereby facilitating students' in-depth understanding of complex engineering concepts.

Additionally, in the realm of liberal arts, such as history education, VR courseware can recreate historical scenes, enabling students to immerse themselves and vividly experience historical events. In art education, VR technology can offer students a virtual creative space, stimulating artistic inspiration. Although the difficulty of courseware development varies across different disciplines, teachers can flexibly utilize VR technology according to the characteristics of each course and gradually explore its application potential in various fields. Through continuous experimentation and refinement, panoramic VR interactive courseware holds promise as a versatile tool for interdisciplinary teaching, providing students from diverse majors with a richer and more intuitive learning experience.

In the context of interdisciplinary teaching practices, panoramic VR interactive courseware can be employed to design virtual historical or art museums, facilitating explanatory and hands-on training in the classroom teaching of tourism management majors. By constructing realistic virtual scenarios of historical and art museums, it becomes possible to effectively integrate the knowledge systems of multiple disciplines, including history, art, museology, and tourism management. This approach achieves cross-disciplinary teaching integration and provides students with rich and engaging learning materials.

## Conclusion and Prospects

### Research Conclusions

This study developed panoramic VR interactive courseware and integrated it with the course content. Based on the APT teaching model, a rigorous instructional design was formulated. The study demonstrated the effectiveness of panoramic VR interactive courseware in enhancing students' learning interest and classroom participation in the "Tea Product Marketing" course,

offering valuable insights and recommendations for the future use of panoramic VR interactive courseware in teaching. The following research summary is drawn from the teaching practice and instructional outcomes of this study:

Firstly, a virtual simulation teaching model based on the archetypal APT (Assessment, Pedagogy, and Technology) framework was constructed. The key components of this model encompass assessment methods (A), pedagogical approaches (P), and technological tools (T). Utilizing this model, an instructional design for panoramic VR interactive courseware was developed, wherein teachers select diverse pedagogical strategies tailored to the course content and nature. Within the information technology environment facilitated by the panoramic VR interactive courseware in this study, various assessment methods such as real-time evaluation and peer assessment, along with pedagogical approaches including situated learning, case-based teaching, and flipped classroom, were employed.

Secondly, in accordance with the APT virtual simulation teaching model, we utilized Nibiru Creator software and its associated functionalities to design and implement an instructional plan for panoramic VR interactive courseware. Based on this foundation, two rounds of action research were conducted. During the implementation process, a comprehensive analysis of data and interview results revealed that the panoramic VR interactive courseware had a positive impact on enhancing students' learning interest, participation, and motivation. Specifically, when engaging in learning activities with the panoramic VR interactive courseware, students were more inclined to actively participate in classroom discussions and activities, demonstrating an increased level of engagement with the course content. Compared to traditional media-based instruction, the use of panoramic VR interactive courseware exerted a favorable influence on students' learning states, although there remained room for improvement in terms of learning concentration. The application of this teaching approach not only deepened students' understanding of tea product marketing knowledge but also sparked their curiosity and desire to explore this field further, ultimately leading to an overall improvement in learning outcomes.

In summary, the panoramic VR interactive courseware employed in this study offers technological reference value for secondary vocational school classroom instruction. Secondary vocational teachers can draw inspiration from the instructional design presented in this research to further leverage panoramic VR interactive courseware, thereby fostering more innovative and engaging classroom experiences.

### ***Limitations and Prospects***

This study has certain limitations. Firstly, the sample selection was confined to a subset of classes from the second grade of a particular secondary vocational school, resulting in an insufficient sample size and scope, which consequently affects the generalizability of the findings. Secondly, constrained by the limited teaching time, only two rounds of action research were conducted, which failed to fully validate the pedagogical effectiveness of the optimized panoramic VR courseware. In future research, it is essential to streamline the course content and incorporate more interactive elements to enhance learning outcomes. Furthermore, the study solely focused on the school teaching context and did not comprehensively consider the multifaceted factors influencing students' learning, indicating that both the depth and breadth of the research need to be further expanded.

Future research can be improved from the following aspects: Firstly, it is essential to deepen

theoretical study in virtual simulation teaching and panoramic VR technology to solidify the theoretical foundation. Secondly, expanding the sample size and research scope to encompass multiple types of schools and disciplines will enhance the generalizability of the findings. Thirdly, extending the research duration and increasing the number of action research cycles will allow for a more comprehensive observation of teaching effects. Fourthly, refining the design of questionnaires and interviews through precise question formulation will facilitate an in-depth exploration of students' learning experiences and needs, thereby providing more valuable references for educational practice.

## Discussion

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# **Activating the "Family Power" in Vocational Education —A Case Study on the Home-School-Community Collaborative Education Model of the White Swan Management Trainee Specialized Class at Guangzhou**

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# Activating the "Family Power" in Vocational Education —A Case Study on the Home-School-Community Collaborative Education Model of the White Swan Management Trainee Specialized Class at Guangzhou

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## Abstract

Grounded in the core vocational education philosophy of industry-education integration, the White Swan Management Trainee Program at Guangzhou Vocational School of Tourism and Business has innovatively activated the occupational genes within families and effectively leveraged their occupational resources through a family occupational resource empowerment mechanism. By organically integrating the resources of home, school, and community, the program has constructed a "Home-School-Community Collaborative Education Ecosystem." This approach facilitates the efficient realization of the goal of "comprehensive immersion of home, school, and community" in vocational education talent cultivation, providing a model example from a secondary vocational school in the Greater Bay Area for deepening industry-education integration and implementing home-school-community collaborative education.

**Keywords:** *Industry-education integration, Home-school-community collaborative education, Vocational education, Family, Management trainee program*

Guangzhou Vocational School of Tourism and Business (hereinafter referred to as "Guangzhou Tourism & Business Vocational School") has maintained a long-term, stable, and in-depth collaboration with the Guangzhou White Swan Hotel, the first large-scale modern five-star hotel in New China, in the field of High-Star Hotel Operation and Management since 1981. Together, they have forged a partnership spanning over four decades, ultimately establishing a domestic model for industry-education integration and school-enterprise cooperation in the realm of vocational education. In the past decade, both parties have achieved significant outcomes by forming an industry-education integration community and establishing the White Swan Management Trainee Program (hereinafter referred to as the "White Swan Program") to cultivate high-quality skilled talents for the modern service industry. These efforts have substantially enhanced the core competitiveness and brand image of both the school and the enterprise. Currently, aligning with the national strategic plan for home-school-community collaborative education, the White Swan Program, underpinned by a family occupational resource empowerment mechanism and utilizing the "Home-School-Community Collaborative Education Ecosystem" as a platform, has innovatively activated the "family power" in vocational education. This approach supports the

realization of the goal of "comprehensive immersion of home, school, and community" in vocational education talent development. It provides an operable and replicable model for secondary vocational schools in the Greater Bay Area to deepen industry-education integration, demonstrating significant exemplary effects and promotional value.

