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The Impact of Order-Oriented Talent Training, School-Enterprise Collaboration, and Professional Identity on Graduate Employment Quality in Henan, China

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Abstract

This study aimed to explore the influence of order-oriented talent training (OTT), school–enterprise collaboration effectiveness (SECE), and professional identity (PI) on graduate employment quality (GEQ) from the perspective of industry–education integration in Henan Province, China. The study draws on Human Capital Theory and Social Capital Theory as well as Identity Theory, and is based on the mediation model that proposes the influence of educational practices on the quality of employment via the formation of professional identity. A quantitative cross-sectional design was adopted with 332 university students from application-oriented universities in Zhengzhou, China, who completed questionnaires. Descriptive statistics, reliability and validity tests, correlation analysis, hierarchical regression, and bootstrapping mediation analysis were used to analyze data. The findings revealed that OTT significantly influenced both SECE ($\beta = 0.73$, $p < 0.001$) and GEQ ($\beta = 0.65$, $p < 0.001$), while SECE also had a significant positive effect on GEQ ($\beta = 0.67$, $p < 0.001$). Additionally, OTT, SECE, and GEQ were fully mediated by professional identity, suggesting that employment success quality is strongly related to students' professional identity, commitment and orientation to the profession and their psychological attachment to the profession. The study is in line with the current literature on higher education and employability, focusing on the quality of employment and recognizing the importance of professional identity as one of the psychological factors involved in the integration of industry and education. The results also offer practical implications for universities and enterprises to build collaborative talent cultivation systems to enhance the pertinence of courses, workplace learning and career development. Longitudinal and comparative analyses should be conducted on a career development outcome of sustainable career in future studies considering the institutional and regional contexts.

Keywords: Order-Oriented Talent Training, School–Enterprise Collaborative Education, Professional Identity, Graduate Employment Quality, Industry–Education Integration, Higher Education Employability

Introduction

In today's economy, higher-education institutions are increasingly called upon to equip their graduates for a desirable future in the labor market, not just employment, but to have them prepared to engage in high-quality, sustainable jobs in dynamic job markets (OECD, 2024; UNESCO, 2023). In China, application-oriented universities are an important force in cultivating regional economic development talent with a strong industry orientation. To enhance

graduates' employability, the Chinese government has launched the integration of industries and education, cooperation between schools and enterprises, and the training of talents in accordance with the order as important national strategies ([Ministry of Education, 2017](#); [State Council, 2019](#)).

In recent years, Henan Province, one of China's main education and industrial bases, has been increasingly reforming collaborative education in response to the problems of graduates' employment and improvement of industrial levels. School–enterprise cooperation modes of curriculum development, internships, and on-the-job training have been carried out increasingly by universities in Zhengzhou. However, there are concerns about the quality of graduate employment (GEQ), job matching, career sustainability, and career development.

Collaborative education and experiential learning have been found to positively impact employability and workplace readiness ([Brown et al., 1989](#); [Li & Yang, 2019](#)). However, the majority of current research has concentrated on institutional issues, with little attention paid to the psychological processes linking education to work outcomes. Professional identity (PI) is a factor that affects career commitment and job satisfaction ([Guichard, 2018](#); [Han, 2022](#)). However, it has received less attention among the factors of collaborative education and GEQ, especially in application-oriented universities in Henan Province.

This study adopts the Triple Helix Theory, Stakeholder Theory, and Situated Learning Theory as the theoretical basis and uses the relationships between OTT, school–enterprise collaborative education effectiveness (SECE), PI, and GEQ as the research object to carry out a study. The results are expected to have implications for employability in higher education and offer practical suggestions to universities, enterprises, and policymakers to enhance the quality of sustainable talent development and employment.

Research Objectives

- To examine the effect of order-oriented talent training on school–enterprise collaborative education.

- To investigate the effect of order-oriented talent training on the quality of graduate employment.
- To analyze the effect of school–enterprise collaborative education on graduate employment quality.
- To examine the mediating role of professional identity in the relationship between order-oriented talent training, school–enterprise collaborative education, and graduate employment quality.

