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Research on the "Integration of Competition, Teaching, and Research" Model for Cultivating Teachers' Professional Abilities—Taking the Hotel Management and Digital Operation Major as an Example

Yan Zeng[1,a,*]

[1]*Institute of Cultural Tourism and International Exchange, Yunnan Open University, Kunming, Yunnan, China*
[a]*1036830109@qq.com*
[*]*Corresponding author*

Abstract: *The traditional teaching and training model is single, divorced from practice and industry needs, and lacks innovation in methods. As a result, the comprehensive abilities of teachers and students have not been fully enhanced. The purpose of this paper is to innovate the cultivation method of teachers' professional abilities through the "integration of competition, teaching, and research" model, improve teachers' comprehensive qualities, and address the existing deficiencies in the current cultivation of teachers' professional abilities. Taking the "Hotel Management and Digital Operation" major as an example, through case studies and field investigations, and by organically combining the application of the three links of competition, teaching, and research, this paper helps teachers improve their professional abilities and teaching quality in practice, thereby promoting students' comprehensive application ability of knowledge. The results also prove that the model for cultivating teachers' professional abilities is conducive to teachers' professional abilities, promotes the improvement of industry practice abilities (an increase of 21%), and improves their ability to guide students' innovation and scientific research levels. In summary, the model effectively guarantees the improvement of the teaching quality of the professional teaching team.*

Keywords: *Cultivation of teacher professional abilities; Integration of competition, teaching, and research; Case study; Field investigation; Design of teaching process*

1. Introduction

With the continuous development of the education field, teachers' professional abilities have become a key factor in improving education quality and student development. In emerging disciplines such as hotel management and digital operation, teachers not only need to have a solid foundation of subject knowledge but also must possess practical experience closely combined with the industry. However, the traditional teacher training model is too single, mainly focusing on academic theory and neglecting the connection between practical abilities and industry needs. This has led to insufficient improvement in teachers' professional abilities, making it difficult for them to meet the rapidly changing industry environment and technical requirements.

The model is an innovative way to enhance teachers' professional abilities. By organically combining competitions, teaching, and research, it forms an interactive and collaborative teacher development system. Under this model, teachers can improve their practical abilities and industry sensitivity through competitions, innovate teaching methods, update educational concepts in teaching, and participate in academic research to enhance their academic levels and teaching quality. Especially in the field of hotel management and digital operation, which is highly applied and technology - intensive, the introduction of competitions and industry practices helps to comprehensively improve teachers' abilities.

This paper aims to explore the effectiveness of the model in enhancing teachers' professional abilities and provide new ideas and methods for cultivating the abilities of teachers in majors such as hotel management and digital operation. By using the methods of literature analysis, case study, and

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field investigation, this paper analyzes the deficiencies of the current teacher training model and explores how to integrate competitions, teaching, and research to form a new path for enhancing teachers' abilities. The results show that this model can effectively improve teachers' comprehensive qualities, especially in terms of enhancing practical abilities, innovating teaching methods, and connecting with industry needs. The main contribution of this paper lies in applying a new model for enhancing teachers' abilities and clarifying its application value and practical significance in combination with the actual situation of the hotel management and digital operation major.

2. Related Work

Currently, research on enhancing teachers' professional abilities mostly focuses on classroom teaching and academic research, with less emphasis on the combination of industry practices and competitions. NaharS [1] focused on how the quantum teaching model can improve students' collaborative thinking abilities and pointed out the effectiveness of this model in promoting student interaction and cooperation. Kilag OKT[2] explored the role of instructional leadership in teachers' professional development and emphasized the important role of leaders in supporting teachers' growth and career development. NgDTK [3] studied teachers' AI digital competencies and 21st - century skills in the post - pandemic era and pointed out the key role of teachers in digital transformation. NiL[4] emphasized the importance of collaborative learning among teachers in improving education quality. BaiB[5] analyzed teachers' continuous intention to apply information and communication technology and revealed the relationship between teachers' attitudes and technology use. These studies provide theoretical support for educational practice, but new models are still needed to promote the practical application of teachers' professional development.