## Introduction

### *Research Background and Problem Identification*

In October 2021, the Standing Committee of the National People's Congress of China adopted the Family Education Promotion Law of the People's Republic of China, marking the first time in China's legal history that family education was explicitly defined with the fundamental task of cultivating individuals with virtue and integrity, and mandating the establishment of a collaborative education mechanism among families, schools, and communities ([Standing Committee of the National People's Congress, 2021](#)). A year later, in November 2022, the state issued another significant document concerning the systematic construction of a home-school-community collaborative education mechanism. Specifically, the Opinions on Improving the Mechanism for Collaborative Education among Schools, Families, and Society was jointly issued by 13 departments, including the Ministry of Education. ([Ministry of Education, Publicity Department of the Central Committee of the Communist Party of China, 2023](#)). This document explicitly proposed the establishment of a tripartite responsibility division system, with schools taking the lead, families fulfilling their responsibilities, and communities providing support. It emphasized the necessity of strengthening the integration of industry and education, as well as fostering cognitive synergy between families and vocational education institutions. Consequently, home-school-community collaborative education has emerged as a vital national strategy in China, representing an inherent pursuit for fulfilling the fundamental task of nurturing talent with moral integrity and an inevitable choice for promoting students' holistic and healthy development. This strategy carries significant theoretical implications and practical value ([Shao & Luo, 2025](#)).

Currently, the absence of family involvement in vocational education has given rise to three prominent issues: Firstly, parents' low recognition of vocational education and communication barriers between parents and children hinder the formation of students' occupational values. Secondly, the underdevelopment of family occupational resources leaves a wealth of potential educational assets, such as parents' workplace experiences and professional networks, largely untapped, exacerbating the structural imbalance between industry and educational resources. Thirdly, a severe lack of family-based career planning leads to pronounced generational gaps in occupational awareness, leaving students with confused career goals and weak motivation for professional development ([Xue, 2024](#)). In response to the aforementioned contradictions, the "White Swan Program" at Guangzhou Vocational School of Tourism and Business, rooted in the core vocational education philosophy of integrating industry with education and supported by a family occupational resource empowerment mechanism, has innovatively activated family occupational genes. It has established an "ecosystem for collaborative education among home, school, and community" with profound family participation, organically integrating resources from these three sectors. This approach injects sustainable family occupational momentum into class culture development, social practice implementation, and diversified collaborative assessments, thereby facilitating the realization of the goal of "comprehensive immersion of home, school, and

community" in vocational education talent cultivation. It serves as a model for secondary vocational schools in the Greater Bay Area, demonstrating strong exemplary significance and potential for widespread replication in fulfilling the requirements outlined in the Opinions on Improving the Collaborative Education Mechanism Among Schools, Families, and Society, which calls for "establishing a tripartite responsibility division system led by schools, fulfilled by families, and supported by society."

### ***Research Objectives and Significance***

This study focuses on the "White Swan Program" at Guangzhou Tourism & Business Vocational School, aiming to delve into how it constructs a home-school-community collaborative education mechanism by effectively activating the "family power" in vocational education and evaluates the effectiveness of this mechanism in collaborative education. Currently, China's vocational education faces common challenges such as low parental recognition of vocational education, insufficient development of family occupational resources, and a lack of family career planning. As a key educational entity, the role of families has long been underemphasized and underdeveloped in the field of vocational education. This study attempts to analyze how the "White Swan Program" breaks through the traditional framework of school-enterprise cooperation by deeply integrating the family dimension into the ecosystem of talent cultivation in vocational education. This approach forms a closed-loop collaborative education system where the school plays a leading role, the family assumes primary responsibility, and society provides major support, thereby addressing the core question of "how to effectively activate family power to enhance the quality of education in vocational settings." By dissecting its practical pathways and multidimensional outcomes, this study is dedicated to providing actionable empirical references for resolving the current pain points in vocational education talent development.

This study holds significant theoretical value and practical implications. At the theoretical level, it enriches the connotations of collaborative education theory in vocational education by breaking through the limitations of previous research, which predominantly focused on dual collaborations between "schools and enterprises" or "schools and communities." Instead, it attempts to elevate "family power" to a ternary collaborative dimension of equal importance alongside schools and society, constructing an analytical framework for the deep integration of home, school, and community. This provides a new perspective for understanding the complex interactions within the collaborative education ecosystem in vocational education. At the practical level, the home-school-community collaborative education ecosystem and the family occupational resource empowerment mechanism developed in this study possess broad applicability and operational feasibility, with practical implications manifesting in three key aspects. Firstly, it serves as a model for vocational colleges to innovate their talent cultivation models, demonstrating how institutionalized designs can effectively mobilize parental enthusiasm and transform their perceptions and modes of participation in vocational education. Secondly, it offers new insights for enterprises to deepen industry-education integration, showing that proactive efforts by enterprises to showcase their development platforms and cultures to parents can bolster family confidence in their children's career choices, thereby stabilizing high-quality student enrollments and improving talent retention rates. Thirdly, it provides a basis for policymakers to optimize the governance system of vocational education, highlighting the necessity of incorporating family support into evaluation indicators for modern apprenticeship systems or order-based training programs. Ultimately, through empirical

data, this study validates the pivotal role of "family power" in enhancing students' professional identity, skill competencies, and employment quality, offering a grounded and effective solution for promoting high-quality development in vocational education within the context of the Greater Bay Area's secondary vocational schools.

### ***Research Methodology and Case Selection***

This study adopts a case study approach within the qualitative research paradigm, focusing on the "White Swan Management Trainee Program" jointly conducted by Guangzhou Vocational School of Tourism and Business and Guangzhou White Swan Hotel. The case study method is particularly well-suited for in-depth exploration of complex phenomena and their underlying mechanisms within specific contexts. Its core strength lies in its ability to investigate and provide rich descriptions of "how" and "why" questions, along with the reasons behind them, in real-world settings through cross-validation of multi-source evidence, thereby facilitating theoretical construction (Li & Mao, 2015). The selection of the "White Swan Program" at Guangzhou Tourism & Business Vocational School as the research subject is grounded in its suitability as an ideal vehicle for exploring the home-school-community collaborative education mechanism in vocational education and its effectiveness in activating "family power."