Literature Review

This study uses Triple Helix Theory, Stakeholder Theory ([Freeman, 2006](#)), and Situated Learning Theory (Lave & Wenger, [1991, 2004](#)) to explain how collaborative educational practices affect graduate job outcomes through the building of professional identity. This topic is also based on Human Capital Theory, Social Capital Theory, and Identity Theory to enable hypothesis development and mechanism analysis.

Order-Oriented Talent Training and School–Enterprise Collaborative Education

Order-oriented talent training (OTT) combines curriculum design, practical training, and industry participation with the coordination of higher education and labor market needs in changing times ([Chen 2012](#); [Huang & Qu 2020](#)). OTT is a fundamental part of industry–education integration and is closely related to School–Enterprise Collaborative Education (SECE) to promote cooperation between universities and enterprises in terms of talent training. The Triple Helix Theory proposes that this mutualization strengthens the integration of resources, innovation, and workforce development ([Etzkowitz & Leydesdorff, 2005](#)).

Recent research conducted in China has also pointed out that collaboration between industry and universities has a positive impact on employability, practical skills, and workplace readiness, especially in application-oriented universities ([Li & Yang, 2019](#); Zhang et al., 2023). However, most research on employability and institutional change has mainly focused on employability, and little attention has been paid to the quality of employment at graduation (GEQ) (career sustainability, job matching, and professional development, among others).

The concept of professional identity (PI) has recently emerged as a key construct in employability research and its effects on professional commitment and employment outcomes (Donald et al., 2021; Xu et al., 2023). PI can benefit from university–industry partnerships through workplace learning, mentorship, and professional socialization (Cui & Harzing, 2022). However, the role of PI as a mediator between collaborative educational practices and GEQ has not been adequately explored, particularly in the context of application-oriented universities in China.

By combining the three theories—Human Capital Theory, Social Capital Theory, and Identity Theory—this study accounts for the relationships among OTT, SECE, PI, and GEQ.

Employment outcomes are no longer the only aspect of employability that has been explored, with research increasingly looking at the concept of employability as a multidimensional construct comprising career adaptability, professional identity, digital skills, and career sustainability (Clarke, 2018; Tomlinson, 2017). Other research also suggests that work-integrated learning, university–industry collaboration, and professional identity development play an important role in shaping graduates’ readiness to enter labor markets that are undergoing transformation (Jackson, 2016; Donald et al., 2019). In addition, research from more recent years highlights the importance of experiential learning, interdisciplinary (cross-cutting) skills, employability skills and adaptability, and university–industry collaboration in higher education (Jackson & Tomlinson, 2021; Cui & Harzing, 2022). With these lenses, one can further see the value of researching the role of order-oriented talent training and collaborative education between schools and enterprises in enhancing the employment quality of graduates by cultivating their professional identity. These views lead to the following hypothesis:

H₁: Order-oriented talent training (OTT) has a significantly positive effect on school–enterprise collaborative education (SECE).

Order-Oriented Talent Training and Graduate Employment Quality

According to human capital theory, education

improves people’s employability by building their knowledge, skills, and competencies (Becker, 1993). Order-oriented talent training (OTT) is a training model oriented towards the industry, which can provide students with hands-on experience and skills that are closely related to employment, thereby enhancing employment prospects.

Previous research has demonstrated that OTT has a positive effect on job matching, employment stability, and career advancement (Chen, 2012; Liu, 2020). Recent studies on higher education applications also show that WIL and industry alignment significantly impact graduates’ employment and employment quality (OECD, 2024). Others, however, believe that the psychological dimension of employment, including career commitment and professional identity (Guichard, 2018), plays a role in employment outcomes.

From the literature reviewed, it can be concluded that the following hypothesis is proposed:

H₂: Order-oriented talent training (OTT) has a significant positive effect on graduate employment quality (GEQ).

School–Enterprise Collaborative Education and Graduate Employment Quality

The employment orientation benefits of school–enterprise collaborative education (SECE) are derived from its ability to enable students to access industry resources, experiences, and networks. According to the Social Capital Theory, these interactions and connections provide opportunities that enhance individuals’ careers (Coleman, 1988). According to previous research, collaborative education students have higher employment quality, career readiness, and career adaptability (Li & Yang, 2019; Xu et al., 2025). Recently, studies conducted at some universities in China that focus on application have also shown that university–industry collaboration has a positive effect on employment by enhancing students’ work skills and industry experience (Chen et al., 2023; Chen et al., 2025). Alternatively, SECE might also be influenced by students’ internalization of experiences in the form of psychological processes, such as professional identity. The literature review suggests the following hypothesis:

H₃: School–enterprise collaborative education (SECE) has a significant positive effect on graduate employment quality (GEQ).

