# Research on the Construction of Smart Courses in Universities in the Context of the Digital Age

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**Abstract:** In the context of the digital age, higher education and teaching have ushered in new opportunities for reform. This paper conducts in-depth research on the construction of smart courses in universities under the digital age. First, it analyzes the significance of constructing smart courses in universities; then, it elaborates on the potential problems faced in the construction process; finally, it proposes effective construction strategies. The aim is to provide references for promoting the construction of smart courses in universities and driving the innovative development of higher education and teaching.

**Keywords:** Digital age; Universities; Smart courses

## 1. Introduction

Under the impact of the digital wave, digital technology has been widely applied in various fields of society, bringing tremendous changes to people's production and life, and also showing great application potential in the field of education [1]. As an important base for cultivating high-quality talents in China, universities are facing significant opportunities and various challenges in digital transformation. How to more effectively cultivate students' professional literacy and comprehensive abilities to make them high-quality talents meeting the needs of industrial and social development has become one of the teaching difficulties perplexing university teachers. As the core content of the digital transformation of higher education, the construction of smart courses has become an inevitable choice to improve the quality of education and teaching and adapt to the development of educational modernization. Smart courses can use a variety of emerging technologies such as artificial intelligence, intelligent algorithms, and machine learning. They can not only break the limitations of traditional teaching time and space, but also better meet students' diverse learning needs, enrich their learning experience, and cultivate students' practical and innovative abilities, cultivating them into high-quality talents needed by society and enterprises. Therefore, in-depth research on the construction of smart courses in universities under the digital age is of great practical significance.

## 2. Significance of constructing smart courses in universities in the digital age

In the context of the digital age, universities' active promotion of smart course construction is of great practical significance [2]. This paper conducts an in-depth analysis of the following aspects.

### 2.1. Improve teaching effect and quality

Smart courses can use the powerful data collection and analysis functions of big data technology to collect students' learning behavior data throughout the process without perception [3]. By analyzing and processing these data, teachers can more comprehensively understand students' learning situation and real needs, thereby laying a solid foundation for optimizing teaching design and formulating personalized teaching strategies. At the same time, it enriches teaching methods. Digital technology provides a variety of teaching methods and tools for higher education and teaching. Tools such as online teaching platforms and smart teaching software can facilitate teachers to expand teaching models, promote the sharing of educational resources, and lay a foundation for efficient interaction between teachers and students.

### 2.2. Promote students' personalized development

The construction of smart courses can promote students' personalized development [4]. In the context of the digital age, through online teaching platforms based on digital technology, students can independently choose suitable learning resources according to their own interests and diverse learning needs. This can not only meet students' learning needs but also effectively improve learning effects and promote their personalized development. For example, the system can intelligently push suitable learning resources to students based on their learning data, helping them make targeted up for knowledge gaps and improve their knowledge system. At the same time, smart courses can flexibly provide learning support according to students' learning time and rhythm, greatly meeting their diverse learning needs, breaking the limitations of traditional teaching in time and space, and making learning more efficient and flexible.

### 2.3. Promote educational equity and resource sharing

The construction of smart courses also helps promote the sharing of educational resources and enhance educational equity [5]. In the context of the digital age, actively promoting the construction of smart courses and using digital platforms can spread high-quality educational resources to other regions, enabling more students, especially those in remote and economically underdeveloped areas, to enjoy these high-quality educational resources. This resource sharing can not only narrow the educational gap between regions to a certain extent but also significantly improve educational equity. In addition, the construction of smart courses can promote inter-regional and inter-university cooperation. Teachers from different universities can achieve active interaction and communication through the communication modules of online teaching platforms, sharing advanced teaching concepts and educational models, thereby effectively promoting the improvement of teachers' literacy and abilities, further enhancing the overall level of education, and promoting the innovative development of higher education and teaching.

## 3. Problems faced in the construction of smart courses in universities in the digital age

In the context of the digital age, the construction of smart courses in universities faces numerous obstacles and

difficulties [6].

## 3.1. Weak digital literacy of teachers

First, some university teachers lack in-depth research on digital technology and have obvious shortcomings in the application of digital technology, making it difficult to flexibly apply it to teaching practice, thus affecting the improvement of educational and teaching effects [7]. At the same time, due to the lack of a sound teacher training system, some teachers have weak digital literacy. When facing some complex technical problems, they often feel at a loss, thus affecting the progress of smart course construction.

## 3.2. Difficulties in curriculum resource integration and sharing

In the process of promoting the construction of smart courses, universities also face difficulties in curriculum resource integration and sharing [8]. Specifically, first of all, there are often certain differences in curriculum resources between different disciplines and majors. Currently, a unified and scientific set of norms and standards has not been established, making resource integration more difficult. Secondly, some universities tend to "focus on their own affairs" in terms of curriculum resource integration. There is a lack of close communication and exchange between universities, leading to duplicate construction of resources and a waste of a large amount of resources. At the same time, due to the increasing awareness of intellectual property rights, some high-quality curriculum resources are difficult to share, which further exacerbates the imbalance in the distribution of educational resources. In addition, the functions of current digital platforms are not perfect, making it difficult to meet the needs of university teachers and students, which also poses certain obstacles to the integration and sharing of curriculum resources.

## 3.3. Imperfect teaching evaluation system

Currently, the teaching evaluation system for smart courses is not perfect, resulting in evaluation results lacking authenticity and comprehensiveness, and it is difficult to fully reflect students' comprehensive abilities [9]. Specifically, on the one hand, the evaluation method is relatively simple, mainly referring to students' exam scores and learning outcomes, focusing too much on students' learning results, but lacking scientific evaluation of their learning process. On the other hand, there is a lack of sufficient data as support for evaluation, leading to incomplete and objective evaluation results. Although some universities have introduced digital technology into the evaluation system and used digital tools to assist evaluation, they have not given full play to the advantages of digital technology, resulting in certain deviations in the collection and analysis of evaluation data, thereby affecting the accuracy of evaluation results. In addition, the current evaluation index system is not perfect, making it difficult to evaluate students from multiple angles and levels, which also affects the accuracy of evaluation results to a certain extent.

