An Analysis of the Innovative Effects of a Full-Course Educational Policy on Undergraduate Learning Engagement in the Digital Age

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Abstract. Full-course education policy is a complex and multi-faceted policy, which involves the renewal of educational content, the transformation of educational methods and the reallocation of educational resources. Under the influence of digitalization, undergraduates' learning engagement is changing, which affects the effect of comprehensive education. Therefore, it is necessary to analyze the innovative effect of full-course education policy on undergraduates' learning engagement in the digital era. Combining the overview of the full-course education policy and the influencing factors of undergraduate learning engagement, we analyze the innovative effect of the full-course education policy on undergraduate learning engagement in the digital era from four aspects: the enrichment and sharing of teaching resources, the realization of personalized learning paths, the enhancement of interactive and collaborative learning, and the change of the learning evaluation method, and elaborate the effective strategies of learning engagement enhancement, which will help to improve the teaching strength and ensure the classroom education in each university. It makes a certain contribution to improving the teaching strength and ensuring the quality of classroom education.

Keywords: Digital age; Full-course education; Undergraduate students; Learning; Engagement; Innovation; Effectiveness analysis.

1 Introduction

In the digital age, the field of education is undergoing unprecedented changes, and a variety of effective policies have emerged. As an important part of the education reform [1-3], the policy of full-curriculum education aims to improve students' comprehensive literacy and learning ability by optimizing curriculum design, integrating teaching resources, and innovating teaching methods. Student engagement refers to the degree of student participation in classroom activities, which is an important indicator of educational effectiveness. Under the background of digitalization, all kinds of educational information technology are gradually improved, and undergraduates' participation in learning is getting lower and lower [4-7], therefore, in order to improve the

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teaching effect of each university, it is necessary to analyze the innovative effect of the full-course education policy on undergraduates' participation in learning.

The full-course education policy can introduce rich digital tools, provide students with more diversified and convenient learning resources, enrich students' learning experience and stimulate their learning motivation. In addition, the full-course education policy emphasizes the cultivation of comprehensive ability among various disciplines, which can effectively broaden students' knowledge horizons [8-10] and enhance their problem-solving ability. The study shows that the impact of the full-course education policy on undergraduate learning engagement in the digital era is not achieved overnight, but requires a number of factors such as students' individual differences, subject characteristics and the allocation of teaching resources. At the same time, it is also necessary to pay attention to the problems and challenges that may arise in the process of policy implementation, such as the appropriateness of technology application and the guarantee of educational equity. An in-depth analysis of the innovation effect of the full-course education policy can help to understand the mechanism of the policy [11-13], and also provide useful reference for further optimization and improvement of the policy. As a matter of fact, undergraduates will continue to improve their collaborative ability in the process of learning, make use of a variety of learning platforms for communication, optimize the previous single learning mode, and adopt a variety of new evaluation methods for assessment to optimize the learning problems in a timely manner. However, due to the influence of students' original differences, some students are not motivated enough to solve the problems in the classroom, which naturally cannot meet the teaching needs in the digital era. In order to solve the above problems, this paper analyzes the influencing factors of undergraduates' learning participation and the innovative effect according to the characteristics of the digital era and the content of the full-course education policy.

2 Overview of the Policy on Full-course Education

The full-course education policy is highly comprehensive, promoting the overall development of education and enhancing the overall qualities of students. It requires a high degree of holistic, coherent and coordinated curricula and emphasizes the intersection and integration of different disciplines in order to meet the needs of modern society for human resources, as summarized in Table 1 below.

Table 1. Overview of the policy on cross-curricular education

Policy points	Details
Policy objectives	Improving the quality of education and promoting the comprehensive development of students
policy area	Covering all disciplines and courses
policy content	Integrate and optimize teaching resources, innovate teaching methods and evaluation mechanisms
Policy implementation	Collaborative efforts of education departments, universities, and teachers at all levels
policy effect	Improve student engagement in learning, enhance learning outcomes and overall quality

As can be seen from table 1, the full-course education policy emphasizes the overall design of the curriculum. It requires educators to plan the curriculum system as a whole from a holistic perspective, ensuring the articulation and complementarity of various disciplines, avoiding duplication or omission of knowledge, and improving the learning efficiency of students. Secondly, the full-course education policy emphasizes the coherence of the curriculum [14-16], which requires the establishment of close links between different school segments and different grades to ensure that students can gradually and progressively master knowledge throughout the entire learning process, which helps to cultivate their systematic thinking and problem-solving abilities. Finally, the full-course education policy emphasizes the coordination of the curriculum, requiring educators to pay attention to the balance between different subjects and to avoid overemphasizing one subject at the expense of others. In the process of implementing the full-course education policy, it is necessary to make comprehensive adjustments to the teacher training and evaluation systems, to realize resource security, and to increase investment in education, so as to ensure that schools are able to carry out full-course teaching activities smoothly.

