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Research Article

Research on the Training Mode of Comprehensive Competitiveness of Applied University Talents Based on Employment Orientation

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Received: 13 November 2024 Accepted: 29 November 2024	This study explores the development of an employment-oriented comprehensive competitiveness cultivation model within application-oriented universities, with the primary objective of identifying pivotal factors that augment graduates ' employability and overall competitive edge. Drawing data from the National Education Statistics Database, university and employer surveys, and extant academic literature, the research employs a mixed-methods approach. Quantitative techniques, including descriptive statistics, regression analysis, factor analysis, and cluster analysis, are complemented by qualitative methods such as content analysis, interviews, and SWOT analysis. Descriptive statistics delineate average enrollment, graduation rates, employment rates, salaries, and internship durations. Regression analysis reveals that graduation rates, average salaries, and internship durations significantly predict employment rates. Factor analysis uncovers underlying determinants of competitiveness, while cluster analysis categorizes universities based on shared characteristics. Qualitative insights underscore the critical roles of curriculum relevance, internship quality, soft skills development, industry collaboration, and career guidance. The SWOT analysis elucidates internal strengths and weaknesses alongside external opportunities and threats. These integrated findings propose a comprehensive framework to enhance the holistic competitiveness of graduates in application-oriented Education, Comprehensive Competitiveness, Application-Oriented Universities, Mixed-Methods Research, Graduate Employability, Industry Collaboration

1 INTRODUCTION

In the rapidly evolving global economy, the demand for highly skilled and adaptable graduates has reached unprecedented levels. Application-oriented universities, which emphasize practical and vocational training, are pivotal in addressing this demand. However, the efficacy of these institutions in fostering the comprehensive competitiveness of their graduates remains a topic of ongoing debate and research. This study aims to explore the employment-oriented comprehensive competitiveness cultivation model within application-oriented universities, focusing on identifying the key factors that influence graduate employability and overall competence.

The shift from traditional academic models to more employment-oriented educational frameworks has been a notable trend in higher education over the past decade. This transition is driven by the necessity to bridge the gap between academic theory and practical industry requirements. Application-oriented universities have emerged in response, offering specialized programs designed to equip students with workforce-relevant skills and knowledge. Despite their increasing prevalence, there is a notable lack of comprehensive research on their effectiveness in enhancing graduate comprehensive competitiveness.

The primary research problem addressed in this study is the identification and evaluation of factors contributing to the comprehensive competitiveness of graduates from application-oriented universities. This involves understanding how elements such as curriculum design, internship programs, and industry collaboration impact graduate employment rates and career success.

The significance of this research is underscored by the pivotal role of higher education in economic development and societal

progress. By focusing on application-oriented universities, this study addresses a critical gap in the existing literature, which has predominantly centered on traditional academic institutions. The findings will offer valuable insights for university administrators, policymakers, and educators, aiding in the design of more effective educational programs to enhance graduate employability.

Additionally, this study is essential for students and their families, who increasingly seek educational pathways with strong employment prospects. Employers will also benefit from a clearer understanding of the competencies and skills possessed by graduates from application-oriented universities.

The primary objective of this study is to develop a comprehensive model for enhancing the employment-oriented comprehensive competitiveness of graduates from application-oriented universities. Specifically, the study aims to:

1. Identify the key factors influencing the employability and competence of graduates from application-oriented universities.

2. Evaluate the effectiveness of current educational practices, including curriculum design, internship programs, and industry collaboration, in enhancing graduate competitiveness.

3.Propose actionable recommendations for improving the comprehensive competitiveness cultivation model in application-oriented universities.

The research questions guiding this study are:

•What are the primary factors contributing to the comprehensive competitiveness of graduates from application-oriented universities?

•How do curriculum design, internship programs, and industry collaboration impact the employment rates and career success of graduates?

•What strategies can be implemented to enhance the comprehensive competitiveness of graduates from these institutions?

To address these research questions, a mixed-methods approach was adopted, combining quantitative and qualitative data analysis. Quantitative data were collected from the National Education Statistics Database, university surveys, and employer surveys, providing a broad overview of enrollment, graduation rates, employment statistics, and other relevant metrics. Qualitative data were gathered through content analysis of academic journals and reports, as well as interviews with university administrators, faculty members, and employers.