The Mediating Role of Professional Identity between SECE and GEQ

School–enterprise collaborative education (SECE) has opened opportunities for students to enter authentic work fields, communicate with professionals, and understand organizational culture. Situated Learning Theory proposes that learning takes place in a community of practice and that the development of a professional identity is a process that evolves gradually as a result of social interaction and experiences in real contexts ([Lave & Wenger, 1991](#)). Workplace exposure and experiential learning may reinforce students' professional identity and career commitment, which may in turn enhance their professional readiness. SECE can reinforce students' professional identity and career commitment, and thus improve their professional readiness through some form of workplace exposure and experiential learning. There has been a recent surge in research emphasizing experiential learning and workplace involvement in the formation of professional identity and career growth (Pach et al., 2025; Dean, 2025). Higher employment quality and adaptability are related to students' stronger professional identities. However, little research has validated the mediation of professional identity in the relationship between SECE and graduate employment quality (GEQ), especially in application-oriented universities in China. Thus, the following hypothesis is proposed:

H₅: Professional identity (PI) mediates the relationship between school–enterprise collaborative education (SECE) and graduate employment quality (GEQ).

Figure 1 illustrates the conceptual framework proposed in this study.

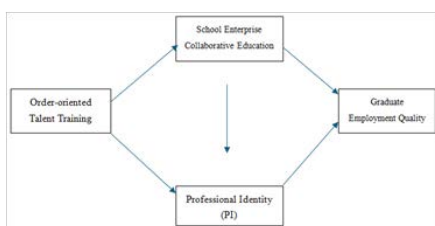


Figure 1 Conceptual Model

In summary, this study proposes a conceptual framework in which Order-Oriented Talent Training (OTT) → School–Enterprise Collaborative Education (SECE) → Professional Identity (PI) → Graduate Employment Quality (GEQ). This framework integrates structural, relational, and psychological perspectives to provide a comprehensive understanding of how educational practices influence employment outcomes.

Research Methodology

A quantitative cross-sectional research design was used to analyze the relationship between Order-Oriented Talent Training (OTT) and School–Enterprise Collaborative Education (SECE) and the relationship between Professional Identity (PI) and Graduate Employment Quality (GEQ). The study was informed by Triple Helix Theory, Stakeholder Theory, and Situated Learning Theory, as these theories provide an explanation for the structural, collaborative, and experiential aspects of employability development.

Population and Sampling

The target population was undergraduate students of the two application-oriented universities in Zhengzhou, Henan Province, China, Sias University and Zhengzhou Sias Institute of Digital Technology Industry, who were being trained in order specialties. Stratified sampling was used to enhance the representation of the sample, with sampling by major and grade level.

The number of participants in the sample size was recommended to be 384 ([Krejcie & Morgan, 1970](#)). A total of 380 questionnaires were distributed, and 332 valid questionnaires were retained, which is an effective response rate of 87.37 %. The final number of samples was slightly lower than the recommended number; however, it was deemed statistically sufficient for multivariate analysis and for testing mediation. For Structural Equation Modeling and regression-based mediation analysis, [Hair et al. \(2019\)](#) stated that a sample size of 300 or larger is acceptable, depending on the model's reliability, validity, and statistical power. Moreover, the number of respondents in the sample was greater than the generally recommended minimum sample size ratio

of 10 respondents per estimated parameter, thereby ensuring the robustness and stability of the results. Thus, the retained sample provided adequate power for hypothesis testing and mediation analysis.

Data Analysis and Interpretation

A structured questionnaire with a 5-point Likert scale was used, which was modified based on previously validated questionnaires and relevant studies in the field of application-oriented higher education in China. The constructs were OTT, SECE, PI, and GEQ. Content validation was performed by higher education and educational administration experts.

The results of a preliminary study of 50 students showed good reliability, with Cronbach's alpha coefficients ranging from 0.87 to 0.90. The results of Exploratory Factor Analysis (EFA) indicated that the instrument had satisfactory construct validity in terms of KMO (0.86) and Bartlett's test ($p < .001$).

