

Research on the Current Situation and Problems of Information Development in Application-oriented Undergraduate Education

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ABSTRACT

With the rapid advancement of modern information technology, application-oriented undergraduate education has undergone a transformation from the traditional teacher-centered model to a model that focuses on the individual needs of students. The restructuring of the application-oriented undergraduate education system has promoted the sharing of educational resources, educational equity, and the development of personalized education. As an essential part of the national talent cultivation system, application-oriented undergraduate education has contributed significantly to the country's industrial upgrading and economic development. The core aspects of information development in application-oriented undergraduate education include the digitalization of teaching resources, online teaching and distance education, intelligent teaching, virtual practical training, and the informatization of educational management. These changes have improved the quality of education and enriched learning resources. However, the development of information technology in application-oriented undergraduate education faces several challenges, including uneven distribution of resources, insufficient information technology application skills among teachers, outdated teaching content, increased difficulty in evaluating learning outcomes, information security and privacy protection, and a lack of information literacy among students. To address these issues, a series of comprehensive measures are needed, including increasing investment, optimizing resource allocation, strengthening teacher training, updating teaching content, improving the evaluation system, and enhancing students' information literacy. These efforts aim to promote the high-quality development of informatization in application-oriented undergraduate education.

Keywords: *Application-oriented undergraduate education, Informatization, Issue research, Development paths.*

1. INTRODUCTION

The development of information technology has profoundly impacted the field of higher education, with its application promoting a comprehensive renewal of educational concepts, teaching models, and the educational system. It has enabled application-oriented undergraduate education to shift from the traditional teacher-centered model to one that places greater emphasis on meeting the individual needs of students. Through precise analysis of student learning habits using big data, personalized teaching is achieved. It has also facilitated the spread of the concept of lifelong learning, with online learning platforms enriching learning resources and making learning methods

more flexible.[1] Teaching models have also been transformed by the development of cloud computing and mobile internet, with blended learning that combines online and offline elements breaking the constraints of time and space. The flipped classroom model, using videos and online courses, has made classrooms more efficient.[2] Furthermore, information technology has driven the restructuring of the education system, with Internet of Things and cloud computing technologies enhancing the sharing of educational resources and promoting educational equity. The integration of artificial intelligence and big data has fostered interdisciplinary integration with other subjects. The development of information technology itself has also led to the emergence of new disciplines

and career paths such as data science and artificial intelligence. These changes have not only altered teaching and learning methods but have also expanded the scope of education. As information technology continues to evolve, future education is set to move towards a new era that is more personalized, intelligent, and efficient.[3]

2. THE MAIN CONTENTS OF THE INFORMATIZATION OF APPLICATION-ORIENTED UNDERGRADUATE EDUCATION

The informatization of application-oriented undergraduate education mainly involves integrating information technology into various aspects of talent cultivation, aiming to improve the quality, efficiency, and coverage of education. [4] The specific contents include:

- Digitalization of teaching resources: This involves digitizing textbooks and courseware, creating a rich digital teaching resource repository for the convenience of both teachers and students.
- Online teaching and distance education: Utilizing online platforms for delivering courses and providing distance education breaks the constraints of time and space, offering learning opportunities to a broader student population.
- Intelligent teaching: Through artificial intelligence technologies such as intelligent tutoring systems and personalized learning recommendations, along with analyzing student learning behaviors through big data, people can achieve personalized adjustments to teaching content and progress.
- Virtual practical training: Utilizing technologies like Virtual Reality (VR) and Augmented Reality (AR) to create virtual training platforms, students can engage themselves in practical operations and training within simulated environments to enhance their practical skills.
- Informationization of educational management: Establishing student information management systems and teaching management systems can help to realize the informationization of educational management including student enrollment, grade management, and teaching arrangements, thereby improving management efficiency and transparency.

- Establishment of evaluation and feedback systems: By setting up online evaluation and feedback systems to monitor and assess students' learning processes and outcomes in real-time, schools can adjust teaching strategies and talent development plans accordingly.
- Training of teachers' information skills: By organizing regular information technology training and seminars, teachers can improve their application abilities in information technology and promote innovation in teaching methods.

The informatization of applied undergraduate education not only enhances educational quality and teaching effectiveness but also provides students with diverse learning methods and resources, effectively supporting the development of vocational education.

3. THE CHALLENGES AND ISSUES FACED BY THE INFORMATIZATION OF APPLICATION-ORIENTED UNDERGRADUATE EDUCATION

The informatization of applied undergraduate education plays a significant role in promoting the modernization of education and improving its quality. However, several problems and challenges have been encountered in practice:

3.1 Unequal Resource Allocation

Although information technology has enabled the sharing of educational resources, there is still a significant disparity in the allocation of informatization resources between different regions and schools in practice. Schools in some central and western regions lag behind in terms of hardware facilities and digital resources.

