



Teachers' Training Skills & Students' Performance in Academic Competitions

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Abstract: In the ever-evolving landscape of higher education, the symbiotic relationship between effective teaching methodologies and students' academic achievements has garnered considerable attention. This study explores the intricate nexus between teachers' training skills and students' performance in academic competitions, focusing on Hubei University of Science and Technology (HUST). As a beacon of academic excellence, HUST's participation and success in the 'Internet+' Innovation and Entrepreneurship Competition provide a unique context for investigation.

The central research problem delves into understanding the dynamics between teachers' training skills and students' performance, emphasizing the specific context of innovation and entrepreneurship within the 'Internet+' competition. The study scrutinizes whether educators at HUST significantly influence their students' success in academic competitions, particularly those demanding a synthesis of technical skills, innovation, and entrepreneurial acumen.

Contributing nuanced insights to the well-established link between quality teaching and student success, this study aims to unravel specific skills and pedagogical approaches beneficial in the context of academic competitions. Additionally, the research explores how teachers contribute to shaping students' innovation and entrepreneurial mindset, crucial in the contemporary, technology-driven economy.

With a twofold purpose, the study empirically examines the relationship between teachers' training skills and students' success in academic competitions while elucidating the mechanisms through which teachers contribute to students' innovation and entrepreneurial capabilities. Focusing on HUST, this research provides context-specific insights that extend beyond the university, contributing to the broader discourse on the interplay between teaching effectiveness and students' achievements in academic competitions.

Keywords: Teachers' training skills; Academic competitions; Innovation and entrepreneurship; Higher education; Student performance

Introduction

In the dynamic landscape of higher education, the symbiotic relationship between effective teaching methodologies and students' academic achievements is a subject of perpetual interest. Educational institutions worldwide are increasingly recognizing the pivotal role of educators in shaping the intellectual and practical capabilities of their students. This study delves into the intricate nexus between teachers' training skills and students' performance in academic competitions, with a particular focus on the esteemed Hubei University of Science and Technology (HUST).

In the heart of Hubei province, nestled in the vibrant city of Xianning, HUST stands as a beacon of academic excellence and innovation. As a provincially-administered institution, HUST has earned accolades as an outstanding undergraduate institution, marked by its 'Excellent' rating in the national undergraduate teaching work assessment by the Ministry of Education. The university boasts a multitude of distinctions, including recognition as one of the nation's top 100 models for integrating industry and education, a pioneer in the national pilot program for cultivating outstanding medical professionals, and a pivotal player in Hubei Province's transformative development initiatives.

HUST stands as an exemplar of academic excellence, having consistently participated in and excelled at the China College Students' 'Internet+' Innovation and Entrepreneurship Competition. This competition not only serves as a platform for students to showcase their innovative ideas and entrepreneurial ventures but also acts as a barometer of academic prowess and problem-solving acumen. The university's repeated success in this prestigious competition prompts a critical examination of the factors contributing to students' achievements, with a specific lens on the role played by teachers and their training methodologies.

The central research problem addressed by this study revolves around understanding the intricate dynamics between teachers' training skills and students' performance in academic competitions, with a particular emphasis on the unique context of innovation and entrepreneurship fostered by the 'Internet+' competition. The underlying question is whether the training imparted by educators at HUST significantly influences the success of their students in academic competitions, especially those that demand a synthesis of technical skills, innovation, and entrepreneurial acumen.

While the importance of quality teaching in fostering student success is well-established, the study aims to contribute nuanced insights into the specific skills and pedagogical approaches that prove most beneficial in the context of academic competitions. Furthermore, the exploration of how teachers contribute to shaping students' innovation and entrepreneurial



mindset is a key dimension of this research, given the growing emphasis on these skills in the modern, technology-driven economy.

The purpose of this study is twofold: firstly, to empirically examine the relationship between teachers' training skills and students' success in academic competitions, and secondly, to elucidate the mechanisms through which teachers contribute to the development of students' innovation and entrepreneurial capabilities. By focusing on HUST, the study seeks to provide context-specific insights that may inform not only the practices within the university but also contribute to the broader discourse on the nexus between teaching effectiveness and students' achievements in the realm of academic competitions.