Data were collected from October to November 2024 using offline questionnaires. Participants were advised of anonymity, confidentiality and the voluntary nature of the survey before taking part in the survey.

Statistics

The data were analyzed using SPSS and AMOS. Data on respondent characteristics and study variables were summarized using descriptive statistics tables. Reliability was measured using Cronbach's alpha, and the measurement model was validated using Confirmatory Factor Analysis (CFA). The convergent and discriminant validities of the constructs were tested using Composite Reliability (CR) and Average Variance Extracted (AVE).

The hypothesized relationships were tested using Pearson correlation and hierarchical regression analyses. The mediating role of PI was analyzed using bootstrapping ([Preacher and Hayes, 2008](#)) procedures with 5000 resamples. Harman's single-factor test was employed to check for common method bias, and it was found that there was no serious common method bias.

Ethical Approval

This study was approved by the appropriate institution's research ethics committee before data collection. The aims of the study, confidentiality procedures, conditions of voluntary participation, and the right to withdraw at any time without penalty were explained to all participants. All the respondents provided their informed consent before being administered a questionnaire, and the data obtained for the purpose of the research were used exclusively for scientific research in compliance with the ethical standards of research.

Results

Descriptive Statistical Analysis

Table 1 Demographic Characteristics of Respondents (n = 332)

Characteristic	Category	(n)	(%)
Gender	Male	158	47.59
	Female	174	52.41
Major Type	Liberal Arts	186	56.02
	Engineering	146	43.98
Grade Level	Junior	215	64.76
	Senior	117	35.24
Internship Duration	≤ 3 months	98	29.52
	3–6 months	156	46.99
	> 6 months	78	23.49

A total of 332 valid responses were obtained. The male-female distribution was fairly even, with males representing 47.59% and females 52.41% of the respondents. In terms of academic majors, 56.02% of the respondents were from liberal arts disciplines, and 43.98% were from engineering disciplines, as in the institutions. The majority of the respondents were juniors (64.76%), and the remaining were seniors (35.24%) who were engaged in an order-oriented training program with hands-on experience. Regarding the duration of internships, most students had completed internships of 3–6 months (46.99%), followed by ≤ 3 months (29.52%) and > 6 months (23.49%). Overall, the sample was reasonably well distributed and representative.

Table 1 Descriptive Statistics of Study Variables (n = 332)

Variable	Number of Items	Mean (M)	Standard Deviation (SD)	Minimum	Maximum
Order-Oriented Talent Training (OTT)	12	4.21	0.58	2.80	5.00
School–Enterprise Collaborative Education (SECE)	12	4.18	0.61	2.70	5.00
Professional Identity (PI)	10	4.35	0.52	3.00	5.00
Graduate Employment Quality (GEQ)	12	4.27	0.55	2.90	5.00

The descriptive statistics of the study variables are shown in Table 1. The mean scores of all constructs were greater than 4.0 on a five-point Likert scale, suggesting a generally positive perception of order-oriented talent training, school-enterprise collaborative education, professional identity, and quality of graduate employment. The highest mean score ($M = 4.35$, $SD = 0.52$) was obtained for professional identity, indicating that this is an

important factor in graduate employment outcomes. In contrast, school–enterprise collaborative education (SECE) reported the lowest mean score ($M = 4.18$, $SD = 0.61$), suggesting potential areas for improving university–enterprise collaboration in this regard. Relatively low standard deviation values indicate strong agreement and consistency among respondents.

Table 2 Cronbach Alpha Results for Construct Validity (n=332)

Variable	Number of Items	Mean (M)	Standard Deviation (SD)	Cronbach's α
Order-oriented Talent Training (OT)	12	4.21	0.58	0.89
School-Enterprise Collaborative Education (SE)	12	4.18	0.61	0.88
Professional Identity (PI)	10	4.35	0.52	0.87
Employment Quality (EQ)	12	4.27	0.55	0.90

As shown in Table 2, the Cronbach's alpha coefficients for all constructs exceeded the recommended threshold of 0.70 (Nunnally, 1978), with values of 0.89 (OTT), 0.88 (SECE), 0.87 (PI), and 0.90 (GEQ). These results indicate excellent internal consistency reliability for all the measurement scales.