Specifically, the case selected for this study exhibits remarkable typicality and representativeness. Firstly, Guangzhou Tourism & Business Vocational School is a national key vocational school and one of the first batch of national demonstration schools for the reform and development of secondary vocational education. Its major in High-Star Hotel Service and Management, as a founding program of the school, boasts strong educational capabilities and enjoys high prestige and influence within the vocational education sector of the Greater Bay Area and even across the nation, making its experiences of certain demonstration value. Secondly, its partner, Guangzhou White Swan Hotel, stands as the first Sino-foreign cooperative five-star hotel established after China's reform and opening-up, serving as an industry benchmark and a representative of national hotel brands. Its profound involvement in vocational education inherently carries significant brand influence and industry-leading attributes. More crucially, the school-enterprise collaboration between Guangzhou Tourism & Business Vocational School and Guangzhou White Swan Hotel originated in the 1980s and has persisted for over four decades, marking an unparalleled depth and breadth of cooperation among domestic vocational institutions. Consequently, the "White Swan Program" is not a short-term pilot initiative but rather the culmination of years of sustained practice and iterative optimization by both the school and the enterprise. From its initial stages as evening classes and short-term training programs to subsequent customized classes and the current management trainee program, it has evolved into a relatively mature operational system with a stable collaborative ecosystem. Currently, the "White Swan Program" has been steadily implemented across four cohorts, effectively ensuring the stability of the research subject and the reliability of the experiences. The most distinctive feature of this program lies in its breakthrough from the traditional "school-enterprise dual" cooperation framework by systematically integrating the resources and influence of students' families—namely, family power—into the entire process of talent cultivation in vocational education. It is committed to constructing a ternary collaborative education model where "the school plays a leading role, the family assumes primary responsibility, and society serves as a major support." This innovative practice constitutes the core focus of this study. Meanwhile, the program has achieved remarkable outcomes in terms of talent cultivation

quality, students' career stability (such as high retention rates and low turnover rates), enterprise satisfaction, and parental recognition, providing a solid empirical foundation for analysis and reference.

To ensure the reliability and validity of the research, this study extensively collected detailed primary and secondary data through diversified channels, striving to construct a comprehensive "evidence triangle." The primary data primarily includes: (1) In-depth interview records: Semi-structured interviews were conducted with key participants, encompassing school administrators (such as vice principals in charge and program heads), core teachers and class advisors of the "White Swan Program," human resources managers and corporate mentors from Guangzhou White Swan Hotel, current and graduated student representatives of the program, as well as parent representatives actively involved in the project. The focus was on understanding the perspectives, experiences, and evaluations of all parties regarding the collaborative education mechanism. (2) Participatory and non-participatory observation records: The researchers organized and participated in significant events of the management trainee program (such as Parent Open Days, Corporate Experience Days, and Periodic Achievement Presentations) and the daily teaching management process through on-site visits. They documented the specific contexts, details, and atmospheres of home-school-community interactions. (3) Questionnaire survey data: Questionnaires were distributed to students and parents of the "White Swan Program" to quantitatively collect their perceived data on aspects such as satisfaction with the program, their own levels of participation, changes in professional identity, and the effectiveness of communication. Secondary data primarily encompasses: (1) Project documents of the "White Swan Program": These include the collaboration agreement, talent cultivation plan, teaching schedule, management regulations, parent notification letters, activity plans, and meeting minutes, among others. (2) Achievement materials: These consist of award certificates from student skill competitions, corporate commendation documents, case studies of outstanding graduates, media reports, and project summary reports, etc. (3) Relevant archival records: These involve student internship evaluation forms, employment tracking data, and parent feedback collection forms, among others. Through cross-analysis and integration of the aforementioned multi-source and multi-type data, this study endeavors to comprehensively, objectively, and profoundly reconstruct the practical landscape of home-school-community collaborative education within the "White Swan Program." It aims to unveil the underlying logic and key elements in activating "family power" in vocational education, thereby providing scientific and robust empirical support for theoretical construction and practical promotion.

### Case Background: Overview of the "White Swan Program"

This study selects the "White Swan Program" as the case for research, which was established in response to the profound transformations in the hotel industry and the strategic consensus between the school and the enterprise. With the upgrading of the cultural and tourism industry in the Guangdong-Hong Kong-Macao Greater Bay Area and the surge in demand for talent in high-end service sectors, particularly high-star hotels, industry-leading enterprises such as Guangzhou White Swan Hotel are confronted with a structural shortage of high-quality, highly stable frontline service personnel and management talent. Traditional recruitment models struggle to meet their stringent requirements for employees' cultural alignment, professional skills, and service philosophies.

Meanwhile, Guangzhou Tourism & Business Vocational School, as a national key vocational institution, has consistently strived to explore effective approaches to enhance talent cultivation quality and employment compatibility. While its major in High-Star Hotel Operation and Management boasts a long-standing history and a solid foundation, there remains significant room for improvement in deepening industry-education integration and strengthening students' career commitment. Against this backdrop, the two parties initiated a strategic collaboration in 2021, jointly establishing the "White Swan Program" through enterprise-ordered talent cultivation. Currently, the program has been steadily operating for four cohorts. The talent development objectives of this specialized program are precisely aligned with the demands for team leader and supervisor positions in frontline service roles at Guangzhou White Swan Hotel. It aims to cultivate reserve management talent equipped with robust professional skills in hotel service and management, exceptional vocational qualities (including service awareness, communication skills, adaptability, and teamwork abilities), profound corporate cultural identity, and a high degree of career loyalty. The overarching goal is to achieve "highly compatible employment, high-quality retention, and high-potential development" for graduates.

The operation of the "White Swan Program" begins with a rigorous student selection process at the start of enrollment and spans the entire three-year secondary vocational education, embodying the distinct vocational education characteristic of "dual-subject education with full-process integration." After new students enroll, a joint school-enterprise assessment (including interviews and comprehensive quality evaluations) is conducted to select outstanding students from all students in the Hotel Management Department to form the "White Swan Program" cohort. The program follows the conventional three-year secondary vocational education system but implements a teaching strategy of "alternating work and study with progressive skill development." Compared to other classes, students in the "White Swan Program" have more industry practice and enterprise-based courses, along with joint school-enterprise mentors. Notably, the curriculum system of the "White Swan Program" is jointly developed by both the school and the enterprise, deeply integrating the service standards, management processes, and corporate culture essence of the White Swan Hotel. In addition to the nationally mandated professional foundational and core courses, a substantial number of customized modular courses are offered, such as White Swan Service Philosophy and Practice, High-End Customer Relationship Management, and Hotel Supervision Practice, aiming to integrate the enterprise's personalized employment needs into the school's curriculum system. Furthermore, the teaching arrangement of the "White Swan Program" emphasizes the close integration of theory and practice. First-year students complete foundational skill enhancement and cultural immersion at on-campus training bases, while second and third-year students are arranged for multiple rounds of progressive enterprise training and on-the-job internships, jointly guided by campus instructors and enterprise mentors (composed of senior supervisors or technical experts from the White Swan Hotel). In terms of faculty allocation, a "dual-mentor system" is implemented, wherein each student is assigned a dedicated mentor for moral education and career development to provide comprehensive guidance throughout their vocational growth journey. This model represents an in-depth practice of the modern apprenticeship system within the realm of secondary vocational education. Its distinctive feature lies in the integration of enterprise employment standards into the entire talent cultivation chain from an early stage, achieving a seamless transition characterized by "enrolling students as if recruiting employees, admitting students into the school as if they are entering the enterprise, and enabling graduates to step into their jobs immediately upon graduation."

