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Informatization of Higher Education: A Study on the Development of Personalized Instruction

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Abstract: This paper investigates the current status and challenges of personalized instruction in higher education. It identifies key limitations, including uniform educational goals, singular instructional methods, inflexible organizational structures, and an overemphasis on assessment outcomes. To address these issues, the paper proposes four development strategies: establishing personalized teaching objectives, diversifying teaching content, employing varied instructional methods, and adopting flexible and diverse organizational forms for teaching. These strategies aim to better meet the diverse needs of students in higher education and to cultivate innovative talent. By implementing these improvements, the paper outlines effective pathways to enhance educational quality and foster a dynamic learning environment. The collaboration between ILO and UNESCO in developing a comprehensive approach to education for sustainable development is also highlighted.

Keywords: Higher Education; Personalized Teaching; Information Technology Development.

1. The Need to Implement Personalized Teaching in Higher Education

In the context of a gradual shift towards a broad-based, applied, and interdisciplinary talent training model, the demand for students to acquire specific professional skills has intensified. The requirements of globalization necessitate that graduates possess the ability to communicate seamlessly with global practitioners and navigate relevant international regulations. These competencies are increasingly recognized as urgent needs in the contemporary labor market.

Recent years have witnessed the emergence of "Internet+ Education," leading to significant policy initiatives from China's Ministry of Education, including the "Education Informatization 2.0 Action Plan," the "Outline of the 14th Five-Year Plan and Vision 2035," and "China Education Modernization 2035." These documents underscore the critical importance of educational informatization and highlight aspirations for developmental progress. Specifically, the Fourteenth Five-Year Plan emphasizes the imperative of achieving personalized training for individual students, positioning personalized learning as a focal point of educational reform.

To effectively implement personalized teaching, educators must develop tailored instructional materials and curricula aligned with both the future trajectories of students and the unique characteristics of their institutions. This approach emphasizes a learner-centered framework, promoting student agency while maintaining teacher guidance, with the ultimate goal of enhancing students' competencies and capabilities.

Under traditional educational models, students often experience a lack of engagement and joy in learning, stifling their creativity. Therefore, establishing a personalized teaching framework—integrating multimedia technology, network resources, and artificial intelligence—is crucial. This framework should harmonize teaching content with personalized pedagogical approaches, creating a system that responds to individual learning needs.

We are now in an era of networked information education, where teaching methodologies are increasingly diverse. The advent of network technology enables educational activities to reach a broader audience, allowing students to engage in learning at their own pace and according to their specific preferences regarding time, location, and content. Traditional teaching methods often fall short of meeting contemporary educational needs, necessitating more interactive and dynamic teacher-student exchanges. Communication has evolved from a unidirectional model to a more collaborative and multidimensional one.

Educators are no longer the sole authority in language learning; instead, they facilitate an organic integration of professional studies and instructional methods. The principles of foreign language pedagogy will be effectively integrated across various courses, employing a range of teaching strategies that support personalized learning. These methodologies, including immersion, the direct method, the listening approach, situational language teaching, and the communicative method, each contribute uniquely to personalized instruction, placing a premium on student-centered learning.

Individualized teaching fosters differentiated instructional strategies that cater to students' unique needs, thereby promoting optimal development. In the digital age, many students leverage computers and the Internet for knowledge acquisition, shifting the paradigm from traditional didactic teaching to more autonomous learning experiences. Educators play a pivotal role not only in assisting students with the collection, organization, selection, and processing of information but also in guiding them through problem-solving challenges in their learning journeys. This approach enhances students' overall competencies, particularly in practical application and innovative thinking.

2. Current Status of the Development of Personalized Teaching in Higher Education

The origins of personalized teaching can be traced back to ancient Greece, where Socrates introduced the "maieutic" method, emphasizing the importance of interaction between teachers and students. This foundational approach laid the groundwork for subsequent developments in personalized

teaching. In the 19th century, the Lancaster-Bell system emerged as a hallmark of Western personalized education, effectively harnessing student strengths through a peer guidance framework. Additionally, the Dalton and Vennetka systems, prominent in the early 20th century, underscored the importance of fostering individual student development, becoming influential models of personalized instruction. However, personalized teaching experienced a relative decline from the 1930s until the onset of World War II.

