Education Reform and Development, 2025, Volume 7, Issue 4
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

An Analysis on The Cultivation Path of Application-oriented Undergraduate Talents in Higher Education under the Background of Education Digitization

Kai Wang*, Liying Guo, Liyan Wang, Rongrong Zheng, Haiyue Wang, Yaoyao Bai, Xueying Yu

School of Petrochemical Engineering, Shenyang University of Technology, Liaoyang 111003, China

**Author to whom correspondence should be addressed.*

Abstract: Under the background of digitization, the digitization of higher education is an important breakthrough to build a digital education powerhouse. Through the comprehensive application of digital technology, the quality of higher education can be significantly improved, education equity can be further promoted, and the high-quality training of applied undergraduate talents can be realized. Therefore, to promote the sustainable development and innovation of applied undergraduate talents training of higher education, this paper expounds the necessity of digitization of applied undergraduate education of higher education through deeply analyzing the connotation of digitization of higher education, and puts forward a path for the cultivation of applied undergraduate talents of higher education.

Keywords: Digital education; Application-oriented undergraduate; Talent cultivation; Training path

Online publication: April 28, 2025

1. Introduction

In today's world, human society has moved from industrialization to digitization and intelligent, and the educational revolution led by digital transformation has officially arrived. Promoting the digital transformation of education has become the core issue of educational revolution and development. Having seized the opportunity of the era, countries around the world actively promoted the deep integration of digital technology and education. They innovated education and teaching with digital technology and explored new educational models. The European Union released the "European Digital Competence Framework for Citizens" in 2013 and updated it in 2022. The updated framework divides digital skills into five categories: information and data, communication and cooperation, digital content creation, security and problem solving [1]. In 2018, creating a broadly applicable framework for digital competency development, UNESCO published the Digital Literacy Global Framework, which guided countries around the world to develop and assess digital competencies [2,3]. Launching the "Digital

Literacy Accelerator" program in 2021, the Office of Educational Technology of the US Department of Education cultivated students' digital literacy to promote the development of digital talents, to enhance international competitiveness in the digital age [4]. In 2023, the United Kingdom's Joint Information Systems Committee (JISC) issued the "Digital Transformation Framework for Higher Education," in which the vision of the digital transformation of British higher education was defined and the goal of digital transformation was put forward around "united and efficient learning" [5]. With the vigorous development of the digital information technology industry, the digital development of higher education in some countries has begun to move towards a deeper, more scientific, and more efficient direction while successfully transforming.

At present, China is at a critical stage of building an education powerhouse in the new era, and higher education has entered a stage of popularization. Digital transformation is related to whether it can meet the personal needs of lifelong learning talent cultivation. In 2012, China issued the "Guiding Opinions on Advancing the Construction of New Education Infrastructure to Build a High-quality Education Support System" and "Digital Economy Development Plan for the 14th Five-Year Plan Period," both of which emphasized the importance of promoting education digitization [6]. These policies served as an important foundation for the digital transformation of China's higher education. Accelerating the digital transformation of higher education is of great practical significance for China to establish and improve a high-quality education system and build a learning-oriented society and a learning-oriented country with lifelong learning for all. Education digitization is a basic requirement for the innovation and development of application-oriented undergraduate education in China's higher education, as well as an important support for the implementation of education intelligence and the promotion of education modernization. Therefore, promoting the digital transformation and development of higher education and innovating the development path of talent cultivation are of great significance for promoting the long-term development of application-oriented undergraduate colleges and universities.

2. Connotation of the digitization of higher education

With the help of the cross-field and cross-industry characteristics of digital technology, digitization of higher education, which assists the whole process and link each segment of higher education to realize resource integration and joint innovation, promotes the coupling of higher education and digitization under the guidance of technology and digital transformation, to form a new educational ecology oriented by comprehensive integration and empowerment of all elements [7,8]. The core task of digitization of higher education is to cultivate innovative talents with digital literacy and innovation ability, to meet the urgent demand for digital skills in future work scenarios. Digitization of higher education is a comprehensive process that not only involves the transformation and optimization of educational models, contents, tools, and methods through digital technology but also strives to comprehensively improve the quality and efficiency of education. The core elements of digitization of higher education include the digital presentation of teaching content, the sharing and communication of educational resources, the innovation of teaching methods, the personalized shaping of the learning process, and the diversified implementation of evaluation methods [9,10]. In addition, making education more accurate and efficient digitization of higher education can also use big data analysis technology to gain in-depth insight into students' learning behaviors and customize personalized learning paths for each student.

