

Construction of a blended online and offline teaching quality assurance system for colleges based on "TQC+PDCA"

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Abstract: The PDCA (Plan-Do-Check-Act) method is a thinking approach and management procedure based on feedback loops, which can adapt to any management activity and has been successfully applied in many management fields. In the quality management system of colleges, the PDCA method is used to construct a quality monitoring and assurance system. This article incorporates the "Three Full" participation elements of TQC (Total Quality Control) to organically integrate the two, further enhancing the quality assurance system of college teaching.

1. Introduction

The integration of online and offline classrooms is essential for achieving educational modernization. The emergence of online teaching has broken the limitations of time and space in traditional offline teaching, overcome barriers to information transmission, and enhanced the engagement of classroom instruction. Online teaching serves as a powerful supplement to traditional classroom teaching, alleviating uneven allocation of educational resources, addressing disparities in teaching staff, challenging traditional educational concepts, bridging the digital education gap, and improving the overall educational environment. As online and offline classrooms accelerate their convergence, ensuring the quality of blended "online + offline" teaching becomes crucial for achieving effective classroom instruction.

2. Current Research Status of Quality Monitoring and Assurance System for Blended Learning

With the advancement of blended learning, the effectiveness of blended teaching is gradually receiving attention. Foreign scholars have begun to summarize and reflect on blended teaching. In 2018, Kavitha^[1] pointed out in the study that learning materials, student capabilities, and learning environments all affect the effectiveness of online teaching in blended learning. Students' attitudes towards learning have a significant impact on the implementation of blended teaching. In 2020, Jared^[2-3] summarized the development process of blended teaching and suggested starting with the outcomes when designing blended teaching.

The research on the construction of teaching quality assurance system in Chinese higher vocational colleges

started relatively late. For example, Zhang^[4] focused on the core of quality assurance in MOOC teaching, conducting research on the development, features, classification, differential characteristics, and quality issues of MOOCs, and proposed a path for quality assurance in MOOC teaching that includes teaching feedback mechanisms, learning outcome certification mechanisms, teaching quality evaluation systems, and course certification mechanisms; Ma^[5] analyzed the system and content of the institutional construction of blended teaching in colleges, suggesting that the establishment and improvement of the guarantee system for blended teaching should start with organizational management systems, teaching management systems, teacher training systems, basic technical support, and dynamic incentive mechanisms; Han^[6] found problems in multimedia-assisted teaching quality management in Chinese colleges, which have imposed certain limitations on teaching quality. She suggested building a quality assurance mechanism for multimedia teaching based on comprehensive quality management theory.

Many higher vocational colleges have established routine teaching quality assurance mechanisms and achieved some results in ensuring teaching quality^[7-10]. However, there are still many problems, such as insufficient student sample size, incomplete student feedback mechanisms, flaws in peer evaluation mechanisms among teachers, poor effectiveness of horizontal information feedback, discrepancy between professional settings and demand from employers and the market, weak rectification efforts of teaching management institutions, and widespread phenomenon of being overburdened with tasks while neglecting implementation. These problems severely hinder the lack of guarantee for the quality of "online + offline" blended teaching in higher vocational colleges, let alone a series

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of follow-up measures for subsequent supervision and rectification mechanisms.

3.The path to solving the problem

3.1.Strategies for Improving Teaching Quality Based on the TQC (Total Quality Control) Concept

3.1.1 Total Quality Management

For the teaching quality of higher vocational colleges, comprehensive quality refers to the integration throughout various stages of teaching activities, including teaching documents, teaching resources, teaching processes, post-teaching effectiveness feedback, establishment of post-teaching Q&A platforms, employment tracking feedback, and the establishment of reward and punishment mechanisms, among others. This is a process of comprehensive management throughout the entire cycle, with each part interconnected and unified as an organic whole centered around teaching quality. For example, in terms of teaching documents, targeted knowledge integration and instruction should be carried out in classes based on the type of course to achieve various aspects of talent training programs. It is essential to ensure that there are no "blank spaces" and to address practical problems in a targeted manner to achieve a closed-loop between actual training outcomes and training programs. Additionally, teaching resources should be diversified to complement both online and offline teaching. It is important to avoid merely conducting online teaching for the sake of it, but rather to focus on talent training programs and facilitate further interaction between teachers and students during online teaching to prevent awkward teaching scenarios where teachers stand idly by while students look at their phones.

3.1.2 Management of full process participation

From the perspective of Total Quality Control (TQC) theory in enterprises, the entire process includes market research, research, design, trial production, design and manufacturing of processes and tooling, supply of raw materials for production, inspection, factory shipment, and after-sales service. Similarly, the improvement of teaching quality in higher vocational colleges shares similarities with this concept. Students are the products manufactured by higher education institutions, and thus the specifications of this product must meet societal needs. Therefore, the first question regarding teaching quality is what kind of content we can provide to students, which in turn determines how to evaluate the quality.