In the process of implementing the whole-course education policy, the role of teachers will undergo important changes. Teachers need to change from traditional knowledge imparted and interpreters to learning instructors, curriculum designers and learning environment organizers. The following is a discussion on the specific measures for teacher role transformation and the innovation of teaching methods:

Specific measures for teacher training:

(1) Provide systematic training on the concept of whole-course education to help teachers understand the background, principles and implementation requirements of whole-course education policies.

(2) Promote teachers to participate in the training of overall curriculum design and curriculum linking work, and cultivate their overall planning and curriculum de-sign capabilities.

(3) Emphasize the ability of teachers to cooperate and communicate between different classes and grades, and promote cooperation among teachers.

Innovation in teaching methods:

(1) Introduce project-based learning and interdisciplinary teaching to enhance the integration of disciplines and promote the implementation of the overall curricu-lum.

(2) Encourage teachers to adopt inquiry-based learning and problem-solving learning to cultivate students' ability of systematic thinking and problem solving.

(3) Promote personalized teaching and individualized teaching, pay attention to the learning needs of each student, and ensure the effect of full education.

Through the above measures and innovations, teachers can better play the role of leading students' learning, promoting curriculum cohesion and coordination, and cultivating students' comprehensive ability in the implementation of whole-course education policies. They will play a more critical and central role in promoting the overall growth and development of students throughout the learning process.

3 Factors Influencing Undergraduate Learning Engagement in the Digital Age

Under the whole-course education policy, understanding students' learning behavior and psychological changes in the digital age are essential for implementing innovations in teaching methods as well as teacher training. Here is a more in-depth analysis of student learning behavior and psychological changes in the digital age:

Analysis of students' learning behavior:

(1) Students in the digital age are more inclined to obtain information through multimedia and the Internet, and they have a higher visual and interactive demand for teaching content.

(2) Students' active use of digital social media makes them more collaborative and sharing spirit, and more willing to acquire knowledge through group learning and social learning.

Analysis of psychological changes in the digital age:

(1) Students in the digital age may have a stronger desire for knowledge and curiosity, but they may also have problems such as inattention and instant gratification.

(2) Students have an increasing demand for personalized learning and independent learning, hoping to make learning choices according to their own interests and abilities, and pay more attention to the practical significance and application value of teaching content.

Taking the above analysis into consideration, teachers should pay more attention to students' learning preferences and psychological changes when implementing whole-course education policies, and flexibly use digital teaching means and personalized teaching methods to meet stu-dents' needs. When training teachers, relevant content should also be included to help teachers better understand students' learning behavior and psychological changes, so as to guide students more effectively in the whole process of learning.

In the digital era, undergraduate learning engagement is affected by a variety of factors, which include both changes in the learning environment and changes in students' own characteristics, and the descriptive relationship between different influencing factors and engagement is shown in Figure 1 below.

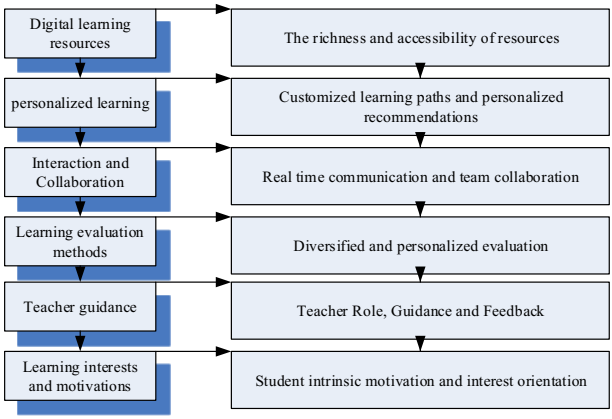

Fig. 1. Schematic depiction of the impact of undergraduate learning engagement

As can be seen in Figure 1, the innovative effects of full-course educational policies on undergraduate learning engagement in the digital age are manifested in a number of ways.

First, the richness of digital learning resources [17-20]. The digital era provides undergraduates with unprecedented rich learning resources, including online courses, e-books, academic databases, etc. These resources are rich and can significantly improve students' participation in learning.

Secondly, the interactivity of online learning platforms, such as MOOCs and online education websites, provides students with rich interactive opportunities. Through the platform, students can communicate with teachers and classmates in real time, participate in discussions, collaborative learning and other activities, and further improve students' participation in learning.

Third, the customization of personalized learning paths. In the digital era, students can customize personalized learning paths according to their own learning progress and ability level, examples of which are shown in Table 2 below.

