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Examining the Influential Factors and Challenges of Modern Apprenticeship Programs from the Enterprise Perspective: A Comprehensive Analysis

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Abstract
This study explores the determinants affecting the efficacy of modern apprenticeship programmes within small and medium-sized enterprises (SMEs) operating in the

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finance and commerce sectors of Zhejiang Province, China. Adopting a mixed-methods design, the research comprised a survey of 238 enterprise managers and educators associated with five higher vocational institutions, resulting in 214 valid responses. Additionally, ten enterprise mentors, nominated by Jiaxing Vocational and Technical College, engaged in semi-structured interviews. The findings highlight the critical roles of both internal and external collaboration, industry associations, institutional backing, and parental engagement in fostering the effectiveness of the modern apprenticeship framework. The study underscores the necessity for active participation from governmental bodies, educational institutions, industry associations, and enterprises in ensuring successful apprenticeship outcomes. Recommendations include reinforcing governmental policy support through targeted incentives, enhancing the influence of industry associations, advancing the development of enterprise mentors via specialised training programmes, and refining communication and coordination mechanisms. These measures are intended to strengthen the apprenticeship system, thereby elevating the quality of higher vocational education and aligning it more effectively with the economic requirements of local industries.

Keywords: Modern Apprenticeship, Small and Medium-Sized Enterprises (SMEs), Enterprise Perspective, Vocational Education and Training (VET), Industry – Education Collaboration.

Introduction

Over the past decade modern apprenticeship (MA) schemes have become a flagship policy lever for governments that hope to close skills gaps, ease youth unemployment and future-proof national innovation systems (McCann & Stewart, 2024). While the dual-training nations of central Europe continue to provide an influential benchmark (Deissinger, 2022; Lassnigg, 2023; Zutavern & Seifried, 2022), a growing body of research shows that successful transplantation of the model depends on the micro-level choices of firms—especially small and medium-sized enterprises (SMEs) that dominate most economies (Gallup, 2024; Hogeforster & Wildt, 2023). In China, the 2022 revision of the Vocational Education Law codified enterprises as "principle actors" in vocational education, yet local colleges still report lukewarm participation from partner firms (Liu et al., 2018; Yu et al., 2025). Similar tensions surface in other middle-income contexts that are piloting dual or "modern" apprenticeship variants, such as India (Maitra et al., 2024), Ukraine (Braun & Melnyk, 2023) and several ASEAN members (Hofmann et al., 2022).

Enterprise reticence is typically traced to three intertwined hurdles: (1) economic risk—firms worry that apprentices will leave before yielding a return (Schuss, 2021; Schweri et al., 2021); (2) organisational capacity—the cost of mentoring, curriculum alignment and assessment often exceeds what SMEs can absorb (Cabus & Nagy, 2021; Ibua et al., 2023); and (3) regulatory ambiguity—standards, incentives and certification rules remain patchy or weakly enforced (Fassbender, 2022; McConnell & Raman, 2024). Yet studies from Germany and Switzerland suggest that where corporatist governance, industry associations and training agencies share costs and information, firms are more willing to

International Journal of Instructional Cases
ISSN: 2399-830x

invest (Graf, 2021; Michelsen et al., 2023). Comparative evidence therefore underlines the need to examine the enterprise point of view in specific socio-economic settings rather than assume a one-size-fits-all formula (Huang, 2021; Vorpe, 2025).

Against this backdrop, the present study investigates how finance- and commerce-oriented SMEs in Zhejiang Province perceive and manage modern apprenticeship programmes delivered in partnership with local higher vocational colleges. By combining a survey of 214 managers with in-depth interviews of ten enterprise mentors, we seek to uncover (a) the factors that motivate or deter firm participation, (b) the organisational practices that shape training quality, and (c) the external supports that firms deem most valuable. In doing so, the paper adds an employer-centred lens to Chinese MA scholarship, which has hitherto focused mainly on policy design, apprentice experience or institutional-level collaborations (Qi & Chen, 2024; Yan, 2023; Zhao & Selvaratnam, 2024).

