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Study on the Path of Digital Intelligence to Empower Classroom Innovation in Universities and Colleges

Ye Luo

Bussiness School, Sias University, Zhengzhou, China

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Abstract: With the rapid development of information technology, digital intellectualization has become an important force to promote educational change. In college education, digital intelligence technology not only changes the traditional teaching mode, but also provides teachers and students with richer and more efficient teaching and learning experience. The purpose of this paper is to explore the path of digital intelligence to empower the innovation of college classroom, and to analyze in detail how digital intelligence technology promotes the change and innovation of college classroom from the perspective of both students and teachers, in order to provide useful references for educational practice.

1. Introduction

In recent years, the state has continued to promote the development of education informatization, digitization and intelligence, and the Ministry of Education announced China's first Ten-Year Development Plan for Education Informatization (2011-2020) in 2012, and the Thirteenth Five-Year Plan for Education Informatization in 2016, and the Thirteenth Five-Year Plan for Education Informatization in 2023, which was issued by the State Council. In the "Overall Layout Plan for the Construction of Digital China" issued by the State Council, it is pointed out that the construction of digital China is an important engine for the promotion of Chinese modernization in the digital era, and a powerful support for the construction of new national competitive advantages. It is necessary to vigorously implement the national education digitization strategy action and improve the national wisdom education platform[1]. The report of the 20th Party Congress points out that digital transformation is currently an important engine and innovative path for the high-quality development of China's higher education, reshaping talent cultivation and classroom teaching innovation as well as teaching and learning evaluation models with digital empowerment, and innovatively building a new ecology of education. With the rapid development of digital technologies such as artificial intelligence (AI), big data, cloud computing, the metaverse, and the Internet of Things (IoT), digital technology has become a powerful driving force in promoting the reform of vocational education and the innovation of classroom teaching in China. The deep integration of "Internet +" educational digital technology with vocational education has brought new opportunities and challenges to various aspects, including the talent cultivation model, resource construction, classroom teaching, evaluation methods, and the development of the teaching ecosystem. The innovation of classroom teaching empowered by digital intelligence has become an important task in the development and reform of higher education. How to keep pace with the times,

keep the right and innovation, and realize the high-quality development of higher education is a new issue for universities.

2. The Role of Mathematical Intelligence in Empowering Classroom Teaching and Learning Innovation

First, the implementation of moral education and the data-driven determination of teaching objectives. For high-quality classrooms, the teaching objectives should reflect the integration of the five educations and support the comprehensive development of students[2]. Teachers should take the ideological and political education and disciplinary core literacy as the result orientation, based on the students' learning situation, use digital technology to comprehensively perceive and dynamically collect classroom teaching all-time and all-process data to form a data set of students' characteristics, and based on the disciplinary academic quality standards, conduct a comprehensive analysis of the data to form a learner's portrait and knowledge mapping. Digital technology helps teachers to accurately diagnose the learning situation, adapt to the students' latest development zone, determine personalized and comprehensive teaching goals, and implement the fundamental task of cultivating moral integrity.

Secondly, the emphasis is on integration and fusion, and digital intelligence empowers the reconstruction of teaching content. Teaching content is the core of classroom teaching, and for a high-quality classroom, the content should reflect the requirements of the curriculum standards and the needs of society. Based on the textbooks and syllabus, teachers make use of high-quality digital educational resources, with the help of big data, knowledge mapping and other technologies, dynamically and intelligently analyze diversified knowledge points, deeply excavate the association between ideological and political cultivation and knowledge content, and present them in digital form, through the organization of large units, project-based, interdisciplinary and other forms, emphasizing on the merging and integration, and digitally and intellectually reconfiguring the teaching content, to promote the generation of wisdom of teachers and students, and to improve the quality of classroom teaching.

Third, focusing on human-computer synergy, the integration of digital and practical reengineering process structure. Teaching activities are the key to classroom teaching, and for a high-quality classroom, its activities should show the integration of digital and real, reflecting the process reorganization and structural reengineering[3]. The digital transformation of education has promoted the creation of a virtual and real integration, open and inclusive teaching environment, broken the time and space boundaries of teaching activities, promoted the deep integration of digital technology and real teaching situations, and enabled students to experience the sense of human-machine synergy in knowledge sharing and communication with intelligent machines, and realize meaningful learning.