Innovation is the primary driving force for development. Implementing the innovation - driven development strategy is an urgent requirement for national development, and this strategy requires strong talent support [6]. Innovative ability is a basic characteristic of outstanding engineering and technical talents and a core symbol of excellent engineers [7]. In the new era, the goal of higher education is to cultivate talents with innovative abilities [8]. Innovative skilled talents not only need to master professional knowledge and technology proficiently and possess excellent operational skills but also need to have a global perspective, a composite knowledge structure, a high level of information sensitivity, and an innovative spirit and thinking [9]. There is a fundamental difference between innovative skilled talents and traditional skilled talents: the former have transformed from passive operators to active innovators and comprehensive technology controllers [10]. Through case studies and field investigations, this paper explores how to promote the improvement of the teaching quality of the professional teaching team through the model, and form a high - quality "integration of competition, teaching, and research" teaching team to better support the country's innovation - driven development strategy.

3. Methods

3.1 Design and Implementation of the Teaching Link

In hotel management courses, successful cases of well - known hotels are selected to analyze their successful experiences in operation management, service quality, and digital transformation. Take Marriott International as an example. It is a globally renowned hotel chain brand and is at the forefront of the industry in digital transformation. With the continuous development of technology, Marriott Hotels uses big data and artificial intelligence (AI) to enhance the customer experience, improve operational efficiency, and achieve more accurate market positioning and personalized services. Teachers use case - based teaching to guide students to discuss and analyze, prompting them to combine theoretical knowledge with practical situations and improve their ability to solve practical problems. The specific content is shown in Table 1.

Table 1. Case - based Teaching Discussion

Number	Question	Related data	Discussion
1	How can big data change customer experience?	By 2023, the application of big data is expected to increase customer satisfaction by 20%.	Explore how data analysis can help identify customer needs, improve customer satisfaction and loyalty.

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2	What is the prospect of artificial intelligence application in the hotel industry?	Applying AI can reduce hotel operating costs by 15-20%. It is expected that by 2025, intelligent customer service will account for 25% of the entire customer service market.	Discuss the potential benefits of AI.
3	How to maintain emotional connection with customers?	80% of consumers are more inclined to interact with brands that provide personalized experiences. Nearly 70% of consumers indicate that they are willing to pay more for personalized services.	Explore how to maintain humanized services in digital transformation to enhance customer loyalty.
4	What insights does Marriott's case have for other hotel brands?	Hotel brands that adopt digital technology have a revenue growth rate 30% faster than their peers. More than 65% of hotel managers indicate that digital transformation is the key to future growth.	Analyze whether Marriott's successful experience can be replicated and discuss the digital strategies of other brands.

Table 1 reflects that Marriott's successful experience can provide a replicable model for other brands and inspire them to develop their own digital strategies.

In digital operation courses, teachers use online simulation software and data analysis tools. Students use Excel for data analysis, calculate key performance indicators such as the occupancy rate of guest rooms, the average daily rate (ADR), and revenue per available room(RevPAR), and formulate corresponding business strategies.

The calculation formula for RevPAR is as follows [11]:

$$\text{RevPAR} = \frac{\text{Total house revenue}}{\text{Number of available rooms}} = \text{ADR} \times \text{Occupancy rate} \quad (1)$$

In the curriculum setting, field investigation and practical links are arranged. Teachers and students are organized to conduct on - site learning in industry enterprises. They observe front - desk reception, room service, and catering management and experience every link of hotel operation in person. Teachers communicate directly with industry practitioners to obtain first - hand information, further enrich the teaching content, and promptly reflect the latest trends and changes of enterprises in the classroom.

Interactive teaching methods are adopted. Discussion sessions are set up in the classroom, and students are divided into groups to debate on a certain industry - hot topic. Teachers act as facilitators. For the topic of "The Impact of Digital Operation on Traditional Hotel Management", they raise questions (such as "Will digital transformation lead to a decline in traditional service quality?") and provide feedback. This method not only improves students' sense of participation but also enables teachers to discover the deficiencies in their teaching during the interaction and adjust their teaching strategies in a timely manner.

An effective feedback mechanism is established. After each teaching session, teachers collect students' feedback through questionnaires and in - class group discussions. They analyze the feedback information, understand the degree of students' mastery of teaching content, and adjust teaching methods and content in a timely manner.