3. Necessity of digitization of application-oriented undergraduate education in higher education

As an open system, application-oriented undergraduate colleges and universities mainly include different functional elements such as education, teaching and management, and each element is interrelated. The purpose of digitally applied undergraduate education is to use digital technology to promote the upgrading and transformation of undergraduate education, optimize the allocation of resources, reorganize education units in fine detail, and reshape the education supply model according to the characteristics of digital-driven work. Promoting the digital construction of application-oriented undergraduate colleges and universities not only will help educators to accurately grasp the development direction and vision of the digital transformation of application-oriented undergraduate education, it will also promote the deep embedding of digital technology in all aspects of higher education. These transformations realize_new education and operation models, and change the business model, strategic direction, and value proposition of higher education institutions.

First of all, education digitization optimizes the allocation of educational resources. Through the digital platform, high-quality educational resources can be more widely disseminated, which breaks the geographical and time constraints, so that more students can enjoy high-quality education. This will not only help improve educational equity, but also improve the overall level of education. At the same time, education digitization also has a positive impact on the student experience, with digital tools providing students with more opportunities to interact, collaborate, and make learning more social. By collecting and analyzing students' learning data in real time, the digital platform can help students better understand their learning status and formulate more effective learning plans. Moreover, it can realize real-time interaction and feedback, strengthen communication and cooperation between teachers and students, promote teaching and learning, and help improve the scientific research level and innovation ability of the school.

At the same time, the digitization of education has greatly expanded the diversity of educational methods. Traditional face-to-face teaching is no longer the only option. Online learning, blended learning, and the application of advanced technologies such as virtual reality and artificial intelligence make teaching more vivid and flexible. Students can learn at their own pace according to individual needs, while teachers can use digital tools to better assess students' learning progress and effectiveness.

Moreover, education digitization has influenced the working mode of teachers. Teachers are no longer limited to the traditional ways of preparing and teaching lessons, but can also use digital tools for more efficient teaching design, student management, and data analysis. This not only reduces the work burden of teachers, but also provides more possibilities to improve the teaching effect. Finally, the aim of promoting the innovation and reform of the talent cultivation model will be realized, the quality of talent cultivation in undergraduate education will be improved, and the level of service to society will be improved.

Last but not least, the education digitization helps to improve the governance level and operational efficiency of colleges and universities. Colleges and universities improve the scientificity and effectiveness of decision-making by applying digital concepts to realize information and intelligent management. At the same time, resources in the main body of undergraduate education should be fully pooled, the internal and external management mechanism of undergraduate education should be straightened out, the whole process of internal and external work system should be improved, and the value of undergraduate education in promoting local development and serving society should be continuously enhanced.

4. Cultivation paths for application-oriented undergraduate talents in higher education under the digitization background.

4.1. Clarify the digital concept and anchor the original mission of "the people-centered education"

Education digitization is driven by digital technology and fully integrates all data elements to promote high-quality development of education. Based on this, it anchors the original mission of " the people-centered education", establishes the correct concept of digital education, and clarifies the goal of educating people to realize the comprehensive development of application-oriented undergraduate talents in higher education.

Firstly, the correct digital concept should be established. Colleges and universities should pay attention to the humanistic value of digital technology while absorbing its instrumental value. New industries and models, which emerge endlessly, have greatly changed the occupational structure and promoted the improvement of the knowledge and skill structure of talents in the digital era. The society has higher and higher standards for professional talents, so it is necessary to vigorously improve the digital literacy and skills of teachers and students in colleges and universities to meet the demand for talents in industrial transformation and upgrading. With the help of advanced digital technology and scientific evaluation concepts, more accurate and comprehensive evaluations of teachers' teaching effects and students' learning outcomes should be carried out to promote the high-quality development of higher education.