Reliability and Validity Analysis

The reliability analysis results indicated that all constructs demonstrated strong internal consistency, with Cronbach's alpha coefficients exceeding the recommended threshold of 0.70. Specifically, the

alpha values were 0.89 for OTT, 0.88 for SECE, 0.87 for PI, and 0.90 for the GEQ. In addition, all sub-dimensions reported values above 0.80, confirming the reliability of the measurement scale.

Confirmatory Factor Analysis (CFA) was conducted to assess convergent validity. The standardized factor loadings ranged from 0.72 to 0.86 and were statistically significant ($p < 0.001$), indicating satisfactory construct validity and strong reliability.

Table 3 CFA Results for Construct Validity (n=332)

Variable	Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Order-oriented Talent Training (OT)	0.72–0.83	0.89	0.68
School-Enterprise Collaborative Education (SE)	0.73–0.84	0.88	0.66
Professional Identity (PI)	0.75–0.86	0.87	0.71
Employment Quality (EQ)	0.74–0.85	0.90	0.73

Furthermore, the composite reliability (CR) values for all constructs exceeded 0.80, and the average variance extracted (AVE) values were above the recommended threshold of 0.50 (Fornell & Larcker, 1981). These results confirm that all constructs demonstrated adequate convergent validity and construct reliability.

Discriminant validity was assessed using the Fornell–Larker criterion. The square root of the AVE for all constructs (OTT = 0.82, SECE = 0.81, PI = 0.84, GEQ = 0.85) exceeded the corresponding inter-construct correlations (0.65–0.73), confirming adequate discriminant validity. These results indicate that the constructs are conceptually distinct and that multicollinearity is not a serious concern in this study.

Table 4 Correlation Coefficients and Discriminant Validity Test Results (n=332)

Variable	OT	SE	PI	GEQ
Order-oriented Talent Training (OT)	0.82	0.73	0.68	0.65
School-Enterprise Collaborative Education (SE)	0.73	0.81	0.70	0.67
Professional Identity (PI)	0.68	0.70	0.84	0.72
Employment Quality (EQ)	0.65	0.67	0.72	0.85

Note: $p < 0.01$ (two-tailed); Diagonal values are the square root of AVE; Off-diagonal values are Pearson correlation coefficients.

Pearson's correlation analysis was conducted to examine the relationships among OTT, SECE, PI, and GEQ (Table 4). All variables were significantly and positively correlated at the 0.01 significance level. OTT was positively correlated with SECE ($r = 0.73$), PI ($r = 0.68$), and GEQ ($r = 0.65$). Similarly, SECE was positively correlated with PI ($r = 0.70$) and GEQ ($r = 0.67$). Among all the variables, PI demonstrated the strongest relationship with GEQ ($r = 0.72$), highlighting the important role of professional identity in graduate employment outcomes. The correlation coefficients ranged from 0.65 to 0.73, indicating moderate positive relationships and

suggesting that multicollinearity was not a serious concern in this study.

Regression Analysis (Hypothesis Testing)

Hierarchical linear regression analysis was conducted to test the direct effects of core variables, including Order-Oriented Talent Training (OTT), School–Enterprise Collaborative Education (SECE), and Graduate Employment Quality (GEQ). Prior to the analysis, all variables were standardized to minimize the effects of the scale differences. The regression results are shown in Table 5.

Table 5 Hierarchical Regression Analysis Results (n=332)

Dependent Variable	Independent Variable	β	t	p	R ²	ΔR^2	F
SE (H ₁)	Constant	0.02	0.35	0.73	0.53	0.53	369.28
	OT	0.73	19.22	< 0.001			
EQ (H ₂)	Constant	0.03	0.48	0.63	0.42	0.42	238.56
	OT	0.65	15.45	< 0.001			

EQ (H ₃)	Constant	0.01	0.21	0.83	0.45	0.45	267.89
	SE	0.67	16.37	< 0.001			

Note: $p < 0.01$ (two-tailed); OT = Order-oriented Talent Training; SE = School-Enterprise Collaborative Education; GEQ = Employment Quality.