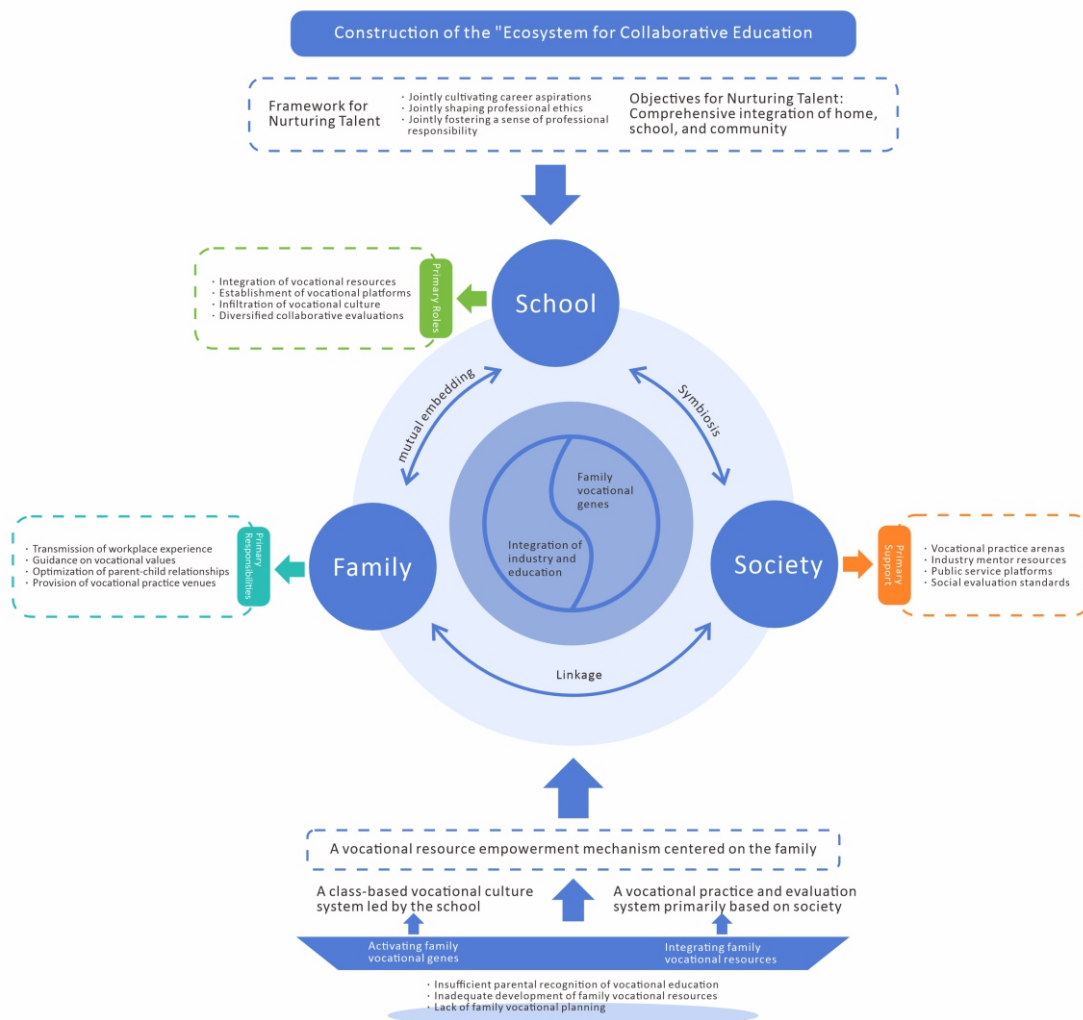
Meanwhile, from its inception, the design of the "White Swan Program" transcended the traditional "school-enterprise duality" mindset by proactively integrating "family power" as a pivotal component of the educational ecosystem, with preliminary institutional arrangements put in place. The first critical step involves informed consent and value alignment: prior to students' enrollment in the program, a dedicated information session is jointly organized by the school and the enterprise for families of prospective students. This session comprehensively outlines the program's distinctive features, training objectives, developmental pathways, career prospects, and potential challenges (such as stringent professional standards and phased high-intensity practical training), ensuring that parents fully understand and consent to participation by signing an informed consent form. This process establishes a collaborative foundation and maximizes parental support. Secondly, a clear communication framework among families, schools, and communities has been established. In this framework, the class advisor is designated as the primary person responsible for daily communication among these three parties. A dedicated parent liaison group (such as one on WeCom) is set up for the "White Swan Program" to serve as a rapid channel for information dissemination, event notifications, and simple inquiries. The class advisor is tasked with regularly updating parents on students' academic performance at school, practical training outcomes in enterprises, and periodic evaluations, ensuring the smooth flow of fundamental information. Furthermore, family roles are organically integrated into pivotal educational milestones. For instance, parents are invited to witness the signing ceremony during the program's inauguration, fostering a sense of ritual and belonging. Additionally, during the signing of internship agreements, parents' rights to be informed and to supervise are explicitly outlined. Although these initial designs may appear fundamental, they clearly convey the "White Swan Program's" anticipation of and emphasis on family participation in vocational education talent cultivation. They lay the groundwork for subsequently fully leveraging "family empowerment" and constructing a more intricate collaborative network among families, schools, and communities, marking an innovative exploration of home-school-community cooperative education in both concept and practice within the program.

### **Innovative Practice: Activating "Family Power" and Building an Ecosystem for Collaborative Education among Home, School, and Community**

This study addresses the pain points in current vocational education caused by the absence of family involvement, such as insufficient parental recognition of vocational education, underutilized family occupational resources, and a lack of family-based career planning. By establishing a family occupational resource empowerment mechanism, we aim to activate "family empowerment" within vocational education. Using the "ecosystem for collaborative education among families, schools, and communities" as a platform, we organically integrate the resources of these three parties to facilitate the realization of the goal of "comprehensive immersion of families, schools, and communities" in vocational education talent development.

#### **Figure 1**

*Construction of an "Ecosystem for Collaborative Education among Home, School, and Community" from the Perspective of Integration of Industry and Education*



Specifically, families bear the primary responsibility. By focusing on the transmission of workplace experience, the guidance of occupational values, and the optimization of parent-child relationships, they aim to deepen students' understanding and identification with professional roles while expanding venues for students' occupational experiences and practical opportunities. Schools play a leading role by exploring the occupational resources within families in the context of industry-education integration, effectively integrating these resources, and establishing platforms to facilitate the infiltration of occupational culture through multi-faceted collaborative evaluation. Society (including communities and enterprises) provides essential support by leveraging practical settings, industry mentor resources, and public service platforms to strengthen students' sense of responsibility and adaptability to job roles. This collaborative educational ecosystem follows a pathway of mutual embedding, linkage, and symbiosis among the three parties' resources. It emphasizes the innovative activation of "family power" in vocational education based on industry-education integration. Through a dynamic, multi-faceted collaborative evaluation and feedback

mechanism, it facilitates the integrated development of students' occupational cognition, experiences, skills, and professional qualities, promoting the formation of occupational values and the enhancement of comprehensive competencies. Ultimately, it establishes a talent cultivation framework where the three parties "jointly nurture occupational ideals, jointly shape occupational spirit, and jointly build occupational responsibility."