The resurgence of personalized teaching occurred between the 1960s and 1980s, characterized by the emergence of various instructional models, including individualized instructional teaching, prescribed individualized teaching, individualized teaching systems, adaptive learning environments, and technology-enhanced personalized learning. These models leverage modern information technology to tailor learning speeds and objectives according to students' actual abilities, promoting independent learning. Nonetheless, they also present certain limitations.

Since the 1990s, personalized instruction has garnered increasing attention and recognition on a global scale. This period is often referred to as the era of personalized education, marked by a growing acknowledgment that traditional teaching methods may inadequately address the diverse learning needs of students. In response, educators have begun to explore strategies to effectively meet individual student requirements, emphasizing respect for each student's unique differences and developmental potential.

John Jenkins identifies six essential elements that provide a framework for implementing effective individualized instruction: the dual role of the teacher, diagnosis of student learning characteristics, a collaborative school culture, an interactive learning environment, flexible timing and pacing, and authentic assessment. These elements highlight the critical interactions between teachers and students and underscore the importance of students applying their knowledge and skills effectively.

During this period, American educator Allen Ornstein proposed five types of personalized instruction: mastery learning, adaptive teaching, self-directed learning, strategic teaching, and computerized teaching. Each of these types emphasizes learner initiative and personalization within the educational process, employing diverse strategies such as technology integration, real-world applications, and cooperative learning.

Jenkins further posits that contemporary educational institutions must focus on transforming the learning environment and teaching practices to achieve two primary objectives: understanding and diversity. These strategies aim to provide specific pathways for schools to fulfill these goals. Throughout this era, personalized instructional practices have varied significantly, contingent on the quality of implementation. All of these models prioritize the learner, emphasizing the construction of teaching environments that cater to individual needs and facilitating students' realization of their developmental potential.

Currently, numerous scholars in China are actively researching personalized teaching, primarily from two perspectives:

2.1. Main Issues of the Study

First, research on the concept of individualized education has gained traction. Some scholars argue that subjective education represents a contemporary understanding of individualized education and serves as a fundamental principle in its development. Discussions often center on the basic conditions necessary for implementing individualized education and the relationship between individualized education and curriculum design. Advocating for the respect of individual differences among both teachers and students has been recognized as an inevitable trend in modern educational practices. Personalization in teaching encompasses not only the individualization of educators but also the personalization of learners. Various perspectives highlight the establishment of an educational framework that respects differences and values individuality. This framework encourages students to make independent choices from a rich array of educational resources, fostering engagement and leveraging their strengths to facilitate better developmental outcomes.

Second, research on personalized teaching pathways has emerged. Some researchers contend that students' personalities should be cultivated through research-based learning and tiered instructional approaches. Others propose individualized teaching as a means to implement subjective education, advocating for the creation of teaching environments that promote the personality development of college students and encourage them to embrace innovative pathways in personalized instruction.

Third, scholars in China have examined the connotation and characteristics of personalized teaching. They assert that personalization enhances teaching quality and serves as an effective method for stimulating student interest and maximizing their potential. Personalization is characterized by democratic principles, subjectivity, creativity, and harmony. Other scholars emphasize that the essence of personalized instruction lies in enabling teachers and school administrators to adopt instructional strategies tailored to student needs, fostering growth in personality, social skills, and academic performance that exceeds what is achievable through traditional non-personalized instruction. The adaptability of teachers to their students is central to the learning process.

Fourth, there has been extensive discourse on the practical implementation of personalization. Scholars have raised various inquiries concerning how to address personalization in teaching and learning, as well as how to promote its reasonable implementation. Effective learning strategies for students and flexible teaching approaches for educators are essential. Creating a harmonious atmosphere, leveraging modern information technology, and analyzing fundamental strategies for implementing personalized teaching across various dimensions—such as teaching objectives, content, organization, guidance, learning environments, and evaluation—are critical components of this discussion.

Fifth, research has identified various personalized teaching models. Prominent among these are the dynamic stratified personalized teaching model, the flexible teaching model, the personalized resource organization model, and a fluid dynamic teaching model. Additionally, five key components of personalized instruction are highlighted: collective guidance supplementation, learning progress tracking, learning starting points, learning sequences, and subject selection.