The regression results show that all the hypothesized relationships are positive and statistically significant. OTT significantly influenced SECE ($\beta = 0.73$, $p < 0.001$), supporting H₁. In addition, OTT positively affected GEQ ($\beta = 0.65$, $p < 0.001$), supporting H₂, while SECE also had a significant positive effect on GEQ ($\beta = 0.67$, $p < 0.001$), supporting H₃. The findings confirm that both order-oriented talent training and school-enterprise collaborative education contribute significantly to improving graduate employment quality and provide a foundation for mediation analysis involving professional identity.

Mediation Analysis Results

To examine the mediating role of Professional Identity (PI), this study employed both Baron and Kenny's (1986) causal steps approach and the bootstrapping method with bias-corrected confidence intervals. The mediation effects of PI were tested in the relationships between Order-Oriented Talent Training (OTT) and Graduate Employment Quality (GEQ), as well as between School-Enterprise Collaborative Education (SECE) and GEQ. The results are presented in Tables 6 and 7.

Table 6 Mediation Analysis Results of PI Between OT and GEQ (n=332)

Step	Dependent Variable	Independent Variable	β	t	p	R ²
1	PI	OT	0.68	14.92	< 0.001	0.46
2	GEQ	OT	0.65	15.45	< 0.001	0.42
3	GFEQ	PI	0.72	17.89	< 0.001	0.52
4	GEQ	OT	0.12	1.85	0.07	0.58
-	-	PI	0.68	13.21	< 0.001	

Sobel Test Result: $Z = 8.96$, $p < 0.001$

Table 7 Mediation Analysis Results of PI Between SE and GEQ (n=332)

Step	Dependent Variable	Independent Variable	β	t	p	R ²
1	PI	SE	0.70	15.67	< 0.001	0.49
1	PI	SE	0.70	15.67	< 0.001	0.49
3	GEQ	PI	0.72	17.89	< 0.001	0.52
4	GEQ	SE	0.10	1.56	0.12	0.60
-	-	PI	0.70	14.53	< 0.001	

Sobel Test Result: $Z = 9.23$, $p < 0.001$

The mediation analysis results indicate that professional identity (PI) fully mediates the relationships between order-oriented talent training (OTT), school-enterprise collaborative education (SECE), and graduate employment quality (GEQ). Although OTT and SECE initially showed significant positive effects on the GEQ, their direct effects became non-significant after PI was included in the model. In addition, the indirect effects were statistically significant (OTT: $Z = 8.96$, $p < 0.001$; SECE: $Z = 9.23$, $p < 0.001$), supporting

H₄ and H₅, respectively. These findings suggest that educational practices improve the quality of graduate employment primarily by strengthening students' professional identity.

Discussion

Order-Oriented Talent Training (OTT) → School-Enterprise Collaborative Education (SECE)

The results indicate that talent training for structure and industry orientation promotes cooperation

between universities and enterprises. This aligns with the Triple Helix Theory, which speaks about the importance of intertwining the actors of education, industry, and innovation in the development of talents and innovations. In application-oriented universities, OTT is an institutionalization mechanism that enables curriculum co-development, resource integration, and practical training. The results are in line with previous research that has indicated that industry-focused and effective training can increase the effectiveness of school–enterprise collaboration and the relevance of education.

Order-Oriented Talent Training (OTT) → Graduate Employment Quality (GEQ)

The findings reveal that OTT positively impacts the quality of employment of graduates by enhancing their competencies and career readiness in the workplace. The result is in line with Human Capital Theory, which posits that education and training are important determinants of improving the employability and productivity of an individual. However, the mediation results highlight that, in addition to skill building, students' professional identity also plays a role in determining the quality of employment. This underlines the need to integrate psychological and professional development into talent cultivation systems.

School–Enterprise Collaborative Education (SECE) → Graduate Employment Quality (GEQ)

The results validate the effectiveness of school–enterprise collaboration in enhancing the quality of graduate employment through industry exposure, industry networks, and hands-on experience. As predicted by Social Capital Theory, students work cooperatively with enterprises to gain access to knowledge and resources in the workplace that facilitate career development. However, the findings also indicate that the SECE is effective to a certain extent because students internalize these experiences in the process of professional identity formation.