### ***Fostering a Collaborative Conceptual Synergy among Families, Schools, and Communities in Education***

In the early stages of domestic academic research on collaborative education involving families, schools, and communities, the focus was primarily on "home-school co-education." Scholars generally agreed that families and schools constitute the core and fundamental units of collaborative education, emphasizing the importance of integrating families into students' growth processes (Wu & Zhang, 2021). According to relevant reviews, the evolution of the concept of collaborative education among families, schools, and communities can be summarized into three stages: "separate education," "home-school cooperative co-education," and "collaborative education among families, schools, and communities." Each stage reflects the evolving educational policies of the nation and its demands regarding whom to cultivate and how to cultivate them in different eras (Fan & He, 2023). In terms of its connotation, collaborative education among families, schools, and communities primarily refers to "the shared responsibility of multiple stakeholders from families, schools, and society to promote student development through collaboration" (Gu et al., 2022). This concept underscores that schools, families, and society, as dynamically interacting subsystems, collectively form the core environment influencing individual development. Therefore, collaboration among these three entities can optimize students' socio-emotional development and academic achievements. Its core strength lies in its ability to mobilize extensive family and social resources, forming a diversified support network (Ran et al., 2024).

Current domestic academic research in this field primarily revolves around four aspects: the connotative characteristics, essential implications, practical status quo, and mechanism construction of collaborative education among families, schools, and communities. The volume of research literature has been steadily increasing, gradually establishing itself as one of the research hotspots in the educational domain. However, the research methodologies predominantly rely on empirical speculation and summarization, with a relative scarcity of scientifically rigorous empirical studies. Moreover, there is a lack of in-depth analysis of micro-level entities (Fan & He, 2023). Additionally, existing research tends to concentrate on the stages of basic and higher education, with relatively insufficient attention given to vocational education, particularly at the secondary vocational education level (Zhu, 2024; Xu & Yang, 2023). Nevertheless, vocational education exhibits distinct characteristics that differentiate it from basic and higher education, and this holds true in the dimension of family involvement in education as well. Firstly, most families demonstrate relatively low recognition and participation in vocational education, often assuming the role of "passive recipients" rather than "active participants," thereby underestimating their potential educational value. Secondly, existing research predominantly remains confined within the "school-enterprise" binary framework, lacking systematic exploration of the mechanisms for deeply integrating families into collaborative education. Notably, there is a dearth of effective pathway analyses on how to address parents' cognitive biases towards vocational education and stimulate their motivation to participate. This theoretical lag often results in collaborative education

among families, schools, and communities being reduced to formalistic communication in practice, failing to form a cohesive educational force. Consequently, this has become a bottleneck restricting the enhancement of talent cultivation quality in vocational education.

Based on this, Guangzhou Tourism & Business Vocational School and Guangzhou White Swan Hotel, at the outset of launching the "White Swan Program," regarded "conceptual consensus" as the logical starting point for activating the "power of families" and implemented a set of precise value-transmission strategies. Firstly, a bidirectional and transparent information dissemination mechanism was established. The school and the enterprise jointly organized multiple rounds of parent briefings in various formats. During these events, not only did the school elaborate on the program's positioning and talent cultivation plan, but senior executives from the enterprise also personally attended to present detailed data and case studies showcasing the development trends of the hotel industry, the brand strength of the White Swan Hotel, employee promotion pathways, and the compensation and benefits system. Particular emphasis was placed on highlighting the career development prospects of management trainees as future management reserve cadres for frontline service positions at the White Swan Hotel, aiming to dispel parents' stereotypes about service talents in the hotel industry being "low-end, unstable, and lacking career advancement opportunities" through specific information. Secondly, the core demands of family support were clearly defined, emphasizing that the "power of families" does not merely require parents to possess work experience in the hotel industry or professional knowledge in hotel service and management. Instead, it expects family members to play multiple roles such as "emotional supporters" (e.g., accepting their children's career choices and offering encouragement when they feel lost or uncertain), "habit supervisors" (e.g., collaborating in cultivating etiquette norms and punctuality discipline specific to the hotel industry), and "growth witnesses" (e.g., actively participating in various activities marking key milestones in their children's development). By lowering the barriers to parental involvement and stimulating their enthusiasm, the ultimate goal is to substantially enhance families' recognition of vocational education. Simultaneously, by effectively tapping into the occupational resources available within families, efforts are made to cultivate capable, motivated parents as occupational mentors. These parents are encouraged to impart their workplace experiences and occupational values to their children, transforming the domestic space into a practical venue for occupational exploration. This approach expands and deepens the school's educational practices, fostering a more holistic and immersive learning environment for students.

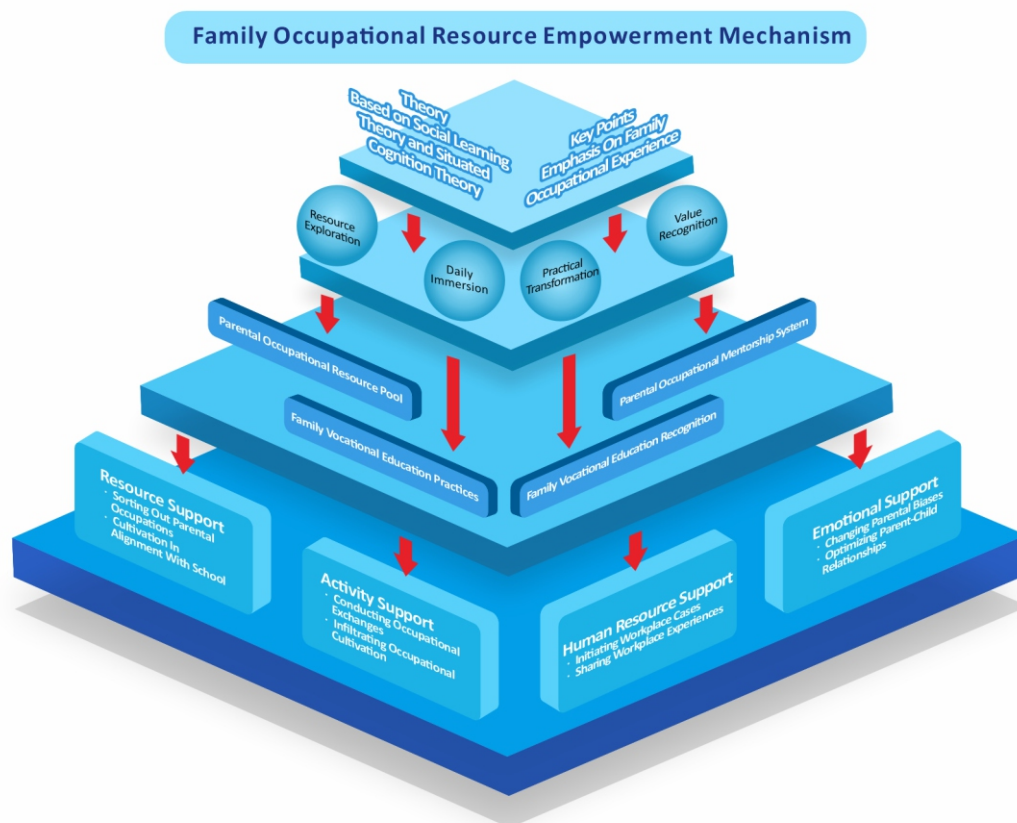
### ***Establishing a Family-Centered Empowerment Mechanism for Vocational Resources***