3.2 Slow Improvement of Teacher Skills

Some teachers in institutions lack the necessary knowledge and skills in information technology, making it difficult to effectively utilize informatized teaching tools. This restricts the effectiveness of informatized teaching. Additionally, the mechanisms for continuous learning and skill enhancement for teachers are not sufficiently developed.

3.3 Disconnection Between Teaching Content and Technology Updates

The rapid development of information technology means that the teaching content and curriculum systems in applied undergraduate education cannot keep up with the pace of industrial technology development, resulting in a gap between educational content and market demand.

3.4 Increased Difficulty in Assessing Learning Outcomes

Online and blended learning make the learning process more individualized and diversified. Traditional assessment methods struggle to evaluate students' learning outcomes comprehensively and accurately, requiring the development of more scientific and effective assessment systems.

3.5 Insufficient Information Literacy Among Students

In an informatized learning environment, students need to have a certain level of information literacy and self-directed learning abilities. However, some students currently lack these capacities, which affects the effectiveness of informatized learning.

4. THE DEVELOPMENT PATH OF INFORMATIZATION IN APPLICATION-ORIENTED UNDERGRADUATE EDUCATION

Facing the issues and challenges in the informatization process of application-oriented undergraduate education, adopting comprehensive measures is essential for promoting its healthy development. These comprehensive measures include increasing investments, optimizing resource distribution, enhancing teacher training, updating teaching contents, improving the evaluation system, and bolstering information security and privacy protections, etc., to achieve high-quality development in informatized education.

4.1 Increasing Government and Societal Investments

The government should enhance financial support for the informatization of application-oriented undergraduate education, and encourage enterprises and social organizations to participate in

informatization construction of vocational education through equipment donations, technical support, etc. Increasing government and societal investments is crucial for advancing the informatization of application-oriented undergraduate education, with specific measures such as:

4.1.1 Increasing Budget Allocations

The government should prioritize informatization of application-oriented undergraduate education in education investments, increasing relevant budgets for updating teaching hardware, building and upgrading network infrastructures, as well as developing and purchasing high-quality digital teaching resources and software.

4.1.2 Enacting Preferential Policies

Government can implement favorable policies for enterprises and social organizations that support the informatization of application-oriented undergraduate education, such as tax reductions, financial subsidies, and government procurement priorities, to motivate more societal resources toward the development of informatization in application-oriented undergraduate education.

4.1.3 Encouraging Industry-Education Integration

Government can also encourage enterprises to directly participate in the informatization construction of application-oriented undergraduate education, such as through school-enterprise cooperation models, where enterprises not only provide equipment donations and technical support but also participate in curriculum development and provide practical training bases, making the educational content and training facilities more aligned with industry requirements.

4.1.4 Establishing Cooperation Platforms

The establishment of a cooperation platform between the government, enterprises and educational institutions can effectively coordinate information technology resources, educational resources and industry needs so that to collectively promote the development of informatization in application-oriented undergraduate education.

4.1.5 Supporting Research and Development and Innovation

Governments and society should jointly invest in the research and development and innovation of educational technology, encouraging the development of information technology applications and solutions that fit the characteristics of application-oriented undergraduate education, thereby enhancing the overall level and effect of educational informatization.

4.2 Optimizing Resource Allocation Mechanisms

Establishing a fairer and more efficient resource allocation mechanism to ensure resources can cover application-oriented undergraduate colleges in central and western regions, narrowing the digital divide between urban and rural areas and different regions. Optimizing the resource allocation mechanism is a key measure in the development of informatization in application-oriented undergraduate education, aimed at ensuring every student, regardless of geographical location, can access high-quality educational resources.

4.2.1 Establishing a Dynamically Adjustable Financial Support System

Financial funds can be allocated dynamically based on factors such as the geographical location, number of students, and development level of application-oriented undergraduate universities to ensure that the central and western regions receive more support.

4.2.2 Implementing Differentiated Policies

For regions and schools with poor resource configurations, governments can implement differentiated policies, such as providing additional technical equipment, teaching resources, and professional training support, to compensate for these deficiencies.

4.2.3 Promoting Resource Sharing Platforms

Using technologies such as cloud computing to establish educational resource sharing platforms can concentrate high-quality teaching resources for shared use by application-oriented undergraduate universities nationwide, effectively reducing the costs of resource construction and maintenance.

4.2.4 Strengthening Inter-regional Cooperation

Encouraging and supporting the exchange and cooperation of educational resources between regions, especially encouraging resource-rich application-oriented undergraduate universities to establish assistance mechanisms with vocational colleges in remote areas, can help to improve the quality of education in remote regions through remote teaching, faculty support.

