Challenges and Countermeasures of Applied University Teachers' Teaching Ability in the Intelligent Era

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Abstract: Intelligent technology and digital education strategy are profoundly reshaping the teaching paradigm of application-oriented colleges and universities, and putting forward new requirements for teachers' teaching ability. This paper systematically analyzes the three transformation trends of teaching objectives turning to ability generation, teaching scene extending to open ecology, and technology role upgrading as core empowerment, and then analyzes the multi-dimensional ability challenges faced by teachers from the four dimensions of goal design, process control, technology integration, and role transformation. The research points out that to meet these challenges, it is necessary to build integrated practice-oriented teacher development content, create a school-based support environment for collaborative innovation, and improve the teaching evaluation and incentive mechanism with clear guidance. This paper aims to provide a reference for the theoretical construction and practical improvement of teachers' ability development in application-oriented universities.

Keywords: Applied universities; Teaching ability; Intelligent era; Teaching paradigm; Challenges and strategies

1. Introduction

At present, intelligent technology represented by artificial intelligence and big data is driving profound changes in all fields of society, including education [1]. The in-depth promotion of the national education digitalization strategic action and the urgent demand for high-quality applied talents from industrial upgrading jointly promote the fundamental reshaping of the talent training objectives of applied colleges and universities. The teaching environment is becoming increasingly intelligent, the teaching mode is accelerating the transformation to hybrid and project-based, and the teaching resources are also showing the characteristics of digitalization and ubiquity [2]. This series of changes put forward unprecedented ability requirements for teachers who directly undertake the task of talent training [3]. The traditional teaching ability framework with knowledge transfer as the core has been difficult to adapt to the training needs of students' complex problem-solving ability, innovative practice

ability, and lifelong learning literacy in the intelligent era. Therefore, it is of urgent practical significance to systematically analyze the new challenges faced by teachers' ability under the background of the transformation of teaching paradigm and explore effective ways to promote the connotative development of Application-oriented Universities and improve the quality of talent cultivation. This paper aims to clarify the specific dimensions of the challenge and put forward systematic coping strategies, in order to provide a reference for teachers' professional development and the construction of an institutional support system.

2. Transformation trend of teaching paradigm in application-oriented universities

2.1. Teaching objectives shift from knowledge transfer to ability generation

The traditional application-oriented teaching focuses on the systematic teaching and mastering of subject knowledge. However, with the acceleration of technological iteration and the blurring of industrial boundaries, the social demand for talent is increasingly focused on the core quality of coping with uncertainty and solving real and complex problems [4]. The teaching goal is changing from the memory and understanding of deterministic knowledge to the cultivation and generation of high-level abilities such as critical thinking, interdisciplinary integration ability, innovation, and practice ability [5]. This requires the reform of the teaching evaluation system, paying more attention to the process performance, project results, and ability appreciation, rather than a single summative knowledge assessment, which poses a direct challenge to teachers' goal design and evaluation ability [6].

2.2. Teaching scenes extend from closed classroom to open ecology

The physical and virtual space where teaching takes place is expanding rapidly. The classroom is no longer the only learning place, and the hybrid teaching of online and offline integration (Omo) has become the normal and deepening direction [7]. Virtual simulation, digital twin, and other technologies have created a highly simulated practice environment and provided a new path for the teaching of engineering, design, and other applied disciplines [2]. More importantly, the integration of production and education and the deepening of school enterprise cooperation have enabled real production projects and industrial technology issues to enter the teaching process, and the teaching scene has extended to enterprise workshops, R&D platforms, and even broad network communities [8], forming a teaching ecosystem with multiple subjects' participation and open and flowing resources.

2.3. Technical role upgraded from auxiliary tools to core empowerment

Digital technology has gone beyond its early positioning as an auxiliary tool for demonstration or information transmission, and is deeply integrating and reshaping the whole teaching process. Artificial intelligence can support learning situation diagnosis, personalized resource push, and intelligent counseling, and drive the deep innovation of teaching mode [1]; Big data provides an accurate basis for teaching decision-making and learning analysis [9]; Virtual reality and other technologies enable high-risk and high-cost practical teaching [2]. Technology is evolving into the core element of reshaping the education mode, enabling students' personalized growth and teachers' precise teaching, and its deep application and integrated innovation ability have become the key variables of teaching innovation [10].

3. Challenges faced by teachers' teaching ability in application-oriented universities

3.1. Challenges of objective dimension

Faced with the ability-based teaching goal turn, many teachers fall into the dilemma of "how to design" and "how to evaluate." To design teaching activities and projects that can effectively cultivate interdisciplinary complex problem-solving ability and innovative practice ability, we need to go beyond the perspective of a single discipline and deeply understand the real needs of the industry, which puts forward higher requirements for teachers' knowledge structure and curriculum design ability [4]. At the same time, there is a lack of mature and available tools and methods for scientific, fair, and developmental evaluation of these difficult-to-quantify high-level capabilities [3]. The existing evaluation system is often still biased towards knowledge assessment, which is difficult to effectively measure students' ability generation and value-added, and has become a bottleneck restricting the deepening of teaching reform [6].