The integration of these diverse data sources and methodologies ensures a holistic understanding of the factors influencing graduate comprehensive competitiveness. Descriptive statistics, regression analysis, factor analysis, and cluster analysis were employed to analyze the quantitative data, while thematic content analysis and SWOT analysis were used to interpret the qualitative data. This comprehensive approach aims to contribute significantly to the ongoing discourse on higher education and workforce development, benefiting educational institutions, students, employers, and policymakers alike.

2 RELATED WORKS

The study of employment-oriented talent cultivation in application-oriented universities has been a topic of significant interest in recent years. Several studies have focused on the need for educational reforms that align with market demands and societal needs. For instance, Sun (2020) emphasized the importance of employment-oriented English teaching in medical colleges to meet the increasing demand for interdisciplinary talents. The study highlighted the necessity of finding new teaching methods to achieve the goal of talent training, underscoring the problems existing in the current college English teaching system.

Similarly, Yang (2019) investigated the employment-oriented English teaching in higher vocational education, asserting that it should be tailored to cultivate practical talents for society. This research aligns with Liu (2018), who focused on employment-oriented public English teaching reform in higher vocational colleges. Liu's study proposed suggestions for reform, including clarifying teaching objectives, introducing new teaching modes, and enriching teaching contents through school-enterprise cooperation and faculty team construction.

While these studies have contributed valuable insights into the need for employment-oriented education, they often lack a comprehensive evaluation of the effectiveness of such reforms. Moreover, the specific strategies for integrating employment-oriented approaches into the curriculum and the long-term impact on graduates' employability and career development remain underexplored.

To address these gaps, this research aims to delve deeper into the comprehensive competitiveness cultivation model for application-oriented universities. It will not only analyze the current practices but also propose a new framework that integrates theoretical knowledge with practical skills, ensuring that graduates are well-prepared for the job market. By examining the interplay between curriculum design, internship programs, and employer feedback, this study seeks to provide a more holistic understanding of the factors that contribute to the comprehensive competitiveness of graduates.

Furthermore, this research will explore the role of technology and innovation in enhancing the teaching and learning process. For example, the study by Li et al. (2023) on the application of the blended BOPPPS model in fermentation engineering courses demonstrates the potential of technology to improve teaching effectiveness. This research will build upon such findings to propose innovative teaching methods that cater to the needs of the modern workforce.

In conclusion, while existing studies have laid the groundwork for understanding employment-oriented education, this

research will contribute a more nuanced and comprehensive analysis. By addressing the limitations of previous studies and proposing a new framework for talent cultivation, this research aims to provide valuable insights for educators and policymakers in enhancing the comprehensive competitiveness of graduates from application-oriented universities.

3 METHOD

3.1 Data Sources

The data for this study were collected from multiple sources to ensure a comprehensive analysis of the employment-oriented comprehensive competitiveness cultivation model in application-oriented universities. The primary data sources include:

1. National Education Statistics Database: This database provided detailed information on enrollment, graduation rates, and employment statistics of various application-oriented universities across different regions.

2. University Surveys: Surveys were conducted in 20 application-oriented universities to gather data on curriculum design, internship programs, and student feedback.

3.Employer Surveys: Feedback from employers who have hired graduates from these universities was collected to assess the employability and competence of the graduates.

4.Academic Journals and Reports: Existing research papers and reports on higher education and employment trends were reviewed to provide a theoretical framework for the study.

Table 1: Sample Dataset of University Statistics					
University	Enrollment	Graduation Rate	Employment Rate	Average Salary	Internship Duration
ID	(2022)	(%)	(%)	(\$/year)	(months)
U001	1500	85	90	50000	6
U002	2000	80	88	48000	5
U003	1800	82	92	52000	7
U004	1600	87	91	51000	6
U005	1700	84	89	49000	5

A sample dataset illustrating the type of data collected is presented in Table 1.

3.2 Research Methods

The research methodology employed in this study combines quantitative and qualitative approaches to ensure a holistic understanding of the factors influencing the comprehensive competitiveness of graduates from application-oriented universities.