Literature Review

From collective skill formation to global diffusion

The dual model that originated in German-speaking Europe is widely credited with smoothing school-to-work transitions and sustaining medium-skill occupations (Deissinger, 2022; Lassnigg, 2023). Historical scholarship traces its cultural foundations to the Beruf tradition and tight education–industry linkages (Graf, 2021). Recent comparative work, however, highlights divergent trajectories even among the "archetype" countries as they confront tertiarisation, demographic shifts and digitalisation (Lassnigg, 2023; Michelsen et al., 2023). Outside Europe, hybrid variants have emerged: China's modern apprenticeship (Liu et al., 2018; Yu et al., 2025), India's dual system (Maitra et al., 2024), Ukraine's pilot dual VET (Braun & Melnyk, 2023) and community-college degree apprenticeships in the United States (Voeller, 2024). Cross-national reviews stress that institutional transplantation succeeds only when governance, cost-sharing and cultural legitimacy align with local labour-market structures (Lassnigg, 2023; Vorpe, 2025; Yan, 2023).

Employer motivations, costs and benefits

Cost–benefit surveys across Europe consistently show that firms recoup training expenses when apprentices contribute to productive output, especially if retention rates are high (Muehlemann & Pfeifer, 2023; Schweri et al., 2021). Yet evidence from Hungary (Cabus & Nagy, 2021) and the care sector in Germany (Schuss, 2021) warns that heavy upfront costs and sector-specific wage pressures can tilt the balance to net loss. In the United States, Morlet (2025) finds that billion-dollar subsidies have not uniformly boosted registered apprenticeship contracts, suggesting that financial incentives alone are insufficient. Research in Scotland categorises large employers into committed, sceptical, passive and dismissive types, each driven by distinct strategic logics (Quigley, 2024). Among SMEs, liquidity constraints, uncertain returns and limited HR capacity heighten perceived risk (Gallup, 2024; Ibua et al., 2023).

International Journal of Instructional Cases
ISSN: 2399-830x

Studies grounded in human-capital and social-exchange theories add nuance. Firms invest not only for immediate productivity gains but also for screening talent, enhancing corporate reputation and fulfilling social responsibility mandates (McConnell & Raman, 2024). However, hidden costs—including administrative compliance, mentor time and curriculum alignment—are frequently underestimated (Muehlemann & Pfeifer, 2023). Digital transformation further complicates matters, as employers must invest in upgraded equipment and develop mentor competencies to effectively integrate e-learning and AI-enabled assessment (Frontiers in Education 2025).

Governance, intermediaries and industry associations

Collective skill-formation regimes rely on dense networks of chambers, unions and sector bodies to broker standards and pool resources (Fassbender, 2022; Michelsen et al., 2023). Where such intermediaries are weak, informal apprenticeship or market-driven variants fill the void but often suffer from inconsistent quality (Hofmann et al., 2022). In China, industry-education integration has become a policy mantra, yet empirical studies point to fragmented coordination and uneven resource flows (Qi & Chen, 2024; Zhang, 2025). Similar coordination challenges emerge in India (Maitra et al., 2024) and Ukraine (Braun & Melnyk, 2023). Training agencies pioneered in Norway and Switzerland illustrate how local consortia can widen SME participation, though their scope varies from general-purpose governance tools to niche solutions (Michelsen et al., 2023).

Mentoring quality and learning environments

Apprenticeship outcomes hinge on the pedagogical expertise of workplace mentors (Maxwell et al., 2024; McAdam & Perrin, 2025). Person-centred analyses in Switzerland reveal that rich resource profiles at both school and workplace predict higher satisfaction and occupational commitment (Lüthi et al., 2021). Meta-syntheses of mentor-training programmes identify adult-learning principles, sustained support and reflective practice as design essentials (Maxwell et al., 2024). Conversely, UK construction studies flag informal, under-resourced mentoring as a barrier to apprentice completion (Daniel et al., 2024). Degree-apprenticeship research echoes the need for clearer roles and interactive toolkits for work-based managers and mentors (Quew-Jones, 2022; Quew-Jones & Rowe, 2022) and highlights the pivotal function of two-tier mentoring in U.S. community colleges (Voeller, 2024).

Equity, access and learner agency

Despite their promise of social mobility, apprenticeship starts have fallen for disadvantaged youth in several countries, exacerbated by COVID-19 and levy reforms (Straw et al., 2022). Studies on motivation and self-regulation show that clinical exposure (Salajegheh et al., 2024) and workplace learning climates (Smith & Shaw, 2022) shape learner agency and persistence. Yet stigma and gendered barriers persist, notably in sectors such as social work and care (Higgs, 2022). International labour-law scholarship therefore

International Journal of Instructional Cases
ISSN: 2399-830x

calls for "quality apprenticeships" standards that embed inclusion and protect against precarious work (McCann & Stewart, 2024).