In terms of teaching resources, teachers regularly integrate and update teaching materials to ensure the timeliness and relevance of the content. The latest industry development reports, academic papers, and market research data are introduced to provide students with richer learning materials. This process is carried out through regular exchanges and cooperation with industry enterprises to ensure the professionalism and forefront nature of the teaching content, so that students can always maintain sensitivity to industry trends.

Combining hotel management and digital operation, teachers design projects and guide students to simulate the development of a new hotel management system throughout the process. From market research, system design to implementation plans, students' teamwork abilities and innovative thinking are enhanced. During the project implementation process, students use the SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis method to evaluate market opportunities and threats, and at the same time develop a financial forecasting model to conduct cost analysis and calculate the return

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on investment ROI.

$$\text{ROI} = \frac{\text{Net proceeds}}{\text{Investment cost}} \times 100\% \quad (2)$$

Through such projects, students' practical operation abilities are exercised, and their innovative and critical thinking is cultivated, enhancing their competitiveness in future career development.

3.2 Introduction and Application of the Competition Link

According to the characteristics of the hotel management and digital operation major, teams are organized to conduct market research to understand the professional skills competition projects in the current industry. Competitions closely related to industry needs are selected ("National Hotel Management Skills Competition" and "Digital Operation Case Analysis Challenge"). The research shows that the "National Hotel Management Skills Competition" focuses on service skills and management abilities, while the "Digital Operation Case Analysis Challenge" emphasizes data analysis and marketing abilities. The combination of these two competitions integrates theory and practice and is very suitable for curriculum design.

Industry experts and senior teachers are invited to conduct special training, and the training content covers the latest industry trends, competition rules, and practical case analysis. A "customer service simulation" session is set up during the training. Teachers are divided into groups for role - playing to simulate the front - desk reception process of a hotel, improving their service awareness and adaptability. The knowledge and skills learned by teachers during the training are directly applied to actual teaching, improving their teaching quality.

Before the competition, teachers are encouraged to form interdisciplinary teams and conduct simulation exercises. The effect of the simulation exercises is evaluated by scoring the teamwork efficiency [12]:

$$C = \frac{\sum_{i=1}^{n} \alpha_i \cdot \beta_i}{\sum_{i=1}^{n} \alpha_i} \quad (3)$$

where α_i refers to the weight of the work task, and $\beta_i$refers to the self - evaluation score of the teacher.

After the competition, an experience - sharing meeting is organized. Award - winning teachers are encouraged to introduce the cases, tools, and methods used in the competition into classroom teaching. The performance is analyzed by playing back the video recording, and the advantages and disadvantages are discussed. The school evaluates the competition achievements of teachers (competition results, honors, and impacts on teaching) through data analysis. According to the evaluation results, corresponding incentive mechanisms are set up (such as providing support for professional title evaluation) to encourage teachers to continuously participate in competitions and improve their professional abilities.

At the beginning of each semester, an annual competition plan is developed to clarify the competition goals and time arrangements. By regularly reviewing the competition results and teachers' feedback, the competition strategies and training content are updated in a timely manner to maintain teachers' enthusiasm for participation and the continuous improvement of their professional skills.

3.3 Integration and Innovation of the Research Link

Cooperative relationships are established with multiple hotels and digital operation enterprises to develop industry - cooperation projects. Teachers participate in actual enterprise projects (market research, customer experience analysis, and service optimization), apply their professional knowledge to conduct field investigations and data analysis to solve practical problems, and accumulate industry experience.

For the digital operation major, the teacher team cooperates with enterprises to carry out technology research and development projects, focusing on intelligent management systems and online marketing tools.

The intelligent management system involves the collection, analysis, and feedback of real - time data. Generally, the PID (Proportional - Integral - Derivative) control algorithm in control system theory is used to optimize management efficiency.

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The PID control formula [13]:

$$u(t) = K_p e(t) + K_i \int_0^t e(\tau)d\tau + K_d \frac{de(t)}{dt} \quad (4)$$

where $e(t)$ is the error, and K_p,K_i,$K_d$are the proportional, integral, and derivative coefficients, which determine the response speed and accuracy of the controller.

The intelligent management system is applied to the temperature regulation of hotel rooms. The system adjusts the air - conditioning settings through the PID algorithm according to the difference between the set temperature and the actual temperature. Teachers can cooperate with enterprises to obtain the optimization effects under different parameters through simulation experiments and bring relevant cases into the classroom to help students master the application of intelligent systems.