Secondly, the goal of digital education should be clarified. In the current period of digital transformation of education, digital technology is undoubtedly the most powerful driving force for the development of higher education. Only by clarifying the goal of digital education can we fully promote the wide application of digital technology to meet the needs of society for digital talents. Focusing on students' subjective consciousness and experience, colleges and universities should take moral education as the fundamental task, create a good digital education environment, and realize the transmission of scientific knowledge, the imparting of technical skills, and the cultivation of noble morality in the digital technology-enabled teaching context.

4.2. Establish the concept of digital construction sharing and build a digital platform

A high-level and all-domain infrastructure is the prerequisite for digital education in higher education. Institutions of higher learning should increase human and material input to achieve full coverage of the Internet, upgrade the digital and intelligent level of teaching facilities, and improve the intelligent equipment configuration level of teaching buildings, laboratories, practice bases and other places [11].

Firstly, institutions of higher learning should strengthen the construction of digital teaching resources. Focusing on building digital resource platforms, including digital course resources, digital libraries and smart classrooms, they should provide course resources and teaching services that meet students' individual needs by relying on big data, artificial intelligence, cloud computing and other technologies, and increase the popularity of mobile terminal platforms. At the same time, the construction of digital management platform should be done well, also the teaching work, financial management, employment guidance, logistics services and other work should be unified management to provide references for all departments of colleges and universities to make accurate and scientific decisions through the integration and analysis of various data.

Secondly, colleges and universities should establish a teaching resource base according to the concept of digital construction. Efforts should be made to build the resource base of teaching and teaching, such as the resource base of enterprise post responsibilities, the resource base of teachers' code of conduct, the resource base of cooperative enterprises in practice and training, the resource base of professional skills competition activities,

and the resource base of professional curriculum education practice. We should actively develop digital teaching materials, courseware, videos, and other teaching resources, introduce digital technologies such as hologram, digital twin, virtual reality and virtual digital human, and rely on them to present students with various real learning situations, strengthen students' learning experience and improve learning quality. Various resources, such as online teaching videos, online tutoring videos, online exercise data, and course learning notes, are utilized to promote communication among relevant subjects of application-oriented talent cultivation and improve the utilization efficiency of teaching resources.

4.3. Improve teachers' digital skills training system and enhance digital teaching ability

Teachers are the key force in the cultivation of application-oriented undergraduate talents in higher education. The key to promoting the digital transformation of higher education is to establish and improve the regular digital skills training system for teachers, optimize the online learning platform for teachers, enrich the content of digital skills training, and constantly improve teachers' digital literacy, digital teaching ability, and digital management ability.

Firstly, to meet the individual needs of different teachers, institutions of higher learning should establish a multi-level and multi-form teacher information technology training system. Training plans should be formulated according to teachers' information technology application level and actual needs to ensure the pertinency and practicality of training content.

Secondly, to provide teachers with flexible and diverse learning paths, a combination of online and offline training and centralized and decentralized training should be adopted. Thirdly, a professional training team is the key to ensuring the quality of training. A training team composed of educational technical experts, educational psychologists, instructional designers, enterprise engineers, and other professionals can be considered to provide teachers with high-quality and high-level training services.

Finally, the combination of information technology training and teaching practice is an effective way to improve the training effect. Teachers should be encouraged to apply the knowledge and skills they have learned in actual teaching so as to achieve the goal of teaching and learning [12].

4.4. Innovate the concept of application-oriented talent Cultivation and establish a personalized digital education teaching model

Education digitization has promoted the talent cultivation objectives of application-oriented undergraduate education to be more diversified and complex. In this process, we must always adhere to the student-centered education concept, take improving the quality of education as the core goal, and ensure that the education digitization can be deeply implemented and achieve tangible results.