Synthesis and gap

Collectively, the literature underscores that employer engagement is multi-causal, context-specific and mediated by governance structures, cost-benefit calculus and mentorship quality. However, granular evidence on how Chinese SMEs in modern service sectors evaluate these trade-offs remains scant (Yan, 2023; Zhao & Selvaratnam, 2024). By foregrounding the voices of enterprise managers and mentors, the present study addresses this lacuna and offers empirically grounded recommendations for industry-education integration in Zhejiang and comparable settings.

Methodology

Sample and Data Collection

However, the essence of sample design is establishing a clear framework to guide the selection of survey participants (Kish, 1965). Whereas sampling per se seeks a subset that mirrors the broader population, sample design specifies the procedures—sampling procedure, units, frame and size—that will generate data representative of that population. Groves et al. (2009) identify five key stages in this process: defining the target population, constructing the sampling frame, choosing the sample design, determining the sample size, and selecting the final sample. Precisely defining sampling units and adopting a robust sampling plan are crucial to ensuring representativeness. Sampling methods themselves fall into two broad categories: probability and non-probability approaches.

This study used stratified random sampling for the questionnaire phase. Taherdoost (2017) offers clear procedures for estimating sample size and stratification in large - scale surveys. For the interviews, purposive sampling was applied so that participants precisely met the study's objectives (Gentles et al., 2015). Semi-structured interviews were selected because they balance consistency with flexibility, yielding in-depth, context-rich data. The research targeted SMEs partnering with five vocational colleges in China's most economically advanced regions—chosen for their key role in modern apprenticeship programmes and their insights into school–enterprise collaboration. Each college then randomly recruited between 47 and 48 managers or educators from its affiliated SMEs.

Three selection criteria guided the inclusion of industry or enterprise managers: (a) they must be actively engaged in collaboration with the designated vocational college and occupy a relevant managerial role within their industry; (b) they must possess a minimum of three years' managerial experience within the enterprise; and (c) preference was given to individuals who had participated in modern apprenticeship initiatives. All respondents completed the questionnaire voluntarily, with no restrictions regarding gender. The survey was distributed to representatives from 238 enterprises, yielding 214 valid responses, thus

International Journal of Instructional Cases
ISSN: 2399-830x

providing a reliable dataset for analysis.

To complement the survey findings, an in-depth case study was conducted on the modern apprenticeship programme at Jiaxing Vocational and Technical College. This component involved extensive interviews and field observations with ten enterprise-based instructors participating in the programme. These interviews gathered diverse viewpoints from industry managers, enterprise mentors, and relevant stakeholders, enriching the study's qualitative dimension. Through the use of semi-structured interviews, the research examined the practical viability of cooperation between SMEs and finance or business-related programmes in higher vocational institutions. This approach not only strengthens the empirical foundation of the research but also contributes valuable insights into the implementation and effectiveness of modern apprenticeship models in professional education and business contexts.

Tools for Analysis

To ensure both the depth and breadth of the research findings, a comprehensive analytical framework was developed, comprising three sequential stages of analysis.

Step 1: Quantitative analysis of survey data.

The first stage involved the statistical evaluation of survey data using SPSS. This software is well-suited for processing complex models and exploring intricate relationships between variables. At this stage, the analysis focused on identifying core themes and patterns within the survey responses, enabling the construction of systematic and quantifiable insights.

Step 2: Qualitative analysis of interview data.

The second stage utilised NVivo to conduct a thematic and narrative analysis of the interview data. NVivo facilitated the in-depth exploration of recurring themes and individual perspectives, allowing for a nuanced understanding of participants' experiences and viewpoints.

Step 3: Integrated analysis and interpretation.

The final stage involved synthesising the quantitative and qualitative findings to develop a holistic interpretation of the impact of modern apprenticeship programmes. This integration provided a more comprehensive understanding, highlighting the ways in which insights from both datasets complemented and enriched one another.