By participating in technology development, teachers can understand the latest industry technology trends and master the application of digital tools. The knowledge and experience accumulated by teachers during the research and development process are directly transformed into teaching content to help students master cutting - edge technologies and enhance their employment competitiveness.

During the research process, a data - driven research method is used. Teachers analyze the real - world data provided by enterprises (customer satisfaction survey data, operation efficiency indicators) to identify key issues in the industry and put forward improvement suggestions.

The total customer satisfaction S is calculated using the weighted - average formula:

$$S = \frac{1}{n}\sum_{i=1}^{n} \omega_i \cdot r_i \quad (5)$$

where ω_i refers to the weight of the i-th service item, and r_i refers to the customer's rating of the i-th service item (on a scale of 1 - 5 points). An example of the relevant calculation of customer satisfaction is shown in Table 2.

Table 2. Examples of Relevant Calculations of Customer Satisfaction

Service items	ω_i	r_i(points)	$\omega_i \cdot r_i$	S
Room cleanliness	0.25	4	1	84%
Service attitude	0.3	5	1.5	
Food and beverage quality	0.2	3	0.6	
Network stability	0.15	4	0.6	
Convenience of Location	0.1	5	0.5	

In Table 2, it is obvious that the score of food and beverage quality is the lowest. However, the weighted score of location convenience is the lowest. Students are guided to use data to evaluate customer satisfaction based on the calculation examples, so as to develop improvement measures.

After completing the research, teachers promptly transform the research results into teaching resources. By writing case analyses, teaching guidance documents, and research papers, they systematically summarize the research process and conclusions and apply them in teaching. Regular teaching seminars are organized to share research results, promote mutual learning among teachers, and improve the overall teaching level.

Regular scientific research training is held, and teachers are encouraged to participate in academic exchange conferences to showcase research results, broaden their horizons, and stimulate their enthusiasm for scientific research.

Through questionnaires and classroom observations, teachers can obtain feedback from students on teaching methods, and then adjust the research focus and teaching strategies to improve the effectiveness of teaching.

Teachers are encouraged to carry out diversified research projects according to their own research interests and industry development trends. Research groups are formed to jointly explore relevant topics. Through diversified research projects, teachers' scientific research experiences are enriched, and more extensive learning resources are provided for students, broadening their professional horizons.

3.4 Comprehensive Improvement of Teachers' Professional Abilities

Teachers use the case - based teaching method and update the teaching content in combination with the latest industry trends, enabling students to learn in real - world situations. This stimulates students'

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critical thinking and problem - solving abilities. The "flipped classroom" model is implemented, and course content is pre - recorded. Teachers need to think deeply and plan in the course preparation stage and flexibly respond to various questions and needs of students in the classroom, improving their organizational and guiding abilities.

Teachers are actively encouraged to participate in skills competitions, experience industry standards in the competitions, and understand the latest skill requirements and service processes. When teachers cooperate with hotel enterprises to conduct market research, they use a combination of quantitative and qualitative research methods to analyze customer feedback and market trends. Empirical research is used to promote the innovation and update of educational content.

Career development planning and psychological counseling are provided for teachers to help them better adapt to industry changes and enhance their professional confidence. Through international cooperation, inter - school cooperation and exchanges, and teaching discussion lectures, the teaching quality of the professional teaching team is improved, the teaching quality of "integration of competition and teaching" is guaranteed, and a high - quality teaching team of the model is formed.

4. Results and Discussion

4.1 Improvement of Teachers' Professional Abilities

Ten teachers participating in the model are selected. A questionnaire including multiple dimensions is designed to evaluate teachers' teaching attitudes, teaching methods, classroom interaction, and student feedback. The questionnaire is conducted once before and once after the implementation, and data is collected twice in total. In addition, an evaluation group is formed, consisting of three peer teachers who observe five classes of the participating teachers. The observation content includes classroom atmosphere, teaching implementation, and student participation. A five - point scale is used for scoring, as shown in Figure 1.