As the foundational cornerstone of the "ecosystem for collaborative education among families, schools, and communities," the family-based empowerment mechanism for vocational resources serves as a pivotal component. It aims to systematically integrate occupational elements within the family sphere and transform them into effective resources for talent cultivation through structured design. Grounded in social learning theory and situated cognition theory, this mechanism underscores the critical role of family occupational experiences and practices in vocational education talent development. It activates the "family power" in vocational education through four dimensions: resource exploration (establishing a parental occupational resource repository), practical translation (instituting a parental occupational mentorship system), daily immersion (implementing effective family-based vocational education practices), and value recognition (strengthening parental endorsement of vocational education). By securing resource support,

activity support, human resource support, and emotional support from families, it seeks to maximize the effectiveness of talent cultivation.

**Figure 2**

*Family Occupational Resource Empowerment Mechanism*



In terms of specific implementation, firstly, methods such as questionnaires and interviews are employed to systematically organize and analyze parents' occupational backgrounds and professional skills. These data are then classified and encoded based on three dimensions: industry type, job characteristics, and educational value, thereby forming a parent occupational resource pool that can be aligned with talent cultivation. Secondly, parents with typical professional experiences and significant occupational resources are selected to form a team of occupational mentors. A collaborative guidance mechanism is established between parent mentors and mentors from schools and enterprises to jointly develop workplace cases based on real-world work scenarios. These mentors are invited to regularly visit the school to conduct career-sharing sessions and demonstrate job skills, thereby imparting workplace experience to students. Subsequently, through the design of tools such as the "Family Task List for Occupational Cognition" and the "Parent Observation Record Form," parents are guided to consciously engage in occupational experience exchanges with their children in family life, utilize their own occupational resources to lead activities, and carry out daily cultivation of professional qualities. Finally, by organizing

activities such as career experience days and interviews, parents are helped to develop a scientific understanding of vocational education, change their prejudices against it, strengthen their recognition of vocational education, optimize parent-child relationships, and secure emotional support from families.

This mechanism expands the talent cultivation framework from the school-enterprise sphere to encompass the family domain by integrating familial occupational resources, thereby forming a more three-dimensional and diversified cultivation system. This talent cultivation model, which takes familial occupational resources as the link, not only enriches the connotations of industry-education integration but also provides a novel approach to addressing the fragmentation issues in vocational education talent development.

### ***Optimizing the School-Led Class-Based Occupational Culture System***

As a specific implementation pathway within the "ecosystem of collaborative education involving families, schools, and communities," the optimization of the school-led class-based occupational culture system entails a systematic reconstruction of the overall occupational culture within classes. This process organically integrates industrial elements and family educational resources into the class-based occupational culture system through four dimensions: environmental construction, institutional construction, spiritual construction, and activity construction. Through this four-dimensional synergy, the "White Swan Program" has effectively achieved four major transformations: the class environment has shifted from a mere learning space to an occupational cognition space; class regulations have evolved from tools for moral education management into carriers for competency cultivation; class activities have transitioned from being oriented towards moral character development to serving as platforms for capability enhancement; and the class spirit has transformed from abstract collective slogans into a driving force for value guidance. In each phase of construction, this case study creatively incorporates the family element, making family occupational resources and emotional support critical pillars in the establishment of the class-based occupational culture system.

In the construction of the class environment, this case innovatively adopts a dual-source cultural integration model of "enterprise atmosphere + family warmth." It not only introduces the visual identification system and work scenario elements from school-enterprise cooperation units but also establishes a "family occupational culture corner" to display parents' work photos, occupational stories, and more. This transforms the classroom space into one that simultaneously embodies a professional atmosphere and the warmth of family. In the establishment of class regulations, the "White Swan Program" breaks through the traditional paradigm of class management by drawing on enterprise management systems (such as the regular meeting system of hotel departments) to formulate class rules. Simultaneously, it creates the role of "parent observer," inviting parents to participate in the supervision and evaluation of class management, thereby forming a dual restraint mechanism of "enterprise standards + family support."

### **Figure 3**

*School-led "Four-Dimension and Three-Stage" Class Vocational Culture System*



Figure 4

The "Parental Workplace Role Model Forum," a flagship activity of the "White Swan Program"



### ***Establishing a Vocational Practice and Evaluation System Centered on Society***

As a specific implementation pathway within the "ecosystem of collaborative education involving families, schools, and communities," establishing a vocational practice and evaluation system centered on society involves integrating social resources to construct a closed-loop cultivation mechanism of "practice-reflection-evaluation." This transforms social practice venues into authentic classrooms for nurturing vocational literacy, encompassing both practical and evaluative systems. In terms of building the vocational practice system, a three-tier practice matrix of "enterprise bases + family networks + community platforms" is established: enterprises provide standardized training such as corporate courses and job rotations, families leverage parental occupational resources to facilitate personalized vocational observations (e.g., accompanying parents in community service work), and communities organize public-interest vocational service projects (e.g., etiquette support for large-scale events). This case innovatively designs a "Parent-Child Vocational Practice Week," where parents act as practice supervisors, guiding students through real-world work tasks from enterprises to communities, fostering an immersive experience of "learning by doing and comprehending through learning."