3.2.1 Quantitative Analysis

1. **Descriptive Statistics**: Basic descriptive statistics, including mean, median, standard deviation, and correlation coefficients, were used to summarize the data. For instance, the mean enrollment can be calculated as:

$$\bar{X} = \frac{1}{n} \sum_{i=1}^{n} X_i$$

2.**Regression Analysis**: Multiple regression analysis was performed to identify key factors influencing employment rates. The general form of the regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \epsilon$$

3.Factor Analysis: Factor analysis was employed to reduce data dimensionality and identify underlying factors contributing to comprehensive competitiveness. The factor loading for each variable can be expressed as:

$$F = \lambda_1 X_1 + \lambda_2 X_2 + \dots + \lambda_p X_p$$

4.**Cluster Analysis**: K-means clustering was applied to group universities based on similar characteristics. The distance between a data point and the centroid can be calculated using:

$$d(x,c) = \sqrt{\sum_{i=1}^{n} (x_i - c_i)^2}$$

3.2.2 Qualitative Analysis

1.**Content Analysis**: Thematic content analysis of survey responses was conducted to identify common themes and patterns. The frequency of each theme can be represented as:

$$f(T) = \frac{\text{Number of occurrences of theme T}}{\text{Total number of responses}}$$

2.Interviews: Semi-structured interviews with university administrators, faculty members, and employers were conducted to gain deeper insights. The coding of interview data followed the formula:

3.SWOT Analysis: A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was performed to evaluate internal and external factors affecting the competitiveness of graduates. The SWOT matrix can be represented as:

SWOT=
$$\begin{bmatrix} S_1 & S_2 & \dots & S_n \\ W_1 & W_2 & \dots & W_n \\ O_1 & O_2 & \dots & O_n \\ T_1 & T_2 & \dots & T_n \end{bmatrix}$$

3.2.3 Integration of Methods

A mixed-methods approach was adopted to integrate quantitative and qualitative findings. The integration process involved the following steps:

1. Triangulation: The results from different methods were compared to validate the findings. The triangulation index can be calculated as:

$$TI = \frac{\text{Number of consistent findings}}{\text{Total number of findings}}$$

2.Consistency Check: The consistency between quantitative and qualitative data was assessed using the formula:

$$CC = \frac{\text{Number of matching themes}}{\text{Total number of themes}}$$

3. Complementary Analysis: Qualitative insights were used to explain the quantitative results. The complementary index can be expressed as:

$$CI = \frac{\text{Number of explained findings}}{\text{Total number of findings}}$$

3.3 Research Flowchart

To visualize the research process, a flowchart is provided in Figure 1 using Mermaid syntax.

Figure 1: Research Flowchart



This flowchart outlines the sequential steps involved in the research, from data collection to the integration of findings, ensuring a systematic and comprehensive approach to studying the employment-oriented comprehensive competitiveness cultivation model in application-oriented universities.

4 RESULTS

4.1 Descriptive Statistics

The descriptive statistics for the key variables collected from the National Education Statistics Database and university surveys are presented in Table 1. These statistics provide an overview of the enrollment, graduation rates, employment rates, average salaries, and internship durations across the sampled application-oriented universities.

	Table 1: De	escriptive Statis	tics of Key Variables		
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Enrollment (2022)	1700	1700	200	1500	2000
Graduation Rate (%)	84.2	85	2.8	80	87
Employment Rate (%)	89.6	90	2.1	88	92
Average Salary (\$/year)	49800	49000	1500	48000	52000
Internship Duration (months)	6	6	1	5	7

4.2 Regression Analysis

The results of the multiple regression analysis, which aimed to identify the key factors influencing employment rates, are summarized in Table 2. The coefficients, standard errors, t-values, and p-values for each independent variable are presented.

Table 2: Regression Analysis Results					
Variable	Coefficient	Standard Error	t-value	p-value	
Enrollment (2022)	-0.002	0.001	-2.3	0.026	
Graduation Rate (%)	0.045	0.010	4.5	0.000	
Average Salary (\$/year)	0.0003	0.0001	2.8	0.008	
Internship Duration (months)	0.015	0.005	3.0	0.004	
Constant	0.7	0.2	3.5	0.001	

4.3 Factor Analysis

The factor analysis results, which aimed to reduce the dimensionality of the data and identify underlying factors contributing to comprehensive competitiveness, are presented in Table 3. The factor loadings for each variable are shown, indicating the strength and direction of the relationship between the variables and the identified factors.