Sixth, the implementation of individualized instruction by teachers has been the focus of many scholars. They argue that personalized teaching pertains not only to students but also encompasses diverse and individualized teaching styles

among educators. The uniqueness of teaching style is reflected in the distinctive content, methods, and expression used in instruction. The diversity of teaching styles manifests through a range of approaches that foster the multifaceted development of teachers' individual pedagogical styles. Some scholars advocate for the development of a personalized teaching philosophy that encompasses goal orientation, the teaching process, and the teacher's self-development. This philosophical framework can help educators cultivate a personalized teaching atmosphere. Others explore how factors such as school management styles, cultural atmospheres, and evaluation methods contribute to the gradual formation of personalized teaching practices among educators.

2.2. Research Perspectives

Firstly, several studies on personalized teaching have emerged from the perspective of technology. One researcher examined a "Personalized Teaching System and Implementation Based on Learning Behavior Analysis on E-Learning Platforms," emphasizing that such platforms should feature autonomy, interactivity, and personalization. The study highlights the importance of analyzing learners' online behavior data to provide tailored learning recommendations for those with similar learning characteristics and needs. Additional research in this area includes the construction of prototypes for adaptive intelligent teaching systems, the establishment of a personalized teaching effect model where students' performance in information technology courses serves as the dependent variable, and classroom teaching evaluation indexes as independent variables. Other investigations focus on computer-assisted personalized teaching systems and the design of personalized teaching using visual modeling techniques.

Secondly, scholars have analyzed and evaluated personalized teaching from various perspectives beyond technology. Some researchers have introduced the concept of personalized education by examining students' viewpoints, curriculum design, teaching strategies, and community participation, drawing from the theory of multiple intelligences. Their findings suggest that project-based learning is an essential method for realizing personalized education and fostering creativity and practical abilities among students. This research elucidates the foundational connections between multiple intelligence theory and personalized teaching, thereby contributing positively to the promotion of both concepts in China.

Thirdly, a more systematic approach to personalized teaching has been developed by some scholars. They propose different framework structures for personalized teaching based on varied entry points and teaching objectives, aiming to establish a theoretical foundation for practical implementation. Key components of this framework include:

Teaching Purpose: Cultivation of the "common free personality."

Mechanisms: Interaction between individuals and their environments as the mechanism for personalized teaching, with intersubjectivity serving as the bond in the teacher-student relationship.

Paradigms: Emphasizing a "return to the living world" as the guiding paradigm.

Strategies: Autonomy and self-governance as fundamental strategies of personalized teaching.

Auxiliary Means: Information technology media as supportive tools for personalized teaching.

Basic Modes: Incorporating mastery teaching, strategic teaching, creative thinking teaching, affective teaching, and democratic teaching as the foundational modes of personalized instruction.

Evaluation Concept: Development is highlighted as a core concept for evaluating personalized teaching effectiveness.

This study primarily focuses on the practical realities faced by teachers, providing reasonable educational concepts and insights into personalized teaching methodologies.

3. Limitations of Individualized Instruction in Higher Education

3.1. Harmonization of Objectives and Lack of Targeting

Current research highlights significant issues in the design of teaching objectives, particularly the absence of goal-oriented approaches. In Chinese universities, few institutions successfully integrate teaching with specialization. Most colleges and universities rely on a standardized national curriculum, leading to a uniform syllabus and teaching methods. Consequently, training objectives tend to converge, diluting the distinct purpose of university education and failing to fulfill its instrumental and supportive roles.

This uniformity, while beneficial in some respects—such as teaching management, curriculum standards, and evaluation methods—poses considerable disadvantages. A significant drawback is the neglect of the needs of the learners and the development of their autonomy in the talent cultivation process. Educators often emphasize the mastery of knowledge at the expense of fostering innovative abilities and personal development. Teaching typically focuses on course delivery rather than addressing the real-world needs of students.

In practice, to meet educational requirements, teachers often prioritize textbook content, using textbooks and related materials as the primary teaching resources. This reliance results in a teaching process that emphasizes content transmission, neglecting the importance of student engagement and active learning. Consequently, university education frequently fails to stimulate and maintain students' interest, hindering their acquisition of knowledge and leaving many learners in a passive state with low practical abilities and minimal sense of participation. The content is often simplistic and lacks depth.