Professional Identity (PI) Mediates the Relationship between OTT and GEQ

The results indicate that professional identity is an important intervening variable between OTT

and graduate employment quality. This reflects the concept of Identity Theory, which proposes that people's career behaviors and outcomes are shaped by their career self-concept and commitment. Industry-oriented training and workplace learning strengthen students' work-based recognition and work orientation, thereby improving the quality of employment. The results build on earlier research by revealing that, in addition to enhancing skills, talent training also contributes to identity formation.

Professional Identity (PI) Mediates the Relationship between SECE and GEQ

The results also show that the relationship between SECE and the quality of graduate employment is mediated by professional identity. Students enhance their professional commitment and career understanding through workplace exposure, working with professionals, and real-world learning activities. The results of this study indicate that, in addition to practical experience, collaborative educational practices impact the quality of employment by influencing the psychological and professional development processes. In summary, this study highlights the role of professional identity as an important link between educational practice and sustainable employment outcomes.

Contribution and Practical Implications Theoretical Contributions

The literature on employability, the role of industry–education integration, and higher education has made several significant theoretical contributions to this study. First, this study enriches the scope of Human Capital Theory by introducing psychological mechanisms, such as professional identity, in addition to the influence of educational practices on the quality of graduates' employment. Second, this study aims to identify the impact of educational practices on the quality of graduates' employment, both directly and indirectly. Second, the study aims to identify the impact of educational practices on the quality of employment of graduates, both directly and indirectly, in addition to the influence of Human Capital Theory. The results show that Order-Oriented Talent Training (OTT) and School–Enterprise Collaborative Education (SECE) influence Graduate

Employment Quality (GEQ) through Professional Identity (PI), indicating that identity formation is an important mechanism between educational experiences and employment outcomes.

Second, this study contributes to Social Capital Theory by framing the school–enterprise relationship as a formal process for creating professional networks, mentorship, and workplace socialization. The results suggest that the positive indirect impact of a collaborative learning context on the quality of employment is realized by strengthening students’ professional identity and sense of professional belonging.

Third, this study contributes to the research on Identity Theory in the context of higher education by shifting professional identity from a dependent variable to an important mediating variable. The findings show that the role of a professional identity goes beyond merely being a complementing factor; it is one of the factors that explain the connection between education and employment quality.

Fourth, in this study, it is proposed that the three theories mentioned above, namely, Human Capital Theory, Social Capital Theory, and Identity Theory, be integrated into one conceptual framework. The framework sheds light on graduate employment quality by clarifying the interaction between structural factors (OTT), relational factors (SECE), and psychological factors (PI), which is more comprehensive than the previous framework for understanding talent cultivation and employment results in application-oriented higher education.

Finally, this study is a step in the right direction of employability literature by emphasizing the quality of employment rather than the number of jobs. Based on a multidimensional approach to the quality of graduate employment, this study addresses current policy and academic concerns over more sustainable and meaningful measures of employment quality, such as job matching, job satisfaction, salary, and career growth outcomes.

Practical Implications

The results have practical implications for universities, enterprises, and policymakers. First, higher education institutions must break out of the traditional paradigm of skills training and

integrate the identity formation of professionals into curriculum design, mentorship programs, and experiential learning programs. The development of identity-infused learning spaces can help increase students’ commitment to the profession and their long-term employment prospects.

Second, universities and enterprises need to further establish cooperative education, deepen institutional cooperation and linkage, and realize actual training in the workplace, such as co-developing courses, co-supervision, and co-teaching. It is important for enterprises to be proactively involved in students’ professional socialization and career development.

Third, policymakers should encourage employment policies to have a quality impact by adding graduate employment quality indicators to higher education evaluation systems. University–enterprise collaboration must be encouraged through policy support, focusing on future career development rather than only employment rates.

Finally, students should take proactive actions in career planning, internships, and professional development activities to enhance their career identity and the quality of their future jobs.

Future Research Directions

The following suggestions are offered as possible avenues for future research to further the results of this study and/or further understand the relationships between educational practice, professional identity, and the quality of graduates’ employment.

First, future research should broaden the study context by including various regions, institutional types, and cross-cultural settings. Comparative research between different application-oriented universities and/or vocational schools and international contexts would provide better generalizability and insight into the impact of cultural and institutional aspects on employment outcomes.