First of all, based on the digital application technology teachers can write the teaching syllabus more efficiently, design the teaching form reasonably, and constantly explore the digital training mode that meets the needs of students' professional development and career growth. By collecting the data of the whole learning process of students, teachers can understand the knowledge framework, cognitive structure, attitude tendency, learning emotion, learning effect and other main contents of students so that they can accurately grasp the problems in the learning process of students according to the "targeted thinking." So, they can adjust the teaching design in a targeted way so as to facilitate the teaching in accordance with their aptitude in the later period, and finally put forward the guidance ideas for course learning. Through analyzing consultation analyzing and sorting out basic information such as students' comprehensive quality and career development tendency, teachers can

effectively match students' needs, timely push learning resources to relevant students, and truly realize the "private customization" of course learning.

Secondly, teachers should grasp the development opportunities of online and offline hybrid teaching in the new era, take the initiative to carry out teaching innovation, and reform the education and teaching mode. On the one hand, they should optimize teaching methods. At present, most colleges and universities have actively introduced smart teaching platforms covering live broadcast, micro-lessons, tests, homework, communication and other functions such as Rainy Classroom, Chaoxing Learning, etc. To improve the scientific and adaptive teaching methods, teachers should take this as a basis to optimize teaching methods combined with students' actual conditions and subject characteristics. For example, to truly realize "learning," teachers can rely on the smart teaching platform to actively apply the flipped classroom, blended teaching and other teaching modes so that they can reasonably plan the online teaching and offline teaching time, explore the new teaching mode of man-machine collaboration, and increase the time of independent learning and extracurricular learning. On the other hand, the teaching process should be reconstructed. With the help of an intelligent teaching platform, intelligent teaching management can be realized by creating a new pattern, which records the whole teaching process and analyzes comprehensive educational data, so that teachers can teach at any time and students can learn at any time. We should build a community and link diverse learning groups to form a three-dimensional learning scene, promote intelligent, safe and effective education and teaching, and finally realize common learning and resource sharing [13].

4.5. Take students as the center to improve students' digital learning literacy

Education digitization will not only reshape the model of talent cultivation, but also pay more attention to the comprehensive improvement of students' digital literacy and abilities. It can help students understand and apply digital technology, improve information literacy and innovation ability, and adapt to the rapidly changing digital environment. It can also help students efficiently evaluate and screen information in the huge and complex information resources. Students should break the traditional teacher-led thinking mode to cultivate digital thinking and habits, and cultivate the interdisciplinary integration ability, communication and collaboration spirit, critical thinking, and the ability to solve complex problems required in the digital era. At the same time, they should pay attention to the cultivation of teamwork consciousness, creativity and innovation, environmental protection, and sustainable development consciousness.

With the integration of educational information and resources, the issue of digital security has become increasingly prominent. Although the embedding of intelligent terminal devices makes it possible to capture personalized data in all directions throughout the whole cycle, it is necessary to be wary of the new clothes of digital "Machine Behaviorism" and avoid the mistake of behaviorism`s oversimplification of learning. Therefore, to avoid negative consequences, it is necessary to cultivate students' cognition and ability to deal with digital security. At the same time, the importance of digital ethics should be emphasized to guide students to use digital information in a correct attitude and establish a good new ecology of digital education.

4.6. Make full use of data processing technology to carry out in-depth digital teaching evaluation

The form of evaluation of learning has an important impact on the way teaching and learning. Through establishing a digital evaluation system, making full use of digital technology to reform and innovate the evaluation methods of the education system, emphasizing the diversity and comprehensiveness of evaluation,

and build a scientific education evaluation system including knowledge evaluation and the evaluation of non-cognitive factors such as skills, attitudes, participation and so on. Through the introduction of a comprehensive evaluation mechanism, which brings together the evaluation of teachers, students, industry experts, and the public, the comprehensive performance and professional ability of students will be comprehensively measured [14,15].

The evaluation of digital education and teaching has the characteristics of individual, real-time, and comprehensive. And it is mainly reflected in the following three aspects. In the first aspect, application-oriented undergraduate colleges and universities can make use of their advantages in running schools to sign stable cooperation agreements with enterprises so that they can develop big data application platforms for talent cultivation and digital academic evaluation platforms together. The application of a digital academic evaluation platform is processed by digital technology to organize, calculate, and analyze each student's learning situation and final learning effect promptly. In combination with students' daily learning habits, teachers carry out targeted learning guidance and put forward learning suggestions and learning methods. In the second aspect, by building a professional theoretical experience model of teaching effect experience, teachers can obtain effective evaluation feedback. Therefore, teachers can adjust the teaching method in real time according to the teaching process and teaching effect, and finally establish a scientific and effective talent cultivation quality evaluation feedback system. In the third aspect, by taking the employment needs of enterprises as the leading and the employee code as the standard, a targeted and practical teaching and education evaluation feedback mechanism is established, and suggestions and criticisms from enterprises are constantly collected. After optimizing and adjusting the evaluation system constantly, its effectiveness and credibility can be improved.