Data Analysis

This study employed SPSS software to analyse data derived from 214 questionnaires, with structural equation modelling and factor analysis utilised to evaluate the reliability and validity of the survey instruments. Furthermore, qualitative data from ten in-depth

International Journal of Instructional Cases
ISSN: 2399-830x

interviews with enterprise-based professors were examined using high-frequency word analysis and NVivo 14.0 software to extract both quantitative and qualitative insights. The results of these analyses are presented in Tables 1, 2, and 3 respectively.

Table 1: Reliability Analysis of Questionnaire Items

Item	Mean if Item Deleted	Variance if Item Deleted	Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Better Work Environment	47.28	91.032	0.766	0.699	0.920
Self-Motivation	46.83	94.769	0.571	0.471	0.927
More Teaching Support	47.33	90.284	0.745	0.719	0.921
Higher Wages and Benefits	47.17	95.839	0.496	0.478	0.929
Apprentice Positions	47.36	91.202	0.749	0.687	0.921
Safety and Legal Security	47.31	90.095	0.739	0.653	0.921
Communication Mechanisms	47.10	92.111	0.713	0.828	0.922
Team Formation	47.16	92.156	0.733	0.754	0.921
Government Policy Support	47.12	90.895	0.672	0.674	0.923
Role of Industry Associations	47.44	89.744	0.779	0.726	0.919
School Support	46.88	93.177	0.688	0.679	0.923
Parental Support	47.18	92.654	0.681	0.690	0.923
Other Factors	48.00	89.879	0.579	0.497	0.929

Table 1 presents the internal consistency evaluation of the questionnaire items. The Cronbach's Alpha values, all exceeding 0.9 across dimensions including work environment, self-motivation, and safety, demonstrate a high degree of reliability. These results indicate that the items are strongly interrelated and effectively capture the underlying constructs associated with the apprenticeship framework. Moreover, as shown in Table 2, the validity analysis confirms that the questionnaire appropriately captures the essential dimensions of the study, encompassing aspects such as educational background and participation in targeted training activities. The broad distribution of means and standard deviations reflects the diversity of responses obtained, thereby illustrating the instrument's effectiveness in capturing the varied experiences and perceptions of the participants.

International Journal of Instructional Cases
ISSN: 2399-830x

Table 2: Validity Analysis of Questionnaire Items.

Variable	N	Min	Max	Mean	SD
Highest Educational Level	214	1	4	2.69	0.631
Current Position	214	1	4	2.39	1.091
Years of Experience	214	1	4	3.32	0.920
Guiding Vocational Students	214	1	3	1.86	0.636
Participation in Educational Training	214	1	3	2.19	0.677
Participation in Teaching/Research	214	1	4	2.85	0.892
Willingness to Mentor	214	1	5	3.98	1.092
Understanding of Apprenticeships	214	1	5	3.27	1.081
Involvement in Training (Designing Training Programs)	214	1	5	3.40	1.287
Involvement in Training (Developing Curriculum Standards)	214	1	5	3.28	1.341
Involvement in Training (Teaching)	214	1	5	3.41	1.334
Involvement in Training (Textbook Writing)	214	1	5	3.07	1.451
Involvement in Training (Assessing Practical Courses)	214	1	5	3.36	1.382
Involvement in Training (Thesis Design)	214	1	5	2.92	1.361
Involvement in Training (Another Teaching Activities)	214	1	5	3.23	1.340
Ideal Mentor to Student Ratio	214	1	4	2.07	0.590
Understanding of Mentors' Rights and Responsibilities	214	1	5	3.36	1.000
Desired Frequency of Communication with Teachers	214	1	4	2.34	0.639
Desired Frequency of Communication with Apprentices	214	1	3	1.56	0.656
Incentives for Enterprise Teachers (Material Incentives)	214	0	1	0.77	0.423
Incentives for Enterprise Teachers (Honorary Titles)	214	0	1	0.63	0.485
Incentives for Enterprise Teachers (Training Opportunities)	214	0	1	0.58	0.496
Incentives for Enterprise Teachers (Access to School Resources)	214	0	1	0.48	0.502
Incentives for Enterprise Teachers (Business Relations with School)	214	0	1	0.56	0.499
Areas for Improvement in Mentor Training (Technical Skills)	214	1	5	3.69	1.587
Areas for Improvement in Mentor Training (Language Skills)	214	1	5	3.58	1.372
Areas for Improvement in Mentor Training (Patience and Attention)	214	1	5	3.74	1.502
Areas for Improvement in Mentor Training (Pedagogical and Psychological Knowledge)	214	1	5	3.64	1.299

Table 3 presents the results of the regression analysis, examining the influence of various factors—such as improved working conditions and governmental policy support—on the operational effectiveness of apprenticeship systems. While several

International Journal of Instructional Cases
ISSN: 2399-830x

variables do not yield statistically significant outcomes, the findings offer valuable insights into areas that may warrant further attention or reassessment to enhance the overall impact of apprenticeship programmes.