Therefore, we need to step out of the campus and enter the business world, closely following the needs of enterprises. We must completely align with these enterprises to achieve an up-to-date enterprise alignment model. Specifically, we need to cultivate students based on what enterprises require. We should tailor our services to local conditions, serve the local area, radiate to the

surrounding areas, and cultivate versatile talents with expertise in a specific field who can also cross industries. It is crucial to update the talent training program annually, with a focus on the key requirements of online teaching within the program. Online teaching should constitute a large proportion of the talent training program, and emphasize how these components can fulfill specific functions and societal service needs.

3.1.3 Managing involvement of all faculty and staff

The quality of products reflects many aspects and work of an enterprise. In a higher vocational college, the academic achievements and success of a student are closely related to various aspects of the school's education over three years. Among them, teaching quality is the core content of teaching evaluation. Any element related to student teaching quality should undergo quality monitoring and evaluation, ensuring that each element can be materialized, controlled, healthy, and sustainable. All aspects should ultimately serve the improvement strategy of teaching quality. For example, the cafeteria in the school may seem unrelated to teaching quality, but upon careful consideration, the culture of this cafeteria is part of the campus culture. Students will directly perceive this atmosphere, and they may feel warmth and enthusiasm due to a friendly greeting from cafeteria staff or an extra spoonful of soup. The energy released from this will allow students to feel the learning atmosphere and campus situation at the school, making their experience fulfilling and happy. Thus, this successful and favorable campus culture reflected by color is beneficial.

3.2. Teaching Quality Improvement Strategies for TQC+PDCA Integration Concept

Teaching Quality Improvement Strategy based on PDCA (Plan-Do-Check-Act) Concept

The teaching quality improvement strategy based on the PDCA (Plan-Do-Check-Act) concept is a scientific management approach that helps in continuously enhancing teaching quality.

(1)Plan Phase

Establish clear teaching objectives: Teachers need to set clear and measurable teaching objectives based on course requirements and student actual situations.

Analyze the current situation: Teachers should conduct a comprehensive analysis of the current teaching situation to understand students' learning needs and challenges.

Develop a teaching plan: Building on the analysis, teachers need to create detailed teaching plans including teaching content, methods, and scheduling.

(2)Do Phase

Innovate teaching methods: Use various teaching approaches like case studies, group discussions, role-playing to stimulate students' interest and initiative in learning.

Create an immersive teaching environment: Foster a conducive learning atmosphere through scenario creation, multimedia applications, and more.

Implement the teaching plan: Execute teaching according to the plan, emphasizing interaction with students and promptly addressing their queries.

(3) Check Phase

Collect feedback: Gather feedback on teaching quality through classroom observations, student inputs, peer evaluations, etc.

Evaluate effectiveness: Compare teaching objectives with actual outcomes to assess if the teaching quality meets expectations.

Identify issues: Analyze evaluation results to pinpoint problems and shortcomings in teaching.

(4) Act Phase

Adjust teaching plans: Modify teaching plans and methods based on issues identified during the checking phase.

Enhance teaching methods: Implement effective measures to improve areas of concern in teaching.

Strengthen teaching monitoring: Intensify monitoring and management of the teaching process to ensure continuous enhancement of teaching quality.

By implementing these four phases, teachers can optimize the teaching process continuously and elevate teaching quality. Furthermore, the PDCA concept aids teachers in developing a scientific management mindset, enhancing their teaching abilities and professional competence.

3.2.1 Update and formulation of talent training programs for universities, enterprises, and governments

To achieve the "three-level linkage of universities, enterprises, and government," each year, academic colleges at universities will take the lead in inviting frontline leaders from the education department, leaders from enterprise human resources departments, and academic heads of universities for a tripartite discussion to develop practical talent cultivation plans. The document should fully reflect the orientation and specific goals of cultivation, address the issue of meeting local economic job demands, and specify the skills required to handle these positions. In the tripartite evaluation, full consideration should be given to the voice of the enterprise, with the emphasis on meeting enterprise needs, while the government and schools serve as the beneficiaries, producing human resources that meet the needs of enterprises.

3.2.2 A new model integrating T (total) into various stages of PDCA

We must fully leverage the importance of full participation by all staff. Efforts should be made to achieve the regulatory and influential role of all faculty and staff in the management of online and offline blended teaching. Quality management standards for teaching should be established, and these standards should be optimized annually to align with the goals of talent cultivation plans. Continuous PDCA cycles should be generated to achieve iterative updates. Throughout this

entire cycle, actual issues in teaching management should be summarized, and those involved in teaching should continually reflect on and learn from others' successful experiences to further revise quality improvement standards and enhance the level of quality management for blended teaching at universities.

3.2.3 Incorporating "Total" (T) into a Novel Model across PDCA Phases

To fully leverage the importance of total involvement, as depicted in Figure 1, efforts should focus on realizing the supervision and influence of all faculty and staff in the management of blended online and offline teaching. It is essential to establish teaching quality management standards, annually optimizing these standards to align with the objectives of talent cultivation programs. Continuous iterations of the PDCA cycle should be generated to achieve iterative updates. During this entire cycle, practical issues in teaching management should be summarized, and stakeholders should engage in continuous reflection, learning from others' successful experiences. This iterative process further refines quality improvement standards, enhancing the level of mixed-mode teaching quality management in higher education institutions.