5. Conclusion

In conclusion, under the background of education digitization, digitization is the basic requirement for the innovation and development of application-oriented undergraduate education in Chinese colleges and universities, and it is also an important support for the implementation of higher education intelligence and the promotion of education modernization. It is of great significance for the long-term development of application-oriented undergraduate institutions of higher education to explore the training path of digitalized application-oriented undergraduate talents in higher education that is in line with China's national conditions, and build a networked, digital, personalized and lifelong education and teaching system by continuously promoting the reform and innovation of higher education with digitization as the starting point.

Funding

2023 Key Research Project of Undergraduate Teaching Reform of Shenyang University of Technology (Project No.: 202431)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Liu JL, Tang Q, 2021, Case Study and Enlightenment of the Application of the Digital Competency Framework for EU Citizens. Library Journal, 40(4): 28–36.

[2] Zhang EM, Shang QL, 2019, Nurturing Learners' Digital Literacy: Interpretation and Implications of UNESCO's Global Digital Literacy Framework and Its Evaluation Recommendations. Open Education Research, 25(6): 58–65.

[3] Audrin C, Audrin B, 2022, Key Factors in Digital Literacy in Learning and Education: A Systematic Literature Review Using Text Mining. Educ Inf Technol, 27(6): 7395–7419.

[4] Yang YH, Ma JJ, 2023, The Policy and Practice Evolution of Information Technology-enabled Education in United States. Basic Education Reference, 2023(5): 61–70.

[5] Wang Y, Cui P, 2023, Predicament, Directions, and Insights of UK Higher Education in the Context of Digital Transformation. China Educational Informationization, 29(12): 49–58.

[6] Chen DM, 2024, An Exploration of the Digital Transformation in Higher Education. Journal of Jiamusi Vocational College, 40(1): 133–135.

[7] Li J, Wang WB, 2024, Research on the Reform of Talent Training Mode for Industry-Education Integration in Applied Undergraduate Education under the Background of Educational Digitalization. Theory and Practice of Innovation and Entrepreneurship, 7(14): 92–94.

[8] Yang ZK, 2023, The Development of Digitalization in Higher Education: Connotation, Stages, and Implementation Paths. China Higher Education, 2023(2): 16–20.

[9] Liu K, Liu XQ, Li Y, 2023, New Engineering Education Teaching Resources under Educational Digitalization: Logical Connotation, Element Characteristics, and Construction Paths. Research in Higher Education of Engineering, 2023(4): 22–26.

[10] Chen L, 2023, Construction and Practice of Digital Teaching Systems in Applied Universities. Digital Technology and Application, 41(9): 25–27.

[11] Wan LY, Xiong RX, 2023, Empowering the Construction of High-Quality Education Systems through Digital Transformation: Underlying Logic, Implementation Mechanisms, and Key Paths. Modern Distance Education, 2023(4): 34–40.

[12] Hu YB, 2024, The Logic and Approach of Digital Transformation Empowering High-Quality Development of Regional Teachers. Teaching and Management, 2024(10): 32–35.

[13] Li Y, 2024, Promoting the Integration of Digital Transformation into the Entire Process of Higher Education Curriculum Teaching. Learning Weekly, 2024(7): 113–116.

[14] Liu YH, 2023, Practice and Exploration of Educational Digital Transformation Empowering Teaching Quality Evaluation in Local Applied Undergraduate Institutions. Journal of Huainan Normal University, 25(5): 114–118.

[15] Yang FF, 2024, Practical Exploration of Digital Transformation in Higher Education Teaching. Journal of Yantai Vocational College, 19(3): 59–65.