**Figure 5**

*Participation of the "White Swan Program" in Vocational Practice Activities Led by Enterprises*



In the establishment of a diversified and collaborative evaluation system, this case innovatively adopts the "Three-Dimension, Five-Stakeholder" assessment model. The three dimensions encompass skill proficiency, professional ethics, and a sense of responsibility, while the five evaluation stakeholders include corporate mentors, professional instructors, community representatives, parent mentors, and the students themselves. Notably, the evaluation by parent mentors focuses on students' familial manifestations of occupational behavior habits, with the development of soft skills such as communication, collaboration, and time management being documented through the "Home-Based Professional Competence Observation Form." To enhance the effectiveness of the evaluation, a feedback mechanism involving three parties has been established, with regular symposiums organized among enterprises, schools, and families to jointly deliberate on improvement strategies for students' vocational growth.

## **Practical Outcomes: The Emergence of the Value of Home-School-Community Collaborative Education**

### ***Significant Enhancement in Students' Comprehensive Professional Competence and Fruitful Achievements in Class Construction***

Following the implementation of this case, students' comprehensive professional competence has witnessed a substantial improvement. Parent observation reports indicate a notable enhancement in students' occupational behavior habits, with 80% of parents reporting that their children can transfer corporate service standards to household chores, and the excellence rate in occupational responsibility assessments has increased by 30%. Among the exemplary growth cases, Mr. Shao, who previously exhibited severe occupational cognitive biases, evolved into an outstanding model in professional course learning after participating in a series of hotel vocational experience activities, inspiring a group of peers to form skill-based mutual assistance study groups.

Leveraging the "Home-School-Community Collaborative Education Ecosystem," the class construction has undergone a qualitative transformation, fostered a positive and upward class ethos and yielded abundant achievements. The "White Swan Program" has established a distinctive class brand. The implementation of corporate-style management systems has ensured a stable student attendance rate of over 90%. Additionally, five teaching modules developed based on parents' occupational resources have been incorporated into the school-based labor education curriculum. Meanwhile, the "White Swan Program" has achieved remarkable results in numerous high-profile school events, producing a large cohort of outstanding students with exceptional professional competence and exemplary moral character. For instance, a class culture construction plan integrating the dual cultural models of "corporate atmosphere + familial warmth" clinched the first prize in the school-level class culture construction evaluation. Other accolades include the titles of Civilized Class, first prizes in Class Style Display and Overall Team Score at the School Sports Meet, first prize in the School Football League, and second prize in the Choir Competition. Notably, 23 students, including student Shao and student He, have garnered awards in sports, ideology and politics, and arts. Furthermore, student Li's youth talent show titled "The Greater Bay Area's Young Heroes: The Enduring Charm of Cai Li Fo" secured the provincial first prize in the "Skills Cultivation for National Rejuvenation" series of educational activities organized by Guangdong Province's vocational colleges in 2024, under the outstanding performance (exhibition) category.

### ***Successful Structural Reshaping of the Educational Community and Significant Improvement in Parent-Child Relationships***

This case has achieved a restructuring of the educational community by creating a home-school-community collaborative education ecosystem. Parents' proactivity in participating in vocational education has markedly increased, with a 100% archiving rate in the parental occupational resource database. Parents actively engage in various class activities, including class meetings, extracurricular programs, and labor education classes, providing both their presence and resource support for all key class events. The improvement in parent-child relationships has been particularly notable. Joint home-school assessments indicate that the frequency of parent-child communication has risen from 1.2 times per week to 3.0 times, while the incidence of conflicts has decreased by 58%. In a representative case, Mr. Wang, a parent with extensive experience in the hotel industry, collaborated with his son, Wan, to design a "Hotel Local Culture Service Package." This innovative concept became the core idea for the student team's participation in both the school-level workplace practice competition and the Guangzhou Innovation and Entrepreneurship Competition. It not only strengthened students' professional identity but also reshaped the intergenerational interaction model, effectively enhancing the parent-child relationship.

**Figure 6**

*Parents actively participate in a series of vocational culture-building activities within the class*



The division of roles within the educational community has become more distinct, with corporate mentors, parent mentors, and school teachers forming a stable collaborative "iron triangle" relationship. A total of three off-campus professional competence enhancement bases, funded and led by parents, have been established. These bases have conducted 10 training and team-building activities for the vocational groups within the "White Swan Program," and the parent-led "Parental Occupational Role Model Forum" has held 12 sessions of activities. This structural transformation has systematically harnessed families' vocational education resources, with parents transitioning from passive cooperation to active co-construction. Families' recognition of and emotional support for vocational education have significantly increased compared to when the students first enrolled, thereby constructing a sustainable social support network for the school's talent cultivation efforts.

### ***Paradigm Upgrade in Talent Cultivation Model and Emergence of the "White Swan Program" -specific Brand Effect***

The innovation in talent cultivation model driven by this case has achieved a leapfrog development from practical exploration to paradigm output. The cultivation system established by the "White Swan Program", which integrates "enterprise standards implantation + family resource transformation + community practice feedback," has significantly elevated students' comprehensive professional competence. Students have participated in the planning and implementation of over a dozen school-enterprise collaborative activities, including enterprise class opening ceremonies, hotel visits and research, the "White Swan Program" annual commendation events, and hotel service skill competition summary and commendation conferences. These activities have yielded positive outcomes and have garnered recognition from parents, society, and the industry.

Leveraging the promotion through the "White Swan Program" video channel, the class brand effect has started to emerge, driving the expansion of the parental occupational resource network. Eight additional parental occupational mentors from the hotel and related industries have been recruited, and three parent-led professional competence cultivation stations have been established. The program's video channel has released a total of 28 program activity videos, accumulating over 60,000 total views, with the highest individual video view count reaching 9,004.

### **Figure 7**

*The "White Swan Program" video channel consistently releases program activities and has become a platform for promoting the class brand*



## Experience Summary: Key Elements for Activating Family Power

### *Adhering to the Deep Integration of Moral Education and Professional Education*

Based on the "Home-School-Community Collaborative Education Ecosystem," this case study consistently upholds the deep integration of moral education and professional education. This approach fundamentally addresses the structural contradiction in vocational education talent cultivation, which has traditionally emphasized skills over moral character, effectively responding to the requirements outlined in the Vocational Education Law of the People's Republic of China

regarding "adhering to the cultivation of both moral integrity and technical proficiency." In the process of establishing a class-based vocational culture system, a social practice system, and a diversified collaborative evaluation system, this case study emphasizes the organic integration of professional ethics and craftsmanship spirit into vocational and professional pursuits. This integration provides operational practical carriers for value shaping, constructing a "moral-technical integration" education system with vocational education characteristics. It not only meets the industry's demand for talents with "strong moral character and high technical proficiency" but also provides crucial support for the typological development of vocational education.

### ***Upholding the Primary Role of Families in Education***

This case study firmly establishes the family as the principal entity in education, emphasizing the activation of familial occupational heritage and everyday educational settings. Through a four-dimensional synergy of resource exploration, practical application, daily immersion, and value recognition, it transforms abstract occupational perceptions into embodied growth experiences. This focus on family agency effectively bridges the gap between school-based vocational education and real-life contexts. Parents engage deeply as resource providers, participants, and evaluators, facilitating a transition in talent cultivation from a "school-led" model to a "home-school-community collaborative" approach. This ensures the school's leadership in the educational process while fully leveraging the family's unique strengths in value transmission and emotional support, thereby creating a high-quality educational ecosystem for nurturing technically skilled professionals with both professional expertise and occupational ethos (Chen & Liu, 2025).