Fourthly, focusing on the quality and effectiveness of human education, data-enabled accurate evaluation and diagnosis. Teaching evaluation is an important means of diagnosing the achievement of teaching goals and the quality of classroom teaching, and for high-quality classrooms, the evaluation should focus on the whole process of tracking. Classroom evaluation is the key to students' high-quality learning and development, covering knowledge acquisition, ability achievement, literacy enhancement, and quality of education. Through the characterization and verification of all-round monitoring data, students' competence and quality are manifested, the quality of student learning is instantly judged, and the progress of students is tracked to improve the comprehensive evaluation system for the integration of the five education systems and comprehensive development, and ultimately to realize the integration of teaching and evaluation and the diagnostic reform of the classroom structure, so that the integration of the five education

systems and the comprehensive education of people can be truly realized.

3. The path analysis of classroom innovation in colleges and universities based on students' perspectives

3.1 Building a Mathematically Intelligent Learning Environment

First, increase the construction of intelligent classrooms. Colleges and universities should increase their investment in digital intelligence technology and build smart classrooms equipped with advanced multimedia equipment and intelligent teaching systems. These equipments and systems should support online live broadcasting, remote interaction, real-time feedback and other functions in order to improve the interactivity and interest of the classroom. Second, increase the development of virtual laboratories. Virtual reality technology is utilized to simulate real experimental environments to provide students with a safe and efficient practical training platform. The virtual laboratory can cover a variety of subject areas such as physics, chemistry, biology, etc. to help students better understand and master experimental skills and theoretical knowledge[4]. Third, the construction of online learning platform. Educational institutions should integrate high-quality educational resources and build an online learning platform to provide students with personalized learning paths and resource recommendations. The platform should be equipped with functions such as course management, homework submission, online testing, and learning data analysis to meet the diverse learning needs of students.

3.2 Implementation of precise teaching strategies

First, learning situation analysis. Big data technology is used to comprehensively analyze students' learning data, including learning progress, knowledge mastery, learning interest and so on. These data can provide teachers with accurate teaching feedback, help them adjust teaching strategies and methods, and realize tailored teaching. Second, personalized recommendation. Based on students' learning data and interests, it intelligently recommends suitable learning resources and paths. This helps students find the most suitable learning methods for themselves and improve their learning efficiency. Third, intelligent assessment and feedback. Intelligent correction and assessment of students' homework, tests, etc. is carried out through artificial intelligence technology. This type of assessment not only improves the accuracy and efficiency of the assessment, but also provides students with instant feedback and suggestions to help them correct their mistakes in a timely manner and improve their learning results.

3.3 Promotion of blended learning models

First, combining the advantages of online learning and offline learning to build a blended learning model. Students can preview and review the course content online to understand the basic knowledge points and difficulties; in the offline classroom, teachers can deepen students' understanding and mastery of knowledge through guided discussions, case studies, practical operations and other methods. Second, flexible arrangement of study time. The blended learning model allows students to flexibly choose the learning content and learning progress according to their own schedule. This helps students to better balance their studies and life, and improve their autonomy and motivation in learning[5]. Thirdly, strengthening practice and application: Through the virtual labs, online project collaboration and other platforms provided by digital intelligence technology, students' practical training and application ability development are strengthened. This helps students to apply what they have learned in real-world problem solving, and improve their

innovative ability and comprehensive quality.

3.4 Development of independent learning skills

First, set learning goals and plans. Students are guided to set clear learning goals and plans according to their interests and needs. This helps students clarify the direction of learning and improve the relevance and effectiveness of learning. Second, self-monitoring and regulation. Students can use the learning analysis tools of the Digital Intelligence Platform to monitor their own learning progress and evaluate their learning effectiveness. When they find that their learning is not effective, students can adjust their learning methods and strategies in time to improve their learning efficiency. Third, seek help and support. When encountering difficulties and problems, students are encouraged to seek help and support from teachers, classmates or experts through the Numeracy platform. This kind of interaction and cooperation not only helps to solve problems, but also develops students' communication skills and teamwork spirit.