4.2.5 Encourage Participation from Social Forces

Through policy guidance and incentives, government can encourage enterprises, non-governmental organizations, and social groups to participate in the informatization construction of application-oriented undergraduate education, especially investing in regions with uneven resource distribution, forming an educational support system involving both government and society.

4.2.6 Optimizing the Allocation of Teaching Staff

In addition to material resources, the rational allocation of teaching resources should also be emphasized. Specifically, resources of teachers with strong information technology skills should be made available to students in remote areas through remote teaching, among other methods.

By implementing these strategies, the gap in informatization of application-oriented undergraduate education among different regions can be effectively narrowed, promoting educational equity and improving the quality of the country's vocational education.

4.3 Strengthening Teacher Training and Professional Development

Schools can regularly provide teachers with information technology training to enhance their IT application capabilities and innovative teaching methods. At the same time, establishing a system for continuing education and professional development for teachers helps encourage them to continually learn and grow. Strengthening teacher training and professional development is crucial for the informatization of application-oriented undergraduate education.

4.3.1 Customized Information Technology Training

Schools can design customized IT training courses according to teachers' basic levels and teaching needs, covering areas such as basic operational skills, teaching software application, online course design, and virtual training technology, to ensure that every teacher can effectively use information technology for teaching.

4.3.2 Establishing Online Learning Platforms

It is convenient to utilize online platforms to provide continuous teacher training and resource updates, including the latest educational technology trends, teaching cases, online seminars, etc., These platforms can facilitate teachers to learn and interact anytime, anywhere.

4.3.3 Encouraging Practice and Research

Teachers are encouraged to participate in practical projects related to informatization teaching, such as developing new teaching tools, participating in school-enterprise cooperation projects, etc., to enhance their technical application capabilities through actual operations. At the same time, teachers should be supported to conduct teaching research related to educational technology, and encourage innovation and improvements of teaching methods.

4.3.4 Establishing a Professional Development Path for Teachers

The importance of informatization teaching capabilities in teachers' career development should be clarified. By making it an important criterion for promotion and awards, it helps motivate teachers to actively learn and improve their information technology application capabilities.

4.3.5 Providing Opportunities for Cross-School Exchange and Learning

By participating in regional or international exchange activities, teachers can learn advanced experiences and methods. By visiting and studying abroad, teachers can broaden their horizons and promote teaching innovation.

4.3.6 Strengthening School Support and Incentive Mechanisms

Schools and educational authorities should provide necessary hardware support, study time, and financial support for teachers, while establishing effective incentive mechanisms, such as rewards for educational technology innovation and the transformation of achievements, creating a positive atmosphere for teacher professional development.

By implementing the above measures, the information technology application and teaching innovation capabilities of teachers in application-oriented undergraduate education can be effectively enhanced, providing a solid teaching force for the deep development of informatization in application-oriented undergraduate education.

4.4 Updating and Optimizing Teaching Content

Updating and optimizing teaching content is one of the core tasks in the development of informatization in application-oriented undergraduate education, which is crucial for improving students' competitiveness in employment and adaptability. Working closely with industry to update teaching content timely, introducing the latest industry knowledge and technology to ensure that education and training align with market demands.

4.4.1 Establishing Industry-Education Integration Mechanisms

Through establishing stable cooperation with industry enterprises and regularly invite industry experts to participate in course setting and updates of teaching content, ensuring that teaching content can be ensured that it is in line with the latest industry development trends.

4.4.2 Introducing Real-time Industry Projects

Through school-enterprise cooperation, real-time projects from enterprises are integrated as teaching cases or practical training projects, allowing students to master the latest technologies and work methods while solving real problems.

4.4.3 Regularly Conducting Course Reviews and Updates

Schools should establish a dedicated course review committee to regularly review and update existing courses, adjust teaching outlines and content timely according to technological developments and market demand changes.

4.4.4 Developing Modular Teaching Resources

Using modularly designed teaching resources for quick replacement and updating of specific parts of course content can increase the flexibility and efficiency of updating teaching content.

4.4.5 Utilizing Online Platforms to Share Resources

Utilizing online education platforms to provide teachers and students with the latest industry reports, technical articles, and online courses can support the acquisition of cutting-edge industry knowledge.

4.4.6 Emphasizing Skill and Capability Training

While updating teaching content, teachers also should focus on cultivating students' core competencies, such as innovative thinking, problem-solving ability, teamwork, and lifelong learning skills, ensuring students can adapt to a rapidly changing work environment.

4.4.7 Promoting Interdisciplinary Education

Schools should encourage and support the development and implementation of interdisciplinary courses, in line with the industry's demand for versatile talents, to cultivate students' comprehensive abilities.