## **Conclusion and Prospects**

Based on a systematic and in-depth analysis of the home-school-community collaborative education practices implemented by the "White Swan Program" at Guangzhou Tourism & Business Vocational School, the findings of this case study indicate that by utilizing the "Home-School-Community Collaborative Education Ecosystem" as a vehicle and innovatively constructing a family occupational resource empowerment mechanism, vocational colleges can effectively activate the long-overlooked "family power," thereby achieving substantive breakthroughs in the ecology and effectiveness of home-school-community collaborative education. The "White Swan Program" in this case has notably enhanced students' occupational identity, skill proficiency, and job stability, deepened families' understanding and support for vocational education, and simultaneously supplied partner enterprises with highly skilled talents who exhibit strong cultural alignment and significant development potential. Ultimately, this has fostered a mutually beneficial scenario where students thrive, families are satisfied, schools improve in quality, and enterprises reap benefits. The successful practice of home-school-community collaborative education in the "White Swan Program" not only validates the pivotal leveraging role of "family power" in vocational education talent cultivation but also provides a replicable and scalable solution to address the prevalent challenges of high student attrition rates and low enterprise satisfaction in vocational education talent development.

The innovative value of this case study is primarily manifested in three aspects: Firstly, it presents a theoretical innovation by being the first to position "family power" as a core element in a ternary collaborative framework alongside schools and society, thereby providing empirical support for

deepening systematic research on the family dimension within the theoretical framework of collaborative education in vocational education. Secondly, it demonstrates practical innovation by constructing an innovative family occupational resource empowerment mechanism based on social learning theory and situated cognition theory. This mechanism maximizes educational effectiveness through four dimensions: resource exploration (building a parental occupational resource database), practical transformation (establishing a parental occupational mentorship system), daily immersion (conducting effective family-based vocational education practices), and value recognition (strengthening parental identification with vocational education). It offers a clear operational guide for activating "family power" in vocational education, with strong potential for replication and application. Thirdly, the case exhibits remarkable typicality. Leveraging the nationally influential school-enterprise partnership between Guangzhou Tourism & Business Vocational School and White Swan Hotel, its experiences carry both authority and persuasiveness, significantly enhancing the demonstrative value and radiating potential of the research findings.

This case study also has certain limitations: Firstly, the case selection focuses on a single well-known school - enterprise cooperation project. Its superior resource conditions and brand effect may limit the general applicability of this case model in regions with weak foundations or among small - and medium - sized enterprises. Secondly, although efforts have been made to diversify data collection, the coverage of in - depth interviews with parents and enterprises can still be further expanded, and there is a lack of long - term tracking data on students' career development trajectories. Thirdly, the quantitative evaluation system for the effectiveness of collaborative education needs to be improved, especially the precise measurement of the contribution of "family power" still requires exploration. Based on this, future research can be further deepened from the following three aspects: First, comparative studies can be conducted on cross - regional and multi - type projects (such as different majors and different enterprise sizes) to test the adaptability and optimization direction of the model. Secondly, a longitudinal tracking method can be employed to evaluate the long - term impact and effectiveness of this home - school - community collaborative education model on students' medium - and long - term career development. Finally, a multi - dimensional quantitative indicator system for the efficiency of home - school - community collaboration can be developed to enhance the scientificity and replicability of the evaluation, and the feasibility of using digital platforms (such as customized APPs and virtual home - school communities) to improve the efficiency and participation of home - school - community collaborative education can be explored.

## Discussion

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## Authors' Bibliography

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## Author's Article Setup Guide

To ensure standardized formatting of manuscripts for ease of review and publication, our journal requires all submissions to strictly adhere to the style guidelines outlined in the *Publication Manual of the American Psychological Association* (7th edition, i.e., APA 7.0). Below are the key formatting requirements that must be verified prior to submission:

### I. Overall Formatting Requirements

#### 1. Page Setup

- Margins: 2.54 cm (1 inch) on all sides (top, bottom, left, right).
- Font: 11-point Times New Roman for the main text.
- Line Spacing: Double-spaced throughout the manuscript (including the reference section).
- Page Numbers: Continuously numbered in the upper right-hand corner, starting from the first page.

#### 2. Title Page

- Must include: Title of the paper (centered, with initial capitalization), author names, institutional affiliations, and the email address of the corresponding author.
- For blind review, the title page should be saved as a separate file (not included in the main text document).

### II. Main Text Structure and Formatting

#### 1. Heading Levels

- Level 1 Headings: Centered, Bold, Title Case Heading Text begins as a new paragraph. (e.g., "Research Method").
- Level 2 Headings: Flush left, Bold, Title Case Heading Text begins as a new paragraph. (e.g., "Participants").
- Level 3 Headings: Flush Left, Bold Italic, Title Case Heading Text begins as a new paragraph.
- Indented, Bold, Title Case Heading, Ending With a Period. Text begins on the same line and continues as a regular paragraph.
- Indented, Bold Italic, Title Case Heading, Ending With a Period. Text begins on the same line and continues as a regular paragraph.

#### 2. Figures and Tables

- Figures and tables must be numbered (e.g., "Figure 1," "Table 2") and accompanied by concise captions (Centered in the top-left corner of the figure/table).
- Equations should be presented on separate lines, with numbers right-aligned (e.g., "(1)").

### III. Reference Formatting

#### 1. In-Text Citations

- Author-Year Format: Author's surname followed by the publication year (e.g., "Smith, 2020"). For direct quotations, include the page number (e.g., "Smith, 2020, p. 45").
- Multiple Authors: List all authors for up to three authors (e.g., "Wang, Li, & Zhang, 2021"); for four or more authors, use the first author's surname followed by "et al."

## 2. Reference List

- Arranged alphabetically by the authors' surnames, with the first line indented by 5 characters and subsequent lines aligned.
- Examples:
  - ✓ Journal Article: Doe, J. A., & Roe, K. B. (2023). Title of article. *Journal Name*, 15(2), 123–135.
  - ✓ Book: Smith, L. M. (2022). *Book Title* (3rd ed.). Publisher.
  - ✓ Webpage: World Health Organization. (2023). Title of webpage. <https://www.who.int/page>

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### 1. Abbreviations and Symbols

- First occurrence: Spell out the full term followed by the abbreviation in brackets (e.g., "World Health Organization [WHO]").
- Statistical symbols (e.g., *M*, *SD*, *p*) should be italicized.

### 2. Language and Punctuation

- Use American English spelling (e.g., "color" instead of "colour").
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