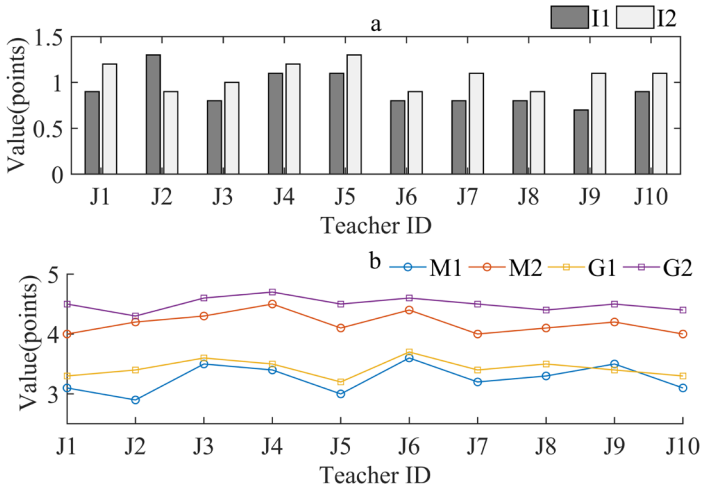

Figure 1(a). Improvement of Teachers' Satisfaction and Classroom Observation Scores
Figure 1(b). Comparison of Teachers' Satisfaction and Classroom Observation Scores

Figure 1. Evaluation of the Improvement of Teachers' Professional Abilities

Figure 1 mainly presents the evaluation of the improvement of teachers' professional abilities. In Figure 1(a), J1 - J10 represent the teacher numbers respectively, and I1 and I2 represent the improvement of satisfaction scores and classroom observation scores of each teacher before and after the implementation of the measures. Overall, the scores of teachers generally increased after the implementation of the measures, indicating that the model had a positive impact. In Figure 1(b), the satisfaction scores before and after the implementation of the measures are represented by M1 and M2 respectively, and the classroom observation scores before and after the implementation of the measures are represented by G1 and G2 respectively. The satisfaction scores before the implementation ranged from 2.9 to 3.6 points, and after the implementation, they rose to 4 - 4.5 points. The classroom observation scores also increased from the range of 3.2 - 3.7 points to the range of 4.3 - 4.7 points, showing significant progress of teachers in teaching practice. This reflects that teachers' recognition of teaching effectiveness has increased, indicating that the implemented teaching improvement measures

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have achieved good results. Overall, these changes highlight the importance of teachers' participation in professional development and continuous improvement.

4.2 Industry Practice Ability

A two - week industry internship is organized. Participating teachers are required to undergo on - site training in the hotel industry and take an exam, and complete relevant practical tasks. Based on their performance during the internship, industry experts are invited to evaluate them. A total of five evaluation criteria are set, and a 100 - point scale is used for scoring. The practical operation scores before and after the internship and the scores given by industry experts according to the five evaluation criteria are recorded, and the comprehensive score (equal to the average of the scores of the five evaluation criteria) is calculated. The specific content is shown in Figure 2.

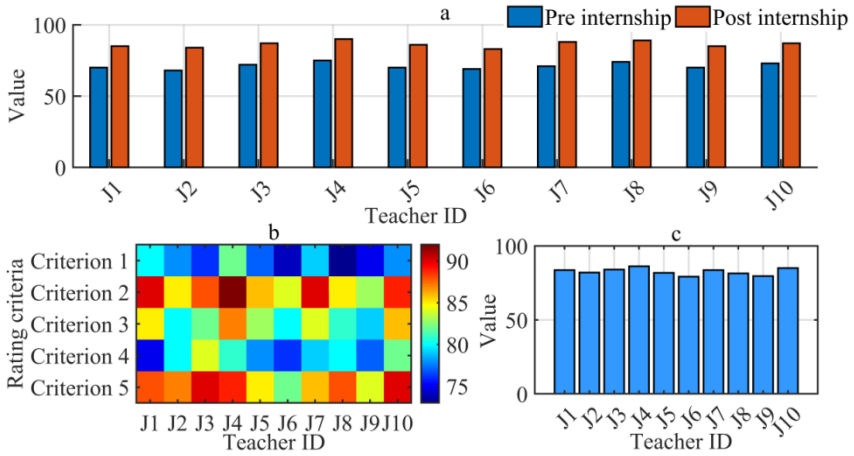

Figure 2(a). Comparison of Practical Operation Scores Before and After the Internship (Unit: points)
Figure 2(b). Scores Given by Industry Experts (Unit: points)
Figure 2(c). Comprehensive Scores (Unit: points)