Table 3: Coefficients of Regression Analysis of Factors Affecting the Operation of Apprenticeship Systems.

Model	Unstandardized Coefficients	Standard Error	Standardized Coefficients	t-value	Significance
Better Work Environment	0.173	0.190	0.165	0.909	0.366
Student Self-Motivation	-0.092	0.145	-0.086	-0.632	0.529
More Teaching and Guidance	-0.118	0.184	-0.121	-0.644	0.521
Increase in Wages and Benefits	-0.291	0.142	-0.283	-2.052	0.043
Provision of Apprenticeship Positions	0.259	0.185	0.249	1.402	0.165
Security and Legal Protection	-0.107	0.162	-0.112	-0.662	0.510
Communication and Coordination Mechanisms	0.124	0.254	0.117	0.489	0.626
Building Suitable Teams	0.143	0.218	0.131	0.654	0.515
Government Policy Support	0.286	0.162	0.307	1.761	0.082
Role of Industry Associations	-0.040	0.187	-0.041	-0.214	0.831
School Support and Investment	-0.127	0.194	-0.115	-0.655	0.514
Parental Support	-0.021	0.188	-0.020	-0.110	0.912
Others	-0.254	0.109	-0.327	-2.332	0.022

Furthermore, Table 4 extends the analysis by examining the factors that influence modern apprenticeships, correlating them with various educational and organisational elements. Notably, factors such as the formation of appropriate teams, institutional support, and investment demonstrate significant positive effects, highlighting areas where strategic improvements could strengthen mentor team development.

International Journal of Instructional Cases
ISSN: 2399-830x

Table 4: Regression Analysis of Factors Influencing the Modern Apprenticeship

Variable	Unstandardized Coefficients B	Standard Error	Standardized Coefficients Beta	T-Value	Significance
(Constant)	2.812	0.640		4.392	¡0.001
Better Work Environment	-0.005	0.193	-0.005	-0.027	0.978
Student Self-Motivation	0.101	0.147	0.094	0.687	0.494
More Teaching and Guidance	-0.305	0.186	-0.308	-1.636	0.106
Increase in Wages and Benefits	-0.045	0.144	-0.043	-0.311	0.756
Provision of Apprenticeship Positions	-0.002	0.188	-0.002	-0.011	0.991
Security and Legal Protection	0.042	0.165	0.043	0.253	0.801
Communication and Coordination Mechanisms	-0.461	0.257	-0.431	-1.790	0.077
Building Suitable Teams	0.447	0.221	0.407	2.019	0.047
Government Policy Support	-0.244	0.164	-0.260	-1.483	0.142
Role of Industry Associations	0.256	0.190	0.257	1.347	0.181
School Support and Investment	0.414	0.197	0.372	2.107	0.038
Parental Support	0.098	0.191	0.092	0.512	0.610
Others	-0.034	0.110	-0.044	-0.309	0.758

The F-test and t-test analyses of the anticipated communication frequency between business mentors and educators reveal significant differences in expectations based on the experience backgrounds of the mentors and teachers. Overall, enterprise mentors express a strong desire for increased communication with school teachers.

Table 5: The Result of F-test and T-Test of Communication Frequency with Teachers.