3.2.4 Teaching optimization control during the transition time period between online and offline teaching

Online teaching serves as a powerful complement to offline teaching and functions as a "refueling station" for offline teaching. When most vocational school teachers are conducting classes, they have good control over offline teaching, but encounter a transition period when moving to online teaching. As a result, issues arise in teacher management of classroom discipline and organization during this transition, leading to an intangible "vacuum" in teaching that can last from a few minutes to nearly 10 minutes. This flaw in the teaching process seriously disrupts teaching coherence and severely impacts teaching quality.

To address these issues, the following points should be emphasized: First, further optimize the design process for classroom organization to achieve seamless transitions; second, enhance the balance between online and offline teaching proportions in the classroom, recognizing the existence of online teaching while emphasizing its complementary role in offline classrooms; and third, adequately prepare by assigning classroom processes through class leaders in advance and embedding "switches" to ensure continuity and coherence in teaching.

3.2.5 Whole staff education: strategies for comprehensive involvement

Whole staff education is an educational model that focuses on all members, employing varied methods and strategies. Here are some specific recommendations.

Clarify Educational Objectives: Firstly, it is crucial to define the goals of whole staff education, including enhancing overall quality, fostering innovative thinking, and strengthening social responsibility. These objectives should be specific and measurable to assess the effectiveness of education. **Establish Involvement Mechanisms for All:** Whole staff education requires active participation from all members. Therefore, a mechanism should be established to encourage everyone to engage in the educational process, regardless of age, background, or abilities. **Provide Diverse Educational Resources:** To meet the learning needs of different members, diverse educational resources should be made available, including online courses, physical books, practical activities, etc. These resources should be easily accessible and user-friendly to facilitate convenient learning for everyone. **Implement Personalized Education:** Since everyone has different learning styles and paces, whole staff education should address individual differences and offer personalized education services. For instance, customized learning plans based on interests and needs or one-on-one tutoring services can be provided. **Enhance Teacher Training:** Teachers play a key role in whole staff education. To deliver high-quality educational services, training for teachers should be strengthened to enhance their educational beliefs and teaching skills. **Establish Evaluation Systems:** Evaluation is a crucial part of whole staff education. An assessment system should be established to regularly evaluate the learning outcomes of each individual, understand the effectiveness of education, and adjust educational strategies accordingly. **Strengthen Home-School Collaboration:** The family environment is essential for children's growth. Schools should proactively collaborate with parents to jointly focus on student development. Through activities like home-school gatherings and parent-teacher meetings, communication and cooperation can be enhanced to collectively devise students' learning plans and development goals, promoting holistic student growth.

4. Conclusions

The PDCA (Plan-Do-Check-Act) method is a mode of thinking and management procedure based on feedback loops, which can be adapted to any management activity and has been successfully applied in many management fields. This article constructs a quality monitoring and assurance system using the PDCA method and integrates it with the "Three Fulls" participation elements of Total Quality Control (TQC), organically enhancing the guarantee mechanism of teaching management and monitoring systems at higher vocational colleges, thereby improving teaching quality. The TQC+PDCA approach is essentially a continuous improvement process that spirals upward. It serves as an excellent means of teaching management and monitoring, effectively enhancing monitoring efficiency and effectiveness to achieve dynamic and real-time monitoring purposes.

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References

- 1 Kavitha. E-Learning-Integration of Information Technology and Subject Curriculum [J]. *Research on Electronic Education*, 2018 (01): 19-27.
- 2 Jared. Framework for quality management research and an associated measurement instrument[J]. *Journal of Operations Management*[J]. 2020, 11(3):339-366.
- 3 Dean J, Bowen E. Management theory and total quality: Improving research and practice through theory development[J]. *Academy of Management Review*, 2014, 19(3):392-418.
- 4 Zhang Z Y. Innovation in the Concept and Mechanism of Teaching Quality Management[J]. *Journal of the National School of Education Administration*, 2003 (04): 25-30+24.
- 5 Ma J Y. Process reengineering of university teaching management based on PDCA cycle [J]. *Modern Education Management*, 2015 (02): 76-80.
- 6 Han F. Research on the Selection of Quality Monitoring Points for Teaching Processes[J]. *Journal of Changchun University of Technology*, 2010,5 (06): 188-189+194.
- 7 Yang Y, Zhang Z Q, Wu C P , et al "Information Technology and Online Teaching under the Epidemic" Essay[J]. *Basic Education*, 2020, 17 (03): 48-60.
- 8 Yang X Y, Zhou D. Research on the Selection of Quality Monitoring Points for Teaching Processes[J]. *Journal of Changchun University of Science and Technology*, 2010, 5 (06): 188-189+194.
- 9 Zhao H, Chen L Y. Process reengineering of university teaching management based on TQC cycle [J]. *Modern Education Management*, 2015 (02): 76-80.
- 10 Zhou X J. Analysis of homework path for diagnosis and improvement of teaching work in vocational schools based on PDCA cycle[J]. *China Vocational and Technical Education*, 2018 (05): 37-40.