## 4. Strategies for constructing smart courses in universities in the digital age
### 4.1. Strengthen the construction of teachers' teams and improve teachers' digital intelligence literacy and abilities

Teachers are not only important organizers and participants of teaching activities but also the main force in promoting the construction of smart courses [10]. In this context, it is necessary for universities to strengthen the construction of teachers' teams and continuously improve teachers' digital literacy and comprehensive abilities

through various methods and means, laying a foundation for the smooth realization of digital transformation. Specifically:

(1) Improve the training mechanism

Universities regularly organize teachers to participate in special training and learning activities. The training content includes an introduction to digital technology, the use of digital teaching platforms, and the operation of teaching software. At the same time, a three-level training system of "basic - advanced - elite" can be constructed, and teachers' digital intelligence literacy and teaching level can be effectively improved by adopting an "online + offline" approach. In addition, a "digital twin teacher" training system can be introduced to cultivate teachers' digital intelligence literacy and improve their teaching level with the help of the system's powerful functions.

(2) Carry out teaching observation and academic exchange activities

Teachers can be organized to participate in smart course construction observation or academic exchange activities to learn from the advanced experience of peer teachers and learn from each other, thereby improving teaching level [11]. By observing excellent cases, teachers can understand effective methods and models of smart course construction and learn how to apply digital technology in teaching. At the same time, teachers participate in academic exchange activities to share their teaching experiences and insights, and jointly explore effective methods and paths for smart course construction, thereby effectively improving their own digital intelligence literacy.

(3) Establish and improve an incentive mechanism

Universities should also establish and improve an incentive mechanism to commend and reward teachers who perform excellently in smart course construction. At the same time, teachers' digital literacy and ability to use digital teaching tools can be included in the teacher assessment and evaluation system, and used as an important reference for professional title evaluation and performance appraisal. In this way, their work enthusiasm can be fully mobilized to promote the construction of smart courses.

## 4.2. Optimize the mechanism for curriculum resource integration and sharing

Constructing a systematic curriculum resource system is an important foundation for promoting the construction of smart courses [12]. In this regard, universities need to proceed from multiple levels and make overall plans to realize the digital transformation of education. First of all, universities should conduct in-depth communication and exchange with brother universities to jointly formulate scientific and unified resource integration standards, clarifying the requirements for the classification, format, and quality of various resources, thereby laying a foundation for the subsequent sharing of educational resources. At the same time, an AI-assisted teaching ethics review committee can be established, consisting of professional teachers, university leaders, educational experts, etc., to formulate the "White Paper on the Application of AI in Smart Courses" to clarify and standardize the boundaries of the use of artificial intelligence technology. Secondly, strengthen inter-university cooperation. Universities should conduct in-depth cooperation with other universities to jointly form a resource-sharing alliance and build a digital platform to realize the cross-university and cross-regional circulation of educational resources. In addition, to effectively address intellectual property issues, an authorization mechanism can be adopted, or cooperation agreements can be signed to promote resource integration and sharing on the basis of fully protecting the legitimate rights and interests of original creators [13]. Finally, to promote resource integration and sharing and improve the resource utilization rate, artificial intelligence technology can be introduced to classify a large number of resources, laying a solid foundation for teachers and students to quickly retrieve.

## 4.3. Improve the teaching evaluation system

In the context of the digital age, to promote the construction of smart courses, improve the evaluation system, and enhance the accuracy and scientificity of evaluation results to promote students' all-round development [14]. In this regard, we can:

(1) Construct a "three-dimensional" evaluation index system

The traditional evaluation model can no longer meet the needs of students' development [15]. In this regard, a three-dimensional evaluation index system of "knowledge mastery + ability development + process participation" can be constructed to evaluate students from multiple dimensions and levels, thereby improving the accuracy and comprehensiveness of smart course evaluation results. For the knowledge mastery dimension, an intelligent evaluation system can be adopted to evaluate students' knowledge mastery through "automatic marking of objective questions + AI-assisted scoring of subjective questions"; for the ability development dimension, innovation ability, teamwork ability, communication ability, etc., can be included; for the process participation dimension, data indicators such as system login frequency, login time, and learning plan completion rate can be included.

(2) Build an evaluation closed loop of "real-time feedback + dynamic adjustment"

The smart teaching platform can real-time monitor students' learning situation, collect and analyze their learning behavior data, and automatically generate personal evaluation reports. If the error rate of students' classroom tests exceeds 30%, the system will automatically push learning resources to them and send tutoring reminders to teachers; at the same time, the smart teaching platform will regularly conduct scientific analysis of the learning level of the class students, generate evaluation reports, and provide references for teachers to adjust teaching strategies, thereby realizing a dynamic closed loop of "evaluation + teaching + correction".

(3) Introduce a "multi-subject" evaluation mechanism

In addition to teachers, student, peer, and industry teacher evaluation subjects can also be introduced to ensure the objectivity and comprehensiveness of evaluation results.

## 5. Conclusion

In summary, in the context of the digital age, higher education and teaching have ushered in new development opportunities and challenges. In this regard, we should fully recognize the important significance of smart course construction, and actively promote the construction of smart courses through various methods and means, so as to improve the effect of education and teaching and the quality of talent training, and lay a foundation for promoting students' all-round development in the future.

## Disclosure statement

The authors declare no conflict of interest.

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