Levene's Test for Equality of Variances	F	Significance	t	df
Equality of Variances Assumed	15.051	Under 0.001	-1.243	61
Equality of Variances Not Assumed			-5.601	59.000

International Journal of Instructional Cases
ISSN: 2399-830x

Results and Discussion

Analysis of Questionnaire Results

An in-depth analysis of the questionnaire results reveals that factors such as educational background, position, and the level of involvement in the apprenticeship program among enterprise mentors significantly impact the effectiveness of apprenticeship training. This analysis underscores the importance of strengthening mentoring relationships and enhancing the training of enterprise mentors to improve apprentice performance and inform the development of educational strategies and support mechanisms. The findings are detailed below:

Participants' academic qualifications were assessed through a question regarding their highest level of education. The average score was 2.69, indicating that most mentors have higher education qualifications, with 57% holding a bachelor's degree and 34% possessing a diploma. This higher education level equips participants with advanced skills and knowledge, and the varying educational backgrounds of mentors generate differing expectations and requirements for apprentices. A survey question asking about participants' current positions revealed a wide range of professional roles, with an average score of 2.39. Notably, 35% of respondents were department managers, while 30% held regular rank-and-file positions, reflecting the diverse roles involved in apprenticeship programs. This diversity contributes to varying perspectives on the apprenticeship experience, highlighting different levels of influence and responsibility among participants.

Regarding participants' years of experience in their current field, the average was 3.32 years, with 60% of respondents having over five years of professional experience. This indicates a highly experienced cohort; whose substantial professional maturity provides valuable insights into the apprenticeship process and its outcomes. When asked about mentoring experience, 58% of participants reported mentoring occasionally, 28% frequently, and 14% had never been involved in mentoring activities. This variation suggests that mentorship is not consistently practised among the respondents, which may impact the effectiveness and continuity of apprenticeship programmes.

In response to the question, "Have you attended any educational or teaching training organised by the school?", 51% of participants reported engaging in educational training, albeit not on a systematic basis. Only 15% had participated in training that was organised and structured. This highlights a significant gap in educational engagement strategies, suggesting that increasing the consistency and regularity of such training could improve the quality of apprenticeship training. Participants were also asked about their level of participation in various aspects of modern apprenticeships. The highest level of involvement was reported in "Course Teaching" with an average score of 3.41, reflecting a preference for direct instructional activities. Conversely, "Graduation Thesis Design" received the lowest level of engagement, with an average score of 2.92, indicating limited

International Journal of Instructional Cases
ISSN: 2399-830x

involvement in project-based tasks. This trend suggests that mentors prefer hands-on instruction over more extensive educational projects, which may influence the depth and complexity of the apprenticeship experience.

The survey also explored the preferred incentive measures for mentors. Material incentives, especially "Providing tangible rewards to mentors or enterprises," were strongly favoured, with an average score of 0.77. However, the option "Gaining access to university resources" received a lower average score of 0.48, indicating a potential misalignment between the incentives offered and mentors' preferences. Lastly, when asked, "What do you believe enterprise enterprises need to improve most in training apprentices?", participants highlighted the importance of personal attributes such as "Endurance and Carefulness" with an average score of 3.74. In contrast, "Language Skills" received a slightly lower score of 3.58. This suggests that mentors place more emphasis on emotional intelligence and attentiveness than on technical communication skills in the mentorship role, underscoring the importance of interpersonal skills in effective apprenticeship training.

As summarised in Table 4, the multiple-regression results point to two predictors whose effects are statistically significant at the conventional 5 % level. First, building suitable teams exhibits a positive association with overall programme effectiveness ($\beta = 0.447$, $p = .047$), indicating that enterprises that allocate the right mix of expertise and clearly defined roles to their mentor teams realise appreciable performance gains. Second, school support and investment likewise shows a positive, statistically reliable impact ($\beta = 0.414$, $p = .038$): stronger institutional commitment—manifested through funding, facilities, and administrative backing—tends to translate into more effective apprenticeship outcomes. In addition, communication and coordination mechanisms demonstrate a negative coefficient that approaches, but does not cross, the 5 % significance threshold ($\beta = –0.461$, $p = .077$). Although this result is only marginally significant ($\alpha = .10$), it suggests that inadequate or poorly structured interaction channels between schools and enterprises may undermine programme performance and therefore merits further empirical scrutiny. Collectively, these findings underscore the central importance of well-constituted mentor teams and sustained institutional investment, while also drawing attention to the potentially detrimental role of sub-optimal communication frameworks in modern apprenticeship systems.

Interview Results Analysis

Based on grounded theory, the interview content was analysed using a coding process consisting of open coding, axial coding, and selective coding. The details of this coding process are summarized in Table 6.