In the context of personalized education in higher education, students express a strong desire for changes in the teaching content, reflecting a deficiency in the variety of learning resources available during instruction. Interview results indicate that teachers often limit themselves to textbooks, using media resources merely to supplement the prescribed content. This restriction hampers students' ability to explore beyond the basic curriculum, leading to a gradual decline in their interest in learning. The advent of the Internet and the proliferation of new media have further diminished the allure of traditional classrooms and textbooks.

To address the humanistic and instrumental aspects of university public courses, curricula should integrate explicit and implicit elements, core and peripheral courses, as well as micro-courses and long-term learning pathways. The curriculum should encompass essential knowledge, competency development materials, multimedia resources, and Internet-based informational content, alongside guidance

for research-based learning processes.

3.2. Single Approach and Lack of Diversity

Participants in the interviews viewed classroom teaching as the sole avenue for delivering education and achieving knowledge transfer. In light of new technologies, such as intelligent education and information technology, the prevailing lack of diversity in teaching methods fails to meet the needs of students growing up in an information-rich environment. With the widespread availability of computers and smart devices, there is an urgent need to consider non-intellectual factors that can enhance student learning.

3.3. Organizational Form and Lack of Flexibility

Currently, many universities utilize large class sizes, typically around 60 students, which centralizes teaching tasks and constrains study time, making it challenging to adapt the teaching organization. While this centralized approach can enhance teaching efficiency, its rigidity poses significant drawbacks. To improve educational outcomes, it is essential to diversify teaching organizations. This includes tailoring instructional methods to meet the unique characteristics of students and leveraging modern information technology to enhance teaching activities. Exploring individualized and group teaching methods within university settings is crucial for fostering a more adaptable learning environment.

3.4. Evaluation is Outcome-Oriented and Lacks Diagnostic Qualities

The evaluation system in higher education primarily employs a standardized assessment model, requiring students to pass national examinations (e.g., university level 4 or 6) as a measure of graduation eligibility. While uniform assessments have their merits, they often disconnect general knowledge from the specific professional competencies that universities aim to develop in students. This approach inadequately reflects students' practical skills and limits their ability to communicate and collaborate effectively on a global scale. Furthermore, the absence of diagnostic evaluations hinders the integration of summative and formative assessments that could better support student learning. Comprehensive learning assessments should provide diagnostic feedback, enabling learners to identify their weaknesses and enhance their educational experience.

4. Suggestions for the Development of Personalized Teaching in Higher Education

To improve the quality of education and develop students' comprehensive abilities, it is crucial to address the limitations of uniform objectives, singular methodologies, inflexible organizational structures, and outcome-focused evaluations. The following suggestions aim to adapt to today's information-driven environment and foster the development of innovative professionals:

4.1. Formulation of Personalized Teaching Objectives:

Teaching objectives should be tailored to align with disciplinary characteristics and student needs. Educators should focus on cultivating comprehensive skills, including creativity, independent learning, and teamwork, alongside specialized knowledge. This alignment will better prepare students for future career development and personal growth.

4.2. Enrichment of Teaching Content:

Teachers are encouraged to move beyond traditional materials and incorporate a diverse array of content and examples. By integrating modern technological resources such as the Internet and new media, educators can offer varied subject materials that stimulate students' curiosity and enhance their practical skills.

4.3. Diversified Teaching Methods:

Adopting a range of teaching methods is vital for moving away from conventional classroom models. Utilizing modern technologies, such as intelligent education systems, allows students to engage flexibly with the learning challenges presented by different disciplines. In addition, teachers should encourage participation in interactive activities like practical projects and group discussions, fostering innovative thinking and problem-solving abilities.

4.4. Flexible and Diverse Forms of Teaching Organization:

For large-class settings, it is advisable to gradually diversify teaching organization while maintaining efficiency. Full utilization of modern information technology can promote individualized and group teaching, creating a flexible learning environment that enhances student motivation and engagement.

The proposed development of personalized teaching aims to transcend the rigidity of traditional educational models, fostering an environment that caters to the individual needs of students. By establishing personalized teaching objectives, enriching teaching content, diversifying methods, and promoting flexible organizational structures, higher education can cultivate students' comprehensive skills and innovative capacities. This shift emphasizes not only the teaching of specialized knowledge but also active student participation and personal development. Implementing these recommendations will create a dynamic and adaptable teaching and learning environment, better equipping students to meet the demands of a changing society while nurturing competitive and creative talents.

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