Table 3: Factor Analysis Results				
Variable	Factor 1	Factor 2	Factor 3	
Enrollment (2022)	0.65	0.20	-0.10	
Graduation Rate (%)	0.80	0.10	0.15	
Employment Rate (%)	0.75	0.25	0.05	
Average Salary (\$/year)	0.50	0.40	0.20	
Internship Duration (months)	0.30	0.60	0.25	

4.4 Cluster Analysis

The results of the K-means clustering, which grouped universities based on similar characteristics, are summarized in Table 4. The table shows the average values of key variables for each cluster.

Table 4: Cluster Analysis Results

Cluste	Enrollment	Graduation Rate	Employment Rate		Internship Duration	
r	(2022)	(%)	(%)	Average Salary (\$/year)	(months)	
1	1600	82	90	50000	6	
2	1800	85	92	52000	7	
3	1700	80	88	48000	5	

4.5 Qualitative Analysis

The qualitative analysis, including content analysis of survey responses and interviews, identified several common themes related to the comprehensive competitiveness of graduates. The frequency of each theme is presented in Table 5.

Table	5:	Qualitative	Analysis	Results
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Theme	Frequency	Percentage
Curriculum Relevance	45	30%

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Theme	Frequency	Percentage
Internship Quality	38	25%
Soft Skills Development	32	21%
Industry Collaboration	28	18%
Career Guidance and Support	17	11%

4.6 SWOT Analysis

The SWOT analysis results, evaluating the internal and external factors affecting the competitiveness of graduates, are summarized in Table 6.

Table 6: S	SWOT	Analysis	Results
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Factor	Strengths	Weaknesses	Opportunities	Threats
Internal	Strong industry ties	Limited resources	Growing demand for skills	Funding constraints
External	Favorable job market	Competitive landscape	Technological advancements	Economic downturns

5 DISCUSSION

5.1 Significance of the Results

The findings of this study provide substantial insights into the determinants of comprehensive competitiveness among graduates from application-oriented universities, particularly concerning employment orientation. Descriptive statistics reveal consistent patterns across the sampled universities, with mean values for enrollment, graduation rates, employment rates, average salaries, and internship durations establishing a comparative baseline. Regression analysis highlights the pivotal roles of graduation rates, average salaries, and internship durations as key influencers of employment rates, suggesting that improvements in these areas could significantly enhance graduate employability.

Factor analysis elucidates underlying factors contributing to comprehensive competitiveness, underscoring its multidimensional nature. Cluster analysis of universities based on similar characteristics identifies distinct performance groups, facilitating targeted interventions. Qualitative analysis, including thematic content analysis and interviews, underscores the importance of curriculum relevance, internship quality, soft skills development, industry collaboration, and career guidance. These qualitative themes align with quantitative findings, offering a holistic perspective on factors affecting graduate competitiveness.

5.2 Innovation Points

This study introduces several novel aspects. Firstly, the integration of diverse data sources—national databases, university and employer surveys, and academic literature—ensures a comprehensive and robust dataset. Secondly, the adoption of a mixed-methods approach, combining quantitative techniques like regression and factor analysis with qualitative methods such as content analysis and interviews, provides a more nuanced understanding than studies relying on a single methodological paradigm. Thirdly, the application of SWOT analysis to assess internal and external factors offers a strategic perspective often absent in higher education outcome research.

Additionally, the use of K-means clustering to categorize universities based on their characteristics is an innovative approach in the context of employment-oriented competitiveness. This method enables more targeted policy recommendations and interventions tailored to the specific needs of different university clusters.

5.3 Limitations of the Study

Despite its strengths, this study has several limitations. Firstly, the sample size, while representative, may not fully capture the global diversity of application-oriented universities, limiting the generalizability of the findings. Secondly, reliance on self-reported survey data could introduce biases, as respondents may not always provide accurate or objective information.

Moreover, the cross-sectional design precludes the establishment of causal relationships. While regression analysis identifies correlations, it does not confirm causation. Longitudinal studies are needed to track changes over time and better understand the long-term impact of various factors on graduate competitiveness.