International Journal of Instructional Cases
ISSN: 2399-830x

Table 6: Coding for Semi-Structured Interview Content of Enterprise Mentors

Coding Category	Open Coding	Axial Coding	Selective Coding	Theoretical Framework
Impact of Industry Associations	Impact of Industry Associations	Role of Industry Associations	Impact and Role of Industry Associations	The bridging role of industry associations in career development (Lattuca & Stark, 2009)
Challenges in Apprenticeship	Student Attrition/Time/ Salary/Motivation/El imination system	Apprenticeship Challenges	Informal Learning Theory	Challenges of student attrition in apprenticeship (Eraut, 2000)
	Lack of Standards for Enterprise Teacher Qualification	Enterprise Teacher Qualification	Teacher Qualification Theory	The impact of lack of standards for enterprise teacher qualifications on training quality (Zeichner, 2005)
	Inflexibility of Training Plans	Training Plans	Training Plan Theory	The impact of training plan flexibility on the effectiveness of apprenticeship (Billett, 2001)
Strengthening School-Enterprise Cooperation	Industry Associations Should Focus and Invest Resources	Resource Allocation	Resource Allocation Theory	The impact of resource allocation by industry associations on vocational outcomes (Fürstenau et al., 2014)
	Strengthening Communication and Cooperation Between Associations, Schools, and Enterprises	Communication and Cooperation	School-Enterprise Cooperation Theory	The impact of school-enterprise cooperation on career development (Gray, 1989)
	Organizing Industry Exchange Activities, Career Exhibitions, and Training	Industry Exchange Activities and Career Exhibitions	Industry Exchange and Career Development Theory	The influence of industry exchange activities on career development (Tomlinson, 2012)
	Obtaining More Logistics Company Information Through Associations, Increasing Mutual Visits	Information Sharing and Mutual Visits	School-Enterprise Cooperation Relationship Theory	The role of information sharing and mutual visits in enhancing network effectiveness (Provan & Milward, 2001)

Using NVivo 14, the interview transcripts were systematically coded, and a series of word-frequency, matrix-coding, and cross-tabulation queries were run. This computer-assisted content analysis generated a robust evidence base from which two complementary strands of findings—quantitative patterns and qualitative themes—were distilled, as detailed in the subsections that follow.

International Journal of Instructional Cases
ISSN: 2399-830x

Quantitative Insights

The average tenure and experience of enterprise mentors is between 3 and 5 years, indicating a stable and seasoned presence in their current roles. Most mentors are actively engaged in critical activities such as teaching, internship supervision, and curriculum development, highlighting their essential role in the apprenticeship process. The high frequency of terms such as "Associations and Enterprises" suggests that these are key topics within the text, indicating that industry associations and enterprises are prominently discussed. Additionally, the frequent mention of "Cooperation and Communication" underscores the importance of these factors, emphasizing their centrality to the overall theme of the discussion (see Figure 1).

Figure 1: Word Cloud of Enterprise Mentors Interview

Qualitative Insights

After analysing the encoded content (see Figure 2), the main findings were observed:

Challenges in Apprentices: Issues such as uneven resource distribution and insufficient practical motivation among students were identified. The low retention rate of graduates in local jobs indicates a reduced return on investment for businesses, underscoring the need for improved support and resource allocation.

Role of Industry Association: The industry association is crucial in establishing professional standards and facilitating collaborations. Participants hope that the industry association can provide more effective support in these areas.

Standards for Enterprise Teacher Qualification: The mentor's role is to enhance the practical abilities of students and help apprentices understand the company culture in practical operations. Due to differences in the experience and ability of mentors, it is emphasized that unified teaching evaluations and qualifications are needed to ensure the quality of training.