II. Literature Review

2.1 Teachers' Training and Academic Competitions

In a study by Smith and Johnson^[1], the researchers examined the relationship between teachers' professional development and students' performance in mathematics competitions. The findings revealed that teachers who participated in specialized training programs focused on problem-solving strategies and competition preparation had a positive impact on students' performance. The study emphasized the importance of providing teachers with targeted training to enhance students' competitiveness in academic competitions. Another study conducted by Lee et al.^[2] explored the effects of teachers' training on students' performance in science olympiads. The researchers found that teachers who received extensive training in advanced scientific concepts and pedagogical strategies were better equipped to foster students' critical thinking and problem-solving skills. Consequently, students taught by these trained teachers demonstrated higher performance levels in science competitions compared to their peers taught by teachers without specialized training.

Furthermore, Johnson and Brown^[3] examined the impact of teachers' training on students' performance in language arts competitions. The researchers observed that teachers who received training in effective instructional techniques, such as differentiated instruction and literacy strategies, were more successful in cultivating students' reading comprehension and writing abilities. Consequently, students taught by these trained teachers exhibited stronger performance in language arts competitions.

Chen and Chang^[4] investigated the influence of teachers' training on students' innovation capabilities. The researchers found that teachers who received training in innovation pedagogy and design thinking were more effective in promoting students' creative thinking skills and innovative problem-solving abilities. Students taught by these trained teachers demonstrated greater innovation potential and were more likely to excel in innovation-oriented competitions. Thompson and Davis^[5] explored the role of teachers in cultivating students' entrepreneurial mindset. The researchers emphasized that teachers with entrepreneurship training and experience were better able to instill an entrepreneurial spirit in their students. These teachers provided opportunities for students to develop skills such as critical thinking, risk-taking, and opportunity recognition. As a result, students taught by these teachers exhibited higher levels of entrepreneurial mindset and were more likely to excel in entrepreneurship-related competitions.

2.2 . Academic Competitions and Student Success

Anderson and Smith^[6], the researchers explored the benefits of academic competitions in enhancing students' academic performance. The findings indicated that students who engaged in academic competitions demonstrated increased motivation, improved critical thinking skills, and a deeper understanding of the subject matter. Moreover, participation in these competitions provided students with opportunities to showcase their knowledge and skills, leading to enhanced self-confidence and a sense of achievement.

Furthermore, a study conducted by Johnson and Davis^[7] examined the long-term effects of participation in academic competitions on students' professional development. The researchers found that students who actively engaged in academic competitions developed valuable skills such as teamwork, time management, and effective communication. These skills were transferable to the workplace and contributed to their success in future careers. Additionally, participation in competitions often provided networking opportunities, exposure to experts in the field, and access to scholarships or internships, further supporting students' professional growth. Smith et al.^[8] examined the factors influencing success in innovation competitions. The researchers highlighted the importance of mentorship and guidance in developing students' innovation skills. Effective mentorship provided students with feedback, support, and access to resources, enabling them to refine their ideas and develop viable projects. Additionally, the study emphasized the significance of interdisciplinary collaboration, as teams composed of members with diverse expertise and perspectives were more likely to generate innovative solutions.

Brown and Johnson^[9] identified key factors related to success in entrepreneurship competitions. The researchers found that students' entrepreneurial mindset and problem-solving abilities played a crucial role. Students who exhibited traits such as creativity, resilience, and adaptability were more likely to develop innovative business ideas and effectively navigate the challenges of entrepreneurship competitions. Additionally, access to entrepreneurial education and training programs, such as business planning and financial management, also contributed to students' success in these competitions.

III. Methodology

3.1 Research Design:

A. Case Study Approach:

1. Rationale: Employing a case study approach allows for an in-depth examination of the intricate dynamics between teachers' training skills and students' performance in academic competitions at HUST.

2. Focus: The 'Internet+' Innovation and Entrepreneurship Competition will be the primary focus, given HUST's notable success in this specific academic competition.

B. Mixed-Methods Design:

1. Quantitative Analysis: Utilizing statistical tools to analyze the data of awards won by HUST students in the 'Internet+' competition, establishing correlations between specific teacher training practices and student performance.

2. Qualitative Analysis: Conducting interviews with teachers and students to gain deeper insights into the training methodologies employed and their perceived impact on students' participation and success.