Figure 2. Evaluation of Industry Practice Ability

Figure 2 shows the evaluation of teachers' industry practice ability. In Figure 2(a), it can be seen that the practical operation scores of all teachers after the internship are generally higher than those before the internship, indicating that the internship has a positive impact on teachers' practical operation ability. Figure 2(b) shows the scores given by industry experts under the five evaluation criteria. The scores show certain fluctuations, and the overall trends are relatively similar, indicating that industry experts' evaluations of teachers are consistent in multiple criteria. Figure 2(c) shows the comprehensive scores. The comprehensive scores of each teacher are at a relatively close level, and the overall level is high, indicating that the teachers performed well during the internship. Overall, the changes in the data show that teachers have been significantly improved during the internship, and the scores given by industry experts can also reflect the changes in teachers' abilities.

The average practical operation score before the internship was 71.2 points, and the practical operation score after the internship was 86.4 points. Compared with the former, the latter increased by 21%.

4.3 Innovation Ability and Scientific Research Level

After the internship, participating teachers are encouraged to participate in actual scientific research projects. The project themes are centered around the latest industry trends (a total of 10 projects, each teacher corresponds to one project and specifically guides a group of students). Each group of students is required to submit research reports before and after participating in the project, and the reports are scored. An achievement evaluation meeting is set up after the project is completed, and industry experts and academic reviewers are invited. The review criteria include innovation, practicality, and research depth, and a five - point scale is used for scoring. The scores of the research reports before and after participating in the project (represented by R1 and R2 respectively) and the scores given by industry experts are shown in Figure 3.

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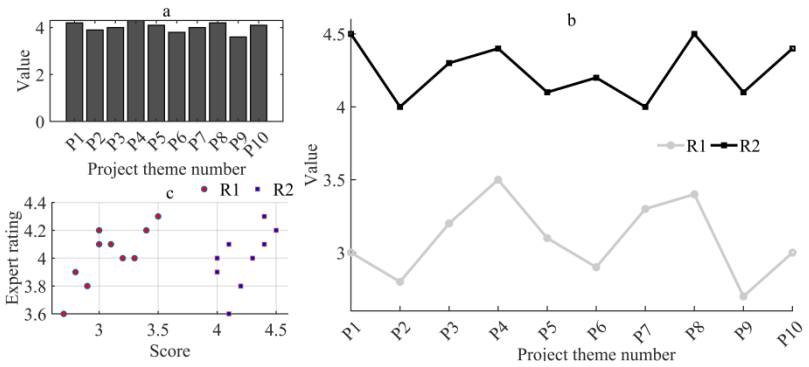

Figure 3(a). Scores Given by Industry Experts
Figure 3(b). Scores of Research Reports before and After Participating in the Project
Figure 3(c). Scatter Plot of Research Report Scores and Expert Scores

Figure 3. Evaluation of Innovation Ability and Scientific Research Level

Figure 3 shows the evaluation of the innovation ability and scientific research level of teachers and students. In Figure 3(a), P1 - P10 refer to different project themes. The vertical axis represents the expert scores, ranging from 3.6 to 4.3 points, indicating that experts generally recognize the projects and showing obvious progress of students in research reports. Figure 3(b) presents the scores of research reports before and after participating in the project. Obviously, the scores of research reports after participating in the project are higher. The distribution of data points in Figure 3(c) shows the improvement of research report scores before and after participating in the project in terms of expert scores, indicating that the efforts of teachers and students have been recognized by industry experts. Overall, these changes indicate that the research quality and expert recognition of teachers and the students they guide have been significantly improved in relevant fields, indicating a positive development trend.

5. Conclusion

This paper applies the model to the cultivation of teachers' professional abilities in the hotel management and digital operation major by integrating competitions, teaching, and research. Through the design and implementation of the teaching link, the introduction of competitions, and the integration of the research link, teachers' professional abilities have been significantly improved, and their practical and innovative teaching abilities have been enhanced. The research shows that this model can effectively improve teachers' comprehensive qualities and is more closely connected with industry needs. However, the implementation details of the model need to be further optimized, and the long - term effect remains to be verified. In the future, applications in more professional fields will be explored, and the model will be continuously improved to promote the comprehensive development of teachers' professional abilities.

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