International Journal of Instructional Cases
ISSN: 2399-830x

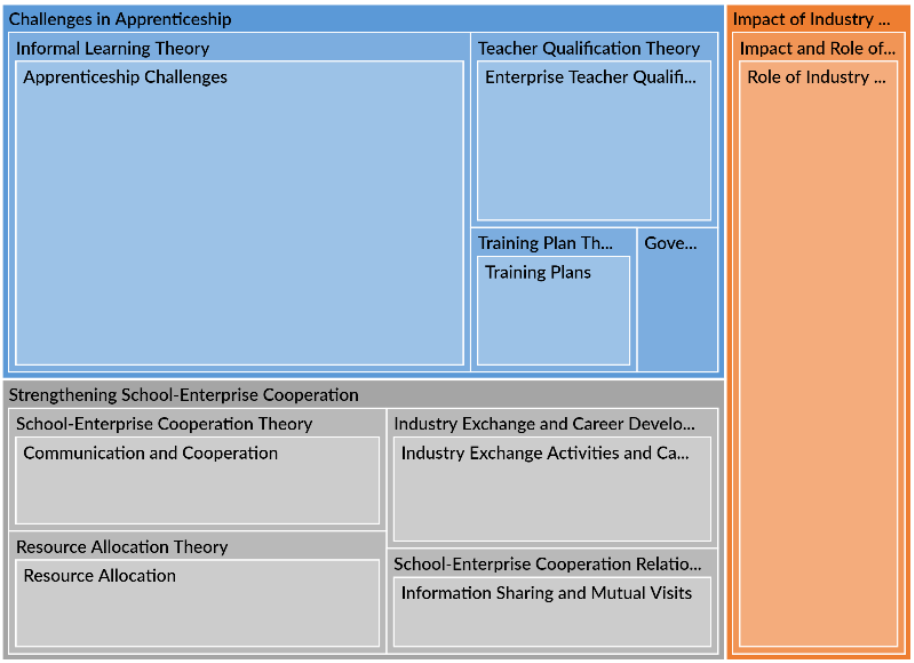

Figure 2: Coding References of Enterprise Mentors

Conclusion

Successful implementation of modern apprenticeship programs relies on interconnected elements, such as government policy support, industry association collaboration, mentor expertise, and structured communication frameworks. To optimise these initiatives, increasing government incentives like tax breaks, financial subsidies, and simplified regulatory procedures can encourage SMEs to engage more actively in apprenticeship programs. Strengthening cooperation between schools and businesses through interactive platforms, shared teaching resources, and co-developed programs ensures apprentices receive education that aligns with industry needs, enhancing their job market competitiveness. Industry associations also play a pivotal role by defining competency requirements, contributing to curriculum design, and facilitating collaboration between businesses and educators. This ensures apprenticeship systems remain responsive to technological shifts, integrating emerging skills such as artificial intelligence and sustainability practices while preparing a future-ready workforce.

Mentor professionalism is essential for successful apprenticeship implementation. Companies should develop key competencies in mentors, such as instructional methods, industry-specific technical experience, and communication skills. To achieve this, differentiated training systems for junior and senior mentors, along with continuous learning through technical summits and online seminars, should be established. Additionally, fostering long-term career development mechanisms, such as parallel career paths in technical and management posts, can encourage mentors to deepen their expertise. Strengthening organisational safeguards, such as mentor qualification certification systems and enterprise practice indicators, ensures high-quality training and rewards excellence. Effective communication between all participants, open feedback mechanisms, and

International Journal of Instructional Cases
ISSN: 2399-830x

collaborative decision-making are critical for creating an efficient learning environment. Drawing inspiration from China's vocational education model, which successfully integrates educational institutions and businesses, these strategies are set to produce a more skilled, competitive workforce that drives economic growth.

Limitations and Future Directions

While the study provides valuable insights into the factors influencing the success of modern apprenticeship programs, it has certain limitations. The research was conducted in a specific geographical area, which may limit the generalisability of the findings to countries or regions with different economic, cultural, and political contexts. Additionally, the sample size for interviews and questionnaires was not large enough, which introduces potential errors and requires further verification of the conclusions. Future research could expand the scope of the study by including larger surveys or comparative studies across different countries, regions, or educational institutions to gain a more comprehensive understanding of the dynamics shaping apprenticeship programs.

Furthermore, the rapid advancements in industry and technology, particularly in artificial intelligence, present new challenges and opportunities for the teaching of modern apprenticeships. These factors were not explored in depth in this study. Future research could examine how the evolving landscape of industries, digitalisation, and automation impact apprenticeship training models and the skills apprentices need to develop. Longitudinal studies tracking apprentices' career progression could provide deeper insights into the long-term sustainability and impact of apprenticeship programs on individuals and industries. In conclusion, while this study offers useful recommendations for improving modern apprenticeship operations, it is essential to continuously adjust training models and methods to meet the evolving needs of industries and enterprises. Future research and policy development should focus on integrating innovative technologies and ensuring that apprenticeship programs align with the needs of all key stakeholders.

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