Table 2. Example of personalized learning path customization table

Student ID	speciality	discipline	Learning stage	Learning Objectives	Personalized learning path
12011	Computer Science	data structure	primary	Master basic algorithms and data structures	1. Study the course "Data Structures" and complete post class exercises 2 Participate in online algorithm competitions to enhance practical skills Read relevant academic papers to understand cutting-edge technologies
12012	mechanical engineering	Material Mechanics	intermediate	Deeply understand the principles of material mechanics	1. Learn the course of Materials Mechanics and master basic knowledge Participate in laboratory projects and carry out practical operations Read relevant textbooks and research reports to expand knowledge
12013	biology	molecular biology	senior	Conduct independent research projects	1. Learn advanced molecular biology courses and establish a research foundation Collaborate with mentors to determine research direction Refer to literature and design experimental plans Conduct experiments, analyze data, and write papers

As can be seen from Table 2, the table shows three students with different majors, disciplines, and stages of study, for whom individualized learning paths were customized based on their learning goals. The paths include various aspects such as course learning, practical activities, academic reading and research projects. On this basis, intelligent recommendation algorithms can be used to recommend learning resources and learning tasks suitable for students, making learning more in line with students' individual needs and further improving students' participation in learning.

Fourthly, the enhancement of students' independent learning ability [21-23], the digital era emphasizes students' independent learning and lifelong learning ability, students need to learn how to effectively use digital resources for independent learning, how to manage their own learning time and progress, and how to cooperate and share with others. The enhancement of these abilities will help students to participate more actively in their learning and increase their engagement in learning.

Fifthly, teachers' role change and guidance. With the continuous development of digital education technology, the role of teach-ers in implementing whole-course education policies needs to be changed accordingly. Provide teachers with training on the use of digital education tools and resources, such as online classroom platform, teaching management software, multimedia teaching tools, etc., to enhance teachers' digital teaching ability; To encourage teach-ers to carry out inquiry learning and instructional design learning activities, in order to enhance their innovative consciousness and curriculum design ability; Cultivate the interactive ability between teachers and students, including online Q&A, student homework feedback and the establishment of open teaching community.

Digital teaching strategies such as online collaborative learning and group learn-ing are introduced to cultivate students' ability of cooperative learning and autono-mous learning. Digital teaching tools such as multimedia teaching AIDS and teaching games are used to enrich teaching means and content, so that students can under-stand knowledge points more deeply; Pay attention to personalized teaching and individualized teaching, according to the individual differences of students, for dif-ferent students to carry out accurate digital teaching guidance.

Sixthly, the diversification of learning evaluation methods, the digital era makes learning evaluation methods more diversified and personalized. In addition to the traditional examination and homework evaluation [24], students' learning can also be evaluated through online tests and learning record analysis. Such diversified assessment methods can reflect students' learning and progress more comprehensively and stimulate their learning motivation and participation.

4 The Innovative Effectiveness of Full-Course Education Policies on Undergraduate Learning Engagement in the Digital Age

4.1 Enrichment and Sharing of Teaching Resources

In the digital era, the policy of full-course education makes full use of information technology to integrate and optimize various teaching resources. Through online education platforms, digital libraries and other channels, undergraduates can conveniently access a wealth of learning materials, including course videos, e-books, academic papers and so on. This mode of resource sharing breaks the limitations of geography and time, making learning more flexible and efficient. At the same time, the policy of full-course education also emphasizes the integration of interdisciplinary resources and encourages students to engage in interdisciplinary learning so as to broaden their horizons and enhance their comprehensive abilities.

4.2 Personalized Learning Pathway Implementation

The full-course education policy focuses on individual differences and encourages undergraduate students to personalize their learning according to their own interests, abilities and needs. Using intelligent recommendation systems and learning analytics, various educational platforms are able to provide students with customized learning paths and resource recommendations. The above personalized learning methods make learning more in line with the actual needs of students, and improve the relevance and effectiveness of learning. At the same time, students can also learn at their own pace and pace, and better control their own learning process.

4.3 Interactive and Collaborative Learning Enhancement

The policy of full-course education in the digital age emphasizes the importance of interactive and collaborative learning. Through the online education platform, students can interact with teachers and classmates in real time [25], sharing learning experiences and problems. Such interaction not only solves the current problem of teaching participation, but also encourages students to carry out collaborative learning projects and ensures undergraduates' learning participation from the ground up.

4.4 Changes in the Way Learning is Evaluated

The policy of full-curriculum education has promoted the change of learning assessment, and the examination and assessment methods of each undergraduate college have gradually changed from the traditional single examination and assessment methods to diversified assessment methods. In the digital era, students' learning process, participation and interaction can be the basis of evaluation. Through online testing, learning

record analysis, project evaluation and other steps to improve the objectivity and fairness of the evaluation, reflecting the real level and potential of students.