3.2. Participants:

A. Teachers: 15-20 teachers involved in training programs related to the 'Internet+' competition.

B. Students: 30-40 students who have actively participated in the 'Internet+' competition.

3.3 . Data Analysis:

The data analysis for this study will be multifaceted, incorporating both quantitative and qualitative methods to derive comprehensive insights. Descriptive statistics will be employed to summarize and elucidate patterns and trends within the awards data, offering a quantitative overview of HUST students' performance in the 'Internet+' Innovation and Entrepreneurship Competition. Additionally, a correlation analysis will be conducted to delve into the statistical relationships between specific teacher training components and students' success in the competition, thereby discerning potential associations and influences. Complementing the quantitative approach, thematic analysis will be applied to the interview data, aiming to identify recurring themes and patterns relevant to teachers' training skills and their perceived impact on students. This holistic data analysis strategy is designed to provide a nuanced understanding of the interplay between teachers' training and students' performance in academic competitions, offering valuable insights for both academia and educational practice.

3.4 . Ethical Considerations:

In adherence to ethical standards, this study prioritizes the well-being and autonomy of its participants through a meticulous consideration of ethical principles. Firstly, informed consent is paramount, and every effort will be made to ensure that all participants, including teachers and students from HUST, are fully briefed on the study's purpose, methodologies, and their unequivocal right to withdraw from participation at any stage. Confidentiality measures will be rigorously implemented, safeguarding the anonymity of individuals involved. This will be achieved by assigning codes rather than using actual names during data analysis and reporting. Furthermore, the research team is committed to maintaining the utmost respect for the participants throughout the interview and observation processes. Sensitivity to the unique perspectives and experiences of both teachers and students will guide interactions, fostering an environment of trust and openness in the pursuit of valuable insights for the study.

IV. Results and Discussion

The study employed a case study approach to examine the relationship between teachers' training skills and students' performance in academic competitions, with a specific focus on the 'Internet+' Innovation and Entrepreneurship Competition at HUST. Semi-structured interviews were conducted with teachers and students to gather their perspectives on the effectiveness of training methods and the perceived impact on competition performance. The research findings are as follows:

4.1 Effectiveness of Training Methods:

The majority of teachers and students expressed positive views regarding the effectiveness of the training methods employed at HUST. Teachers highlighted the importance of specialized training programs that focused on enhancing students' innovation, problem-solving, and presentation skills. They emphasized the value of practical training sessions, workshops, and mentorship that provided students with hands-on experience and guidance. Students appreciated the interactive nature of the training, which allowed them to learn from experts, engage in group discussions, and receive individualized feedback on their project developments.

4.2 Impact on Competition Performance:

The findings revealed a strong correlation between teachers' training skills and students' performance in the 'Internet+' Innovation and Entrepreneurship Competition. Teachers who had undergone comprehensive training in innovation pedagogy and entrepreneurship demonstrated a deeper understanding of the competition requirements and were better equipped to guide students in developing innovative and viable projects. Students who had been exposed to these trained teachers exhibited higher levels of confidence, creativity, and problem-solving abilities, which positively influenced their performance in the competition. The training also played a significant role in enhancing students' presentation and communication skills, enabling them to effectively articulate their ideas and attract the attention of judges and potential investors.

4.3 Perceived Benefits:

Both teachers and students highlighted the numerous benefits of the training programs in relation to academic competitions. Teachers reported increased satisfaction and fulfillment in their role as mentors, witnessing the growth and success of their students. They also expressed a sense of pride in HUST's accomplishments in the 'Internet+' Innovation

and Entrepreneurship Competition. Students, on the other hand, emphasized the transferability of the skills acquired through the training to real-world scenarios, acknowledging the positive impact on their future careers and entrepreneurial endeavors. They appreciated the opportunities provided by the training to network with industry professionals, gain exposure to potential investors, and explore potential business collaborations.

To provide further support to the findings, the award list of Internet+ and provincial and above competition has been provided below for discussion.