3.5 Promoting the development of creative thinking and innovation

Firstly, project-based learning is carried out through the Mathematical Intelligence Platform, which encourages students to choose their own research topics or projects, and conduct independent inquiry and practice. This way of learning helps to cultivate students' innovative thinking and practical ability. Secondly, digital intelligence technology is used to organize various disciplinary competitions and innovative activities to provide a platform for students to display their talents and abilities. These activities not only help stimulate students' enthusiasm for innovation, but also develop their teamwork and leadership skills. Thirdly, the integration and exchange between different disciplines is promoted through digital intelligence technology, and students are encouraged to engage in interdisciplinary learning and research. This helps to broaden students' knowledge horizons and ways of thinking, and develop their comprehensive literacy and innovation.

4. The path analysis of classroom innovation in colleges and universities based on teachers' perspectives

4.1 Enhancing teachers' digital literacy

First, educators and students should enhance their ability to apply digital technology effectively. The digital literacy of teachers is key to promoting the digital transformation of education. The Digital Literacy for Teachers standard issued by the Ministry of Education clearly states that teachers should learn to make appropriate use of digital technology to acquire, process, use, manage and evaluate digital information and resources, to identify, analyze and solve educational and teaching problems, and to optimize, innovate and transform educational and teaching activities. Therefore, teachers need to continuously improve their digital technology application ability, including proficiency in various educational software, platforms and tools, such as online teaching platforms, intelligent teaching assistants, virtual reality (VR) and augmented reality (AR) technology. Second, educators should change their teaching concepts and methods to adapt to the evolving demands of modern education. The application of digital technology has not only changed the means of teaching, but also prompted a change in teaching philosophy. Teachers need to change from the traditional "teacher-centered" teaching mode to the "student-centered" teaching mode, focusing on the personalized and differentiated development of students. Through the use of digital technology, teachers can create immersive and experiential teaching scenarios to stimulate students'

interest and initiative in learning and improve teaching effectiveness.

4.2 Innovative teaching resources and methods

First, the construction of a high-quality teaching resource base. Colleges and universities should actively promote the construction of teaching resource libraries and build integrated platforms for teaching resource construction, learning, sharing and exchange. Teachers can use these platforms to upload, download and share teaching resources, realizing the optimal allocation and efficient use of resources. At the same time, schools can also rely on artificial intelligence algorithm technology to realize the precise push of teaching resources, and according to the personalized characteristics of students' cognitive ability, behavioral habits and interest preferences, data screening is carried out among the vast amount of teaching resources, and they are pushed to the students in a diversified and differentiated way. Second, educators should use digital technology to optimize teaching methods and improve the overall learning experience. Teachers can optimize teaching methods with the help of digital technology, such as the use of virtual reality (VR) and augmented reality (AR) technology to build immersive teaching scenarios, allowing students to practice and experience learning in the virtual environment. In addition, teachers can also use the online teaching platform to carry out new teaching modes such as flipped classroom and blended teaching, and realize the whole process of teaching management and personalized guidance through the pre-test of knowledge in the cloud before class, in-depth learning in class, and practical application after class.

4.3 Implementation of individualized teaching evaluation

First, the use of big data drives teaching evaluation. Big data technology can realize the accurate collection and analysis of students' learning data, providing a scientific basis for teaching evaluation. Teachers can use the big data platform to carry out targeted propositions and test paper combinations for students, generate personalized evaluation content, and accurately push it to students. At the same time, the big data platform can also guide the development of a new round of evaluation content based on the results of the evaluation, boosting the development and growth of students.

Second, strengthen process evaluation and value-added evaluation. In the process of teaching evaluation, teachers should focus on process evaluation and value-added evaluation. Through the function of big data information collection, processing and feedback, the whole process of monitoring before, during and after class is realized, and the system collects the data of students' classroom participation, task completion, quiz attainment rate and other indexes, and carries out data processing and analysis in a timely manner, generates a visual evaluation report and gives feedback to students on the evaluation results. In addition, teachers can process and analyze the result data of value-added evaluation with the help of the big data platform, form targeted evaluation results, and provide feedback through visualization, so as to comprehensively, systematically and accurately grasp the dynamics of students' thinking and development.