3.2. Challenges of process dimension

In the open and mixed teaching ecology, teachers need to control a variety of new teaching modes such as project-based learning and collaborative learning [7]. This requires them to be not only a lecturer, but also a fine designer, effective organizer, dynamic regulator, and resource coordinator of the learning process. Especially in the classroom supported by intelligent technology, how to balance human-computer cooperation, ensure that technology serves deep learning rather than interference, and how to manage the seamless connection and interaction between online and offline pose new challenges to teachers' classroom organization and management ability [1,11]. For teachers who are accustomed to the traditional teaching style, there are significant deficiencies in methods and experience in turning to interactive teaching with student-centered and technology support.

3.3. Challenges of technical dimension

Most teachers have the basic ability to operate information tools, but there is still a gap from "deep integration" [2]. The challenge lies in how to critically evaluate the educational value and application scenarios of various intelligent educational technologies, rather than blindly following the trend; How to creatively transform and integrate technology according to specific teaching objectives and learning conditions, and design high-quality learning experience enabled by technology; How to use teaching data for analysis and reflection to achieve continuous optimization of teaching [9]. This ability chain of "evaluation selection integration innovation" is a common weakness of teachers' digital teaching ability [3,8]. Many teachers' training is still at the level of tool operation, which fails to effectively improve teachers' ability of technology integration and teaching innovation.

3.4. Challenges of role dimension

The transformation of the teaching paradigm requires a fundamental change in the role of teachers. They need to transform from a traditional knowledge authority and a single teacher to a learning guide, collaborator, designer, and a "cross-border contact" connecting schools and industries [4,8]. This change involves not only the change of teaching behavior, but also the reconstruction of deep-seated identity and professional ideas. How to put down the "authority" mentality and become a partner on the way of students' exploration; How to effectively cooperate with enterprise mentors to jointly guide the project; How to act as a content guide, activity organizer and technical supporter in mixed teaching at the same time puts forward higher requirements for teachers' communication and coordination, teamwork, emotional labor and lifelong learning ability [11].

4. Strategies for improving teachers' teaching ability in application-oriented universities

4.1. Building new content for teacher development oriented to integration and practice

The teacher training organized by colleges and universities should go beyond the isolated technical operation training and turn to the design with "teaching integration ability" as the core. The training content should focus on how to organically integrate intelligent technology (TK), subject knowledge (CK), new teaching method (PK), and industrial practice needs (AK), and design real projects or cases [1,8]. We can promote "workshops," "teaching innovation training camps," "digital twin simulation practice," and other forms [2], so that teachers can "learn by doing," experience the whole process from problem identification, scheme design to technology integration, and focus on improving their design thinking and practical wisdom for complex teaching situations. In particular, we should strengthen the practical training of integrating artificial intelligence tools into the teaching design and using big data for learning situation analysis [9].

4.2. Creating a new school-based support environment that supports collaboration and innovation

The school level needs to systematically build the physical and institutional environment to support teachers' ability development. Establish "teacher teaching innovation center" or "smart teaching laboratory" to provide advanced technical tools, development support, and teaching method consulting [10]. Actively cultivate the "teaching innovation community" of interdisciplinary, intercollegiate, and school enterprise interaction, and encourage teachers to carry out collaborative research and teaching reform around common problems [4]. For example, through the collaborative education project, real cases and digital resources of enterprises are introduced into teacher training [8]. At the same time, we should establish a cultural atmosphere that encourages trial and error, tolerance and innovation, provide loose policy space and necessary resource guarantee for teachers' exploratory practice, and reduce the risk and resistance of teachers' teaching reform.

4.3. Improving the new evaluation and incentive mechanism to guide teaching reform

Reform the existing teacher evaluation and incentive mechanism to match the new orientation of teaching ability development. In the evaluation index, increase the weight of teaching innovation, technology integration and application, production and education integration results, guiding students' practice and innovation results [3,6]. The concept of developmental evaluation can be used for reference, and multiple evaluation methods such as teacher portfolio, representative teaching case review, and peer review can be used to comprehensively reflect teachers' teaching ability and contribution [6]. More importantly, effectively link the evaluation results with professional title promotion, performance distribution, honor evaluation, training opportunities, etc., form a strong positive guidance, stimulate teachers' internal motivation to participate in teaching reform and improve their ability, and break the inertia situation of "emphasizing scientific research and ignoring teaching."

5. Conclusion

The wave of the intelligent era and the deepening of the digital transformation of education make the systematic reform of the teaching paradigm in application-oriented universities inevitable. The core support of this reform lies in the advancement and overall improvement of teachers' teaching ability. This paper systematically analyzes the three transformation trends of teaching objectives from knowledge to ability, teaching scenes

from closed to open, and technical roles from auxiliary to empowerment. It also analyzes the multidimensional challenges faced by teachers from the four dimensions of goal design, process control, technology integration, and role transformation. These challenges are interrelated and together constitute a fault between the traditional ability framework and the teaching needs of the new era. To cope with these challenges, teachers should not fight alone, but need the systematic support and reconstruction of colleges and universities, and even at the social level. Through the construction of integrated practice oriented development content, the creation of a supporting environment for collaborative innovation, the improvement of a clearly oriented evaluation and incentive mechanism, and the formation of a joint force to support teachers' professional development, we can effectively promote the application-oriented university teachers to cross the ability gap, and ultimately serve the training goal of high-quality application-oriented innovative talents. Future research can further focus on the differentiated path of teachers' ability improvement in different disciplines and different development stages, as well as the long-term evaluation of the implementation effect of various strategies.

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