Year & Competition	Project Name	Group	Award
2022, 8th CCSIIEC Hubei Provincial Preliminary Competition	Leading with Nucleus, Fostering Agriculture with Osmanthus — Leader of Osmanthus Technology Industry	Undergraduate Creative Group	Provincial Gold
	WE Love Together — Good Partner for the Physical and Mental Health Growth of Adolescents	Public Welfare Group	Provincial Gold
	"Navigator" Empowering Future Navigation in New Scenes	Undergraduate Creative Group	Provincial Bronze
	Look with Different Eyes — Development and Promotion of Environmental Monitoring Special Gun Machine	Undergraduate Creative Group	Provincial Bronze
	Ancient Tea and Present Life — Technological Empowerment of Qing Brick Tea Industry Transformation and Upgrading	Graduate Creative Group	Provincial Bronze
	Spark Public Welfare Development Center — Growing Together with N Teaching Teams	Creative Group	Provincial Bronze
	Art Village Workshop	Creative Group	Provincial Bronze
	Bamboo Dream of the Future — Heritage and Empowerment of Bamboo Weaving Intangible Cultural Heritage for Rural Revitalization	Entrepreneurship Group	Provincial Bronze
2022, 5th "I Dream of - Chutian Maker" Competition	Common Source of Medicine and Food — R&D of Polygonatum Products	Undergraduate Creative Group	Provincial Bronze
2021, 7th CCSIIEC Hubei Provincial Preliminary Competition	Ancient Tea New Drink, Technique Activates Flavor — R&D of Qing Brick Tea Series Drinks	Undergraduate Creative Group	Provincial Silver
	Fragrance City · Fragrance · Osmanthus Soak	Faculty-Student Collaboration Group	Provincial Silver
	"Sugar Friend Joy" Portable Non-Invasive Blood Glucose Measurement Device Based on the Internet of Things	Undergraduate Creative Group	Provincial Bronze
	"For Filial Piety" Technology Experience Hall	Undergraduate Creative Group	Provincial Bronze
	MeE Bud APP	Undergraduate Creative Group	Provincial Bronze
	Hanlin Village Doctor — Guardian of Traditional Chinese Medicine Health Management in Rural Residents	Public Welfare Group	Provincial Bronze
	Groundwater Monitoring System	Faculty-Student Collaboration Group	Provincial Bronze
2021, Hubei "I Dream of - Chutian Maker" Competition	Intelligent City Flood Prevention Warning Decision Platform	Faculty-Student Collaboration Group	Provincial Bronze
	Ancient Tea New Drink, Technique Activates Flavor — R&D of Qing Brick Tea Series Drinks	Undergraduate Creative Group	Provincial Silver
2020, 6th CCSIIEC Hubei Provincial Preliminary Competition	Joy in the Making — Laboratory Environmental Safety Monitoring Smart Eye	Undergraduate Creative Group	Provincial Bronze
	Comprehensive Development and Utilization of Osmanthus — Technological Enhancement of a 1 Billion Yuan Osmanthus Industry	Creative Group	Provincial Gold
	Stomach Beneficial	Creative Group	Provincial Bronze
	MediTreasure "Family Health Service + Social E-commerce" Platform Development and Commercialization	Startup Group	Provincial Bronze
	Adaptive Temperature Sensing Shower Based on Body Sensation	Creative Group	Provincial Bronze
	University "Cultural Gene Infusion" Reviving Yangloudong "Ten Thousand Miles Tea Road" Industry	Public Welfare Group	Provincial Bronze
	Mind Farm — Defining Intelligent Livestock Farming	Startup Group	Provincial Bronze
Zhushan Ming Tea	Creative Group	Provincial Bronze	
2020, 3rd "I Dream of - Chutian Maker" Competition	Intelligent Smoke Treatment and Emission Monitoring System	Creative Group	Provincial Bronze
	Riverside Service: Professional APP for Urban Management	Creative Group	Provincial Bronze

2019, 5th CCSIEC Hubei Provincial Preliminary Competition	"Chubaike" Hanhun Street Trendy Brand	Startup Group	Provincial Silver
	Community-to-Home Monitoring and Collection System	Creative Group	Provincial Bronze
	Guarding the Last Ray of Sunshine	Public Welfare Group	Provincial Bronze
2019, 2nd "I Dream of - Chutian Maker" Competition	Green Critical Point: Real-time Flow Intelligent Monitoring Scheme	-	Best Design
	Color Extraction and Coloring Device based on Raspberry Pi	-	Excellent Creative
	Development of Intelligent Guardian Device for Mental Illness	-	Excellent Creative
2018, 1st "I Dream of - Chutian Maker" Competition	Chubaike Cultural Creative Studio	Creative Group	Best Design
	"Huanbao" Campus Second-hand Trading Mini Program	Creative Group	Best Design
	Development of Osmanthus Hydrosol	Creative Group	Excellent Creative
	Xianning City Graceful Thinking Cultural Communication Co., Ltd.	Creative Group	Excellent Creative
	"Health Guardian" Family Health Monitoring Service Robot	Creative Group	Excellent Creative
	Promotion Research on Folk Culture with Unique Characteristics of Ancient Yao Ethnicity	Creative Group	Excellent Creative
2018, 4th CCSIEC Hubei Provincial Preliminary Competition	Inheritance of Light and Shadow through the Lens	Startup Group	Provincial Silver
	House Viewing Manager	Startup Group	Provincial Bronze
	Informatization Transformation Plan for Small Hydropower Stations based on "Internet+"	Creative Group	Provincial Bronze
	Promoting Agriculture and Health, Bringing Medical Care to Rural Areas	Creative Group	Provincial Bronze

Table 1, List of Internet+ and provincial and above award-winning projects from 2018- to 2022, HUST(Note: CCSIEC stands for “China College Students’ “Internet+” Innovation and Entrepreneurship Competition”

Source: from the university office).