Second, as the study was conducted with a cross-sectional design, there is a need for future research to explore the development of professional identity over time and its implications for the long-term career outcomes. Tracking students from university entry to where they end up after graduation would provide more solid evidence of the causal relationships and sustainability of careers.

Third, other factors and variables can be added in the future, such as digital competencies, AI literacy, internship quality, career adaptability, labor market conditions, gender, academic discipline, and institutional characteristics. These variables can be used to better account for the quality of employment of graduates.

Fourth, future studies should adopt a mixed-method and multi-source perspective to minimize the constraints of self-reported data. A mixed approach of quantitative analysis and interviews, case studies, evaluations from employers, and internships could offer more comprehensive views of professional identity and employment outcomes.

Fifth, advanced analyses, including Structural Equation Modeling (SEM), multi-group analysis, measurement invariance testing, and longitudinal modeling, are suggested to strengthen the methodological rigor and validate the robustness of the proposed relationships.

Finally, future research could expand the existing theoretical model by incorporating other theories, such as Career Construction Theory, Self-Determination Theory, and digital transformation frameworks. This is particularly true for the impact of artificial intelligence, digitalization, and future changes in the labor market on professional identity and employment quality, which deserves further study.

Recommendation Agenda

The results indicate that universities should enhance the training of order-oriented talents and take steps to combine the industry-oriented curriculum, on-site simulation, and project learning with the needs of the labor market. HEIs and enterprises need to have sustainable collaboration mechanisms, such as co-developed courses, enterprise internship supervision, enterprise mentoring systems and frequent curriculum reviews by industry experts. Furthermore, universities need to provide structured professional identity development programs through career counseling, reflective learning activities, professional certification programs, and ongoing interaction with industry practitioners. Policymakers are urged to pursue industry–education integration in diverse ways, including providing targeted funding,

institutional incentives to support industry–education integration, and regional partnership platforms to strengthen graduates’ employability and sustainable career development.

Limitations and Future Research

This study had some limitations. First, the results of this study are only applicable to two application-oriented universities in Zhengzhou, China, which may limit the generalizability of the results. Future studies should include other institutional and wider cultural contexts.

Second, the cross-sectional design did not allow for the analysis of causal relationships and professional identity changes over time. Future studies should be conducted longitudinally.

Third, the study was based on self-reported data, which could potentially cause common method and social desirability biases. Future studies should include mixed methods and multi-source approaches.

Fourth, this study was conducted for OTT, SECE, PI, and GEQ, but other factors, such as digital competencies, AI literacy, career adaptability, and labor market conditions, could also affect employment outcomes and could be explored in future research.

Lastly, future research should use more sophisticated analytic techniques, such as Structural Equation Modeling (SEM) and multi-group analysis, to enhance method and model validation.

Conclusion

This study analyzes the correlation among order-oriented talent training (OTT), school–enterprise collaborative education (SECE), professional identity (PI), and graduate employment quality (GEQ) of students in application-oriented universities in Zhengzhou, Henan Province, China. The results support the positive roles of OTT and SECE in the quality of graduates’ employment and the mediating role of professional identity between collaborative educational practices and sustainable employment outcomes. This study builds on previous research on employability, focusing on the quality of employment, not just the number of jobs, and looking at the significance of psychological and professional development in higher education.

The results also show that industry–university integration is not merely a structural relationship between universities and enterprises but also a process that influences students’ understanding and recognition of their professional role, professional commitment, and adaptability in the workplace. Successful partnerships with businesses in applied education can improve students’ hands-on skills, employability, and prospective career growth.

In this world of digital transformation, automation, and shifting labor market needs, future employability problems will demand graduates to be technologically savvy and digitally adaptable, with the ability to be lifelong learners, interdisciplinary collaborators, and resilient professionals. Based on the analysis, it is believed that universities and enterprises should increase their efforts to build a system of cultivating talent with digital elements, such as work-integrated learning, industry-based innovation projects, and digital competence training, to better equip graduates for changes in the employment environment.

This research offers practical implications for the development of collaborative education systems and sustainable talent development strategies for policymakers, universities, and enterprises. Longitudinal and comparative studies in various institutional and regional settings are recommended for further investigation of the impact of digital transformation and new industry requirements on the development of professional identity and quality of graduates’ employment.

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