Through these measures, the teaching content of application-oriented undergraduate education can not only reflect the latest technological developments and industry demands but can also comprehensively enhance students' professional skills and overall quality, better preparing them for future work challenges.

4.5 Improving the Learning Outcomes Assessment System

Perfecting the assessment system for learning outcomes is an indispensable part of the informatization of application-oriented undergraduate education. It helps to accurately reflect students' learning situations and provides a basis for teaching reforms. Developing new assessment tools and methods compatible with informatized teaching, such as using big data to analyze students' learning behaviors, allows for a comprehensive evaluation of the learning process and outcomes.

4.5.1 Establishing a Diversified Assessment System

Schools can construct a diversified assessment system that combines formative and summative evaluations, tailored to the characteristics of informatized teaching, to comprehensively assess students on multiple dimensions including knowledge mastery, skill application, innovation ability, and learning attitude.

4.5.2 Utilizing Big Data and Artificial Intelligence Technology

Developing and applying big data analytics and artificial intelligence technology to analyze students' online learning behaviors, assignments, tests, and other data, can provide schools with personalized learning feedback and teaching suggestions.

4.5.3 Developing Adaptive Learning Assessment Tools

It is more fair and accurate to use information technology to develop adaptive assessment tools that automatically adjust the difficulty and content of assessments based on students' performance and progress.

4.5.4 Introducing Peer Review and Self-assessment

By encouraging interactive evaluation methods such as peer review and self-assessment, it helps enhance students' critical thinking and self-reflection abilities, while increasing the participatory and dynamic nature of assessments.

4.5.5 Implementing Project and Practical Training Outcome Assessments

For vocational skills learning, schools can add assessments based on projects and practical training outcomes so that to evaluate students' comprehensive abilities and application levels through actual operations and outcomes presentations.

4.5.6 Ensuring Feedback and Application of Assessment Results

Establishing efficient feedback mechanisms for assessment results can promptly convey results to students and teachers for guiding student learning and teaching improvement.

4.5.7 Continuously Optimizing Assessment Tools and Methods

In order to accommodate the development and changes in educational technology and teaching methods, assessment tools and methods should be regularly evaluated and optimized to ensure their effectiveness and adaptability.

By perfecting the learning outcomes assessment system, application-oriented undergraduate education can more accurately grasp students' learning effects, promoting continuous improvement and optimization of teaching and learning, and providing students with more targeted learning support.

4.6 Enhancing Students' Information Literacy

Enhancing students' information literacy is a necessity to meet the demands of contemporary society, especially in the field of application-oriented undergraduate education, where information literacy is directly related to students' professional skills and comprehensive abilities. Information literacy education should be integrated into the vocational education system to cultivate students' abilities in information acquisition, processing, analysis, and application, as well as awareness of cyber security and ethics.

4.6.1 Establishing Information Literacy Education Standards

Schools should define the goals and content of information literacy education, including basic

computer operation skills, network information retrieval and evaluation, data processing and analysis abilities, as well as cyber security and digital ethics.

4.6.2 Integrating into Professional Course Teaching

Information literacy education should be incorporated into the various professional courses of application-oriented undergraduate education so that students can enhance their information processing and application abilities while learning professional knowledge through real cases and projects.

4.6.3 Offering Specialized Information Literacy Courses

Schools should design and offer specialized information literacy courses covering basic knowledge and applications of information technology, cyber security protection, digital copyright, and ethics to ensure that every student can systematically learn these knowledge areas.

4.6.4 Strengthening Practical Teaching

Through experiments, practical training, and project assignments, enhance students' practical operation abilities in information technology and improve their capabilities to solve practical problems.

4.6.5 Promoting Online Learning Resources

Utilizing online platforms and digital resources to enrich students' learning methods, encouraging students to independently learn through open online courses, digital libraries, and other resources can enhance students' self-learning and lifelong learning capabilities.

4.6.6 Conducting Cyber Security and Ethics Education

By organizing lectures, seminars, and other activities, it helps reinforce students' awareness of cyber security and digital ethics, teaching them to protect personal privacy, respect intellectual property rights, and uphold cyber morality.

5. CONCLUSION

Through these measures, not only can students' abilities to apply information technology be improved, but their critical thinking, innovation consciousness, and sense of responsibility can also be cultivated, laying a solid foundation for their future learning and career paths.

In summary, the development path of informatization in application-oriented undergraduate education can not only enhance the level of informatization in application-oriented undergraduate education, promote the effective use of educational resources and educational equity but also innovate educational and teaching models, fostering students' practical and innovative abilities. This provides a solid foundation for the high-quality development of application-oriented undergraduate education and cultivates more high-quality application-oriented talents for the continuous and healthy development of the social economy.

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