In the context of digitalization, the policy of full-course education has effectively enhanced undergraduates' participation in learning through such innovative measures as enriching teaching resources, realizing personalized learning, enhancing interactive and collaborative learning, and transforming learning assessment methods. It helps to cultivate students' comprehensive quality and ability, and also injects new impetus for quality improvement and reform and innovation in higher education.

5 Innovative Strategies for Enhancing Undergraduate Learning Engagement in the Digital Era Based on the Full-course Education Policy

In the digital era, there is an important relationship between the full-course education policy and undergraduate learning engagement, the underlying enhancement characteristics of which are shown in Table 3 below.

Table 3. Characteristics of full-course educational policies and undergraduate learning engagement enhancement in the digital age

Innovation enhances characteristics	Describe
Resource richness and accessibility	Digital resources cover the entire curriculum and provide diverse learning content; Students can access learning resources anytime and anywhere, improving learning convenience
Personalized learning experience	Provide customized learning paths and resource recommendations based on students' learning styles, interests, and needs; Support students for self-directed learning and personalized development
Real time interaction and collaborative learning	Through online education platforms, achieve real-time interaction and collaborative learning between teachers, students, and students; Promoting communication and cooperation among students to improve learning outcomes
Diversified learning evaluation	Using various evaluation methods, including online testing, project assignments, and analysis of learning records, to comprehensively evaluate students' learning outcomes and abilities; Provide personalized feedback and guidance to help students improve their learning
Teacher's Role and Innovative Teaching Methods	Teachers become learning guides and facilitators, utilizing digital tools to innovate teaching methods; Promote the improvement of students' active learning, exploratory learning, and problem-solving abilities
Learning motivation and interest stimulation	Stimulate students' interest and motivation in learning through interesting learning content, gamified design, and other means; Provide challenges and a sense of achievement to encourage students to actively participate in learning

As can be seen from Table 3, the above characteristics work together in the students' learning process and help to enhance learning engagement and learning outcomes, based on which the following innovative strategies for enhancing undergraduate learning engagement based on the policy of full-course education are obtained.

Firstly, to build a digital teaching resource base and realize resource sharing, each university should integrate high-quality teaching resources inside and outside the university, including course videos, e-books, academic papers and so on, so as to facilitate students' independent learning and extended learning.

Second, the use of big data and intelligent technology for personalized learning recommendations, colleges and universities can use big data and intelligent technology to analyze students' learning behaviors and interest preferences, and provide personalized learning recommendations. It can also mine and analyze students' learning data, and accurately recommend courses and learning materials suitable for students.

Thirdly, to strengthen interaction and build a collaborative learning platform with participation, universities should build a well-functioning online education platform to provide real-time communication, group discussion, collaborative projects and other functions. Through the platform, students can interact with teachers and classmates to solve problems and share learning experiences. In addition, colleges and universities can also carry out online competitions, teamwork and other activities to stimulate students' teamwork spirit.

Fourthly, innovative learning evaluation methods can motivate students to actively participate in the traditional single examination evaluation method, which is often difficult to comprehensively reflect the learning achievements and learning ability of students. Therefore, colleges and universities should innovate learning evaluation methods and adopt diversified evaluation means. In addition to exams, online tests, learning record analysis, project reports and other ways of evaluation can be combined. At the same time, students can introduce mutual evaluation and self-evaluation mechanisms, so that students can participate in the evaluation process more actively.

In summary, innovative strategies for improving undergraduate learning engagement based on the policy of full-course education in the digital era need to start from multiple aspects to promote the overall development of students.

6 Conclusion

With the deep development of digital technology, the field of education is undergoing unprecedented changes. As an important part of education reform, the full-course education policy plays a key role in improving undergraduate learning engagement in the digital era, therefore, it is necessary to analyze the innovative effect of full-course education policy on undergraduate learning engagement in the digital era. The research on the innovation of full-course education policy and undergraduate learning engagement in the digital era faces some problems. First, there is still an imbalance in the access to and distribution of quality educational resources, which needs to be addressed by policy makers. Secondly, the policy of full-curriculum education puts higher demands on teachers, requiring them to have the ability to teach across disciplines and

digitally, and to strengthen teacher training and professional development. In addition, how to better balance the relationship between different subjects to ensure the coherence and coordination of the curriculum is also a concern in the implementation of the policy. In order to solve the above problems, this paper analyzes the effects of policy and participation innovations from various aspects, and makes a certain contribution to promoting the development of undergraduate education and improving the coherence and synergy of education.

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