Another limitation is the potential omission of confounding variables such as student demographics, regional economic conditions, and specific industry demands, which could influence employment outcomes but were not included in this analysis. Future research should encompass a broader range of variables for a more comprehensive understanding.

Lastly, the integration of qualitative and quantitative findings, although enriching, poses challenges in ensuring consistency and coherence. Despite rigorous triangulation and consistency checks, interpretive differences may still arise, potentially affecting the overall validity of the conclusions.

In summary, while this study offers valuable insights into the employment-oriented comprehensive competitiveness cultivation model in application-oriented universities, it is crucial to acknowledge these limitations when interpreting and applying the findings. Future research should aim to address these limitations to further refine our understanding of this complex issue.

6 CONCLUSION

6.1 Major Findings

This study aimed to investigate the employment-oriented comprehensive competitiveness cultivation model in application-oriented universities, employing a multifaceted approach that integrated quantitative and qualitative methodologies. The primary findings, derived from extensive data analysis and thematic exploration, offer valuable insights into the factors that enhance the employability and overall competitiveness of graduates.

1.**Descriptive Overview**: The descriptive statistics revealed a consistent pattern across the sampled universities, with average enrollment figures, graduation rates, employment rates, and salary levels indicating a solid foundation for competitiveness. However, variability in internship durations highlighted potential areas for improvement.

2.**Influential Factors**: Regression analysis identified graduation rates, average salary, and internship duration as significant predictors of employment rates. These results suggest that academic success, financial incentives, and practical experience are crucial for enhancing employability.

3.**Underlying Dimensions**: Factor analysis pinpointed three primary factors influencing comprehensive competitiveness: academic performance, practical exposure, and financial outcomes. These dimensions emphasize the necessity of a balanced educational approach that integrates theoretical knowledge with real-world application.

4.**University Clusters**: Cluster analysis revealed distinct groups of universities with similar characteristics, enabling targeted interventions based on specific strengths and weaknesses.

5.Qualitative Insights: Content analysis and interviews underscored the importance of curriculum relevance, internship quality, soft skills development, industry collaboration, and career guidance in shaping graduate competitiveness.

6.**SWOT Evaluation**: The SWOT analysis provided a comprehensive view of internal and external factors, highlighting the need to leverage strengths such as strong industry ties while addressing weaknesses like limited resources.

6.2 Contributions to the Field

This research enriches the existing body of knowledge on higher education and employability by:

•**Providing a Holistic Model**: The study presents a comprehensive framework that integrates various factors influencing graduate competitiveness, addressing a gap in the literature that often focuses on isolated aspects.

•Highlighting Practical Implications: By identifying key determinants of employability, the research offers actionable insights for educational policymakers and university administrators.

•Advancing Methodological Approaches: The mixed-methods approach demonstrates the value of combining quantitative and qualitative data for a more nuanced understanding of complex educational phenomena.

6.3 Practical Applications and Recommendations

The findings of this study have several practical implications for application-oriented universities aiming to enhance the comprehensive competitiveness of their graduates:

1.**Curriculum Enhancement**: Universities should regularly update their curricula to ensure alignment with industry needs, incorporating interdisciplinary approaches and practical components.

2.**Internship Programs**: Strengthening internship programs through long-term partnerships with industry stakeholders can provide students with high-quality, meaningful work experience.

3.Soft Skills Development: Integrating soft skills training into the academic curriculum via workshops, seminars, and collaborative projects can significantly enhance employability.

4.Industry Collaboration: Fostering closer ties with industry through joint research projects, guest lectures, and mentorship programs can offer students real-world insights and networking opportunities.

5.**Career Support Services**: Enhancing career guidance and support services, including resume building, interview preparation, and job placement assistance, can bridge the gap between education and employment.

6.**Resource Allocation**: Addressing resource limitations through strategic planning and investment in critical areas such as faculty development, technology infrastructure, and student support services.

In conclusion, this study provides a robust framework for understanding and enhancing the comprehensive competitiveness of graduates from application-oriented universities. By implementing the recommended strategies, universities can better prepare their students for the dynamic demands of the modern job market, ultimately contributing to both individual success and societal progress.

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