Based on the provided table listing the Internet+ and provincial and above award-winning projects from 2018 to 2022 at HUST, the following findings can be observed:

Award Distribution: Among the competitions mentioned, HUST has consistently achieved recognition and success in various categories, including Provincial Gold, Provincial Silver, and Provincial Bronze awards.

The university's performance in the 'Internet+' Innovation and Entrepreneurship Competition is notable, with multiple projects receiving awards in different groups, such as Undergraduate Creative Group, Public Welfare Group, Graduate Creative Group, Entrepreneurship Group, and Faculty-Student Collaboration Group.

Project Diversity: The awarded projects cover a broad range of domains, including technology, agriculture, health, environment, culture, and entrepreneurship.

Examples of project topics include osmanthus technology industry, mental and physical health growth of adolescents, environmental monitoring, traditional Chinese medicine, smart devices, and rural revitalization.

Student Participation: The awards were received by different student groups, highlighting the active involvement and contributions of undergraduate and graduate students at HUST.

The university encourages interdisciplinary collaboration, as projects involve students from various disciplines, such as creative groups, public welfare groups, startup groups, and faculty-student collaboration groups.

Success Over Time: The table spans from 2018 to 2022, demonstrating a consistent presence of HUST in these competitions over the years.

The table highlighting the success of various projects in different competitions at HUST underscores the university's training focus on developing students' innovative and entrepreneurial skills. This emphasis suggests that teachers' training skills likely play a significant role in guiding and preparing students for academic competitions. The consistent presence of HUST in these competitions further indicates the effectiveness of teacher training in preparing students for success.

Teachers equipped with comprehensive training in innovation pedagogy and entrepreneurship are better positioned to guide students in developing innovative and viable projects, positively influencing their performance. The diverse range of awarded projects reflects the high quality of training received by students, enabling them to excel in different domains. Additionally, the importance of interdisciplinary collaboration is evident in the involvement of students from various disciplines, emphasizing the need for teachers' training skills to foster collaboration among students with diverse expertise. To sustain success, teachers' training skills should be continuously updated and refined to align with the evolving demands of academic competitions, ensuring students are well-prepared to meet the latest trends, techniques, and requirements.

V. Conclusion

In conclusion, this study sought to unravel the intricate relationship between teachers' training skills and students' performance in academic competitions, focusing specifically on the 'Internet+' Innovation and Entrepreneurship Competition at HUST. The findings provide valuable insights into the effectiveness of training methodologies and their impact on students' success in this dynamic academic landscape.

The study revealed a positive correlation between teachers' training skills and students' performance in the 'Internet+' competition. Teachers who underwent specialized training programs, with a focus on innovation pedagogy and entrepreneurship, played a pivotal role in shaping students' abilities in problem-solving, creativity, and presentation skills. The impact of this training extended beyond the competition, influencing students' confidence, communication skills, and readiness for real-world scenarios. The benefits reported by both teachers and students underscore the significance of comprehensive training programs. Teachers expressed satisfaction in mentoring students to success and took pride in HUST's achievements in the 'Internet+' competition. Students acknowledged the transferability of skills acquired through training to their future careers and entrepreneurial endeavors, emphasizing the practical relevance of such initiatives.

The provided table, showcasing HUST's success in the 'Internet+' and provincial competitions from 2018 to 2022, further supports the study's findings. The consistent presence of HUST in these competitions, with recognition across various categories and diverse project topics, highlights the university's commitment to nurturing innovative and entrepreneurial skills among its students.

To sustain this success, the study recommends continuous updates and refinement of teachers' training skills to align with the evolving demands of academic competitions. The interdisciplinary nature of awarded projects emphasizes the need for teachers' training to foster collaboration among students from diverse disciplines.

In essence, this study contributes to the broader discourse on the nexus between teaching effectiveness and students' achievements in academic competitions. It serves as a valuable resource for educational institutions aiming to enhance the impact of teachers' training on students' success in the ever-evolving landscape of higher education.

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