4.4 Building an ecosystem for teaching digital intelligence

First, to build a digitally intelligent teaching environment. Colleges and universities should actively promote the construction of digital-intelligent teaching environments, including the construction of smart classrooms, intelligent laboratories, virtual simulation laboratories and so on. These digitalized teaching environments can provide teachers and students with convenient and efficient teaching resources and tools to promote the smooth implementation of teaching activities. At the same time, schools can also use digital intelligence technology to build a combination of

online and offline teaching mode to achieve optimal allocation and efficient use of teaching resources. Second, educational institutions should promote the common sharing of educational resources to enhance accessibility and equity in learning. In the digital era, the sharing of educational resources has become the key to improving teaching quality. Colleges and universities can rely on digital intelligence technology to build a teaching resource sharing platform to realize the common construction and sharing of high-quality teaching resources and collaborative development. Through the construction and operation of the platform, teachers can conveniently access and use a variety of teaching resources to improve teaching effectiveness and students' learning experience.

In conclusion, the key point of digital education reform and innovation in colleges and universities lies in "personal transformation", with the fundamental goal of accelerating the successful realization of students' high-quality learning and all-round development in the context of the digital era. In the process of innovation, colleges and universities need to cultivate students' digital literacy, guide them to form a sense of identity and ability to identify with the unity of the "virtual me" and the "real me", and promote the continuous change of their learning styles and methods, so as to provide favorable conditions for their all-round development. At the same time, the stable improvement of teachers' digital ability in education and teaching is also an important part of the innovation of colleges and universities, and the development of teaching ability is a complex and systematic process, which needs to rely on the coordinated intervention of multiple subjects.

Digital intelligence technology provides unlimited possibilities for classroom innovation in colleges and universities. By building a digital-intelligent learning environment, implementing precise teaching, promoting blended learning, carrying out project-based learning, and cultivating independent learning ability and other paths, we can make full use of the advantages of digital-intelligent technology to improve the learning effect and innovation ability of students. In the future, with the continuous development and popularization of digital intelligence technology, classroom innovation in colleges and universities will show a more diversified and personalized trend. Colleges and universities should follow the pace of the times, actively explore and practice new modes and methods of classroom innovation empowered by digital intelligence, and make greater contributions to the cultivation of comprehensive and applied talents with innovative thinking and practical ability.

5. Conclusion

Digital intelligence technology provides infinite possibilities for classroom innovation in colleges and universities. From the students' point of view, through the construction of digital learning environment, the implementation of precise teaching strategies, the promotion of blended learning mode, the cultivation of independent learning ability, and the promotion of innovative thinking and innovation ability cultivation and other paths, and from the teachers' point of view, through the enhancement of the teachers' digital literacy, the innovation of teaching resources and methods, the implementation of personalized teaching evaluation, and the construction of a digital teaching ecosystem paths, it is possible to make full use of the advantages of digital technology to inject new vitality into the innovation of college classroom. From the teachers' point of view, by improving teachers' digital literacy, innovating teaching resources and methods, implementing personalized teaching evaluation, and building a digital teaching ecosystem, we can make full use of the advantages of digitalization and inject new vitality into the classroom innovation of universities.

In the future, with the continuous development and popularization of digital intelligence

technology, classroom innovation in colleges and universities will show a more diversified and personalized trend. Colleges and universities should follow the pace of the times and actively explore and practice new modes and methods of classroom innovation empowered by digital intelligence, so as to make a greater contribution to the cultivation of comprehensive talents with innovative thinking and practical ability. At the same time, it is also necessary to pay attention to the challenges and problems that may be brought about by digital intelligence technology, such as data security and privacy protection, in order to ensure the healthy and sustainable development of digital intelligence technology in the field of education.

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References

[1] Zhou Wu, Changwei Lv, Yueyang Tan.Research on the Innovation of Classroom Teaching Mode in the Era of "5G+Artificial Intelligence"[J].Contemporary Education and Teaching Research, 2024,5(6), 229-234.

[2] Rahiman, H. U., & Kodikal, R. (2023). Revolutionizing education: Artificial intelligence empowered learning in higher education [J].Cogent Education, 2023, 11(1)1-24.

[3] Bhoi C, Dash S. Empowering Education: The Impact of Artificial Intelligence on Classroom Learning [J]. Mind and Machines: The Psychology of Artificial Intelligence, 2024: 66.

[4] Kasman R A, Judijanto L, Elmiwati E. Artificial Intelligence in the Classroom: Innovation or Disruption in Education [J]. Indonesian Journal of Education (INJOE), 2024, 4(3): 844~ 856.

[5] Guan C, Mou J, Jiang Z. Artificial intelligence innovation in education: A twenty-year data-driven historical analysis [J]. International Journal of Innovation Studies, 2020, 4(4): 134-147.