

# How University Teachers and Students Can Efficiently Utilize Digital Educational Resources

Xuerui Qin<sup>1</sup>, Xiuying Ma<sup>2, \*</sup>

<sup>1</sup>School of Economics and Business Administration, Yibin University, Yibin, China

<sup>2</sup>Tianfu New Area Aviation Tourism Vocational College, Chengdu, China

\* Corresponding author

---

**Abstract:** In the context of the information age, digital educational resources have become a crucial support for promoting high-quality development in higher education. With the deepening advancement of the national education informatization strategy, a wide array of digital teaching platforms, online courses, academic databases, and other resources are becoming increasingly abundant, providing unprecedented convenience for teaching, research, and learning for university faculty and students. However, while the total amount of resources has increased, their actual utilization efficiency still faces numerous challenges, issues such as uneven resource distribution, varying levels of information literacy among teachers and students, poor platform user experience, and inadequate resource-sharing mechanisms. These issues constrain the full potential of digital educational resources and hinder further improvements in teaching and learning quality. Therefore, how to guide university faculty and students to efficiently utilize digital educational resources has become a key issue in the current digital transformation of higher education. This paper is based on the connotation and characteristics of digital educational resources, based on the current state of digital resource utilization in higher education, this study systematically explores practical pathways and strategies for faculty and students to effectively utilize digital resources, encompassing dimensions such as collaborative teaching, platform optimization, skill enhancement, and institutional innovation. Research indicates that enhancing digital literacy among teachers and students, establishing an integrated resource-sharing platform, improving incentive and training mechanisms, and promoting resource integration and innovative applications are crucial measures to ensure the efficient utilization of digital educational resources and achieve educational modernization.

**Keywords:** Institutions of higher education, Efficient, Digitalization, Resource1.

---

## 1. Introduction

Since the 21st century, modern information technology represented by the Internet, big data and artificial intelligence has developed rapidly, it has profoundly changed the way of social production and life, and also brought revolutionary impact to the field of education. The "China Education Modernization 2035" clearly proposes to accelerate the transformation of education in the information age, build a digital education resource public service system, and promote the high-quality and balanced development of education. Digital educational resources, as various educational materials and tools that have undergone digital processing and can operate in multimedia and network environments, have become an indispensable element in teaching, research, and management activities in universities. It can not only break through the limitations of time and space, expand the breadth and depth of teaching content, but also support personalized learning, collaborative exploration, and academic innovation, providing strong support for cultivating high-quality talents that meet the needs of the times [1].

In recent years, Chinese universities have made significant progress in the construction of digital educational resources. The implementation of the "Three Connections and Two Platforms" project, the construction of national level high-quality online open courses, the promotion of virtual simulation experiment projects, and the improvement of various academic digital libraries have greatly enriched the digital resource library of universities. However, in contrast to the rapid growth in resource construction investment and scale, the actual application efficiency of resources has not

been synchronously improved. Numerous studies have shown that there are prominent issues in the utilization of digital educational resources in current universities, including:

Firstly, there is a prominent structural contradiction in resources, with a concentration of high-quality resources and a coexistence of redundant construction, while the characteristic and cutting-edge resources that teachers and students truly need are relatively scarce. Secondly, the channels for resource sharing are not smooth, and there are "information silos" between different universities, departments, and even platforms, with incomplete mechanisms for resource integration and circulation. Thirdly, there is a significant difference in digital literacy and application ability between teachers and students. Some teachers lack motivation and skills to integrate new technologies into teaching, while others face weak abilities in information recognition and self-directed learning. Fourthly, the support service system is not sound, the resource platform lacks usability and interactivity, and the training guidance and incentive evaluation mechanisms are relatively lagging behind. These factors collectively lead to the dilemma of "emphasizing construction over application" and "having resources but difficult to utilize", and the educational value of digital educational resources has not been fully released [2-3].

In this context, exploring how university teachers and students can efficiently utilize digital educational resources, it is not only related to the deep integration of information technology and education teaching, but also to the overall development of higher education connotation and the improvement of talent cultivation quality. Efficient utilization means that resources can be appropriately acquired,

effectively integrated, creatively applied throughout the entire process of teaching and learning, and ultimately transformed into the development and quality outcomes of teachers and students' abilities. This requires systematic thinking and collaborative promotion from multiple aspects such as concepts, abilities, tools, and mechanisms. This article aims to be based on the reality of higher education, combined with the theoretical characteristics and practical status of digital educational resources, analyze the key factors that affect its efficient utilization, and explore effective strategies to improve resource utilization efficiency from the perspective of teacher-student collaboration. The article first defines the concept and types of digital educational resources, and then analyzes the current situation and core challenges of university teachers and students in utilizing resources. Finally, it proposes countermeasures and suggestions from the aspects of enhancing teachers and students' information literacy, optimizing resource platforms and services, innovating resource sharing and application models, improving institutional guarantees and evaluation incentives. In order to provide reference for promoting the deep application and maximizing the value of digital educational resources in universities [4].

## **2. Types and Characteristics of Digital Educational Resources**

To gain a deeper understanding of the current application status of digital educational resources in higher education, this study conducted a survey on 67 students majoring in international trade at a certain university. The curriculum of this major combines traditional lecture based and student-centered problem-based learning (PBL) models, providing suitable samples for observing resource usage preferences in different types of learning activities. During pre class preparation and post class review, 73.1% of students tend to use traditional resources such as paper textbooks and notes, while only 17.9% prioritize electronic resources. Further analysis of electronic resource usage habits revealed that 58.3% of students prefer search engines for information, and 66.7% of students prefer to use desktop or laptop computers. When conducting self-directed learning tasks such as PBL, there was a significant change in preference: 59.7% of students preferred electronic resources, while the utilization rate of paper resources decreased to 32.8%. Among them, search engines remain the main tool (accounting for 68.7%), and the proportion of learning using computer devices remains at around 70%.

The above differences reflect the matching relationship between learning objectives and resource forms. To explore the rational allocation of digital resources in the system, it is necessary to define their categories. According to the Technical Specifications for the Construction of Modern Distance Education Resources (Trial) in China, digital teaching resources can be divided into the following levels: First is material resources, such as question banks, media materials, courseware, case studies, and literature materials. The second is online courses. The third is the resource management system. The fourth is a remote teaching support platform. In practical applications, these resources are often presented in the form of search engines, high-quality course websites, subject specific platforms, etc. In addition, they also include some online learning software and professional tools. Due to the relatively limited audience, they are not included

in the scope of this discussion for the time being [5-6].

### **2.1. Search Engines with Strong Convenience but Varying Information Quality**

Search engines are almost the preferred entry point for all online users to obtain information, and can quickly provide massive material resources. Its outstanding advantages lie in rapid response, simple operation, and rich results, which highly meet the needs of efficient knowledge acquisition in the information age. Research data shows that both course learning (61.2%) and extended learning (68.7%) have the highest usage rate of search engines. However, its convenience and information overload also constitute a significant double-edged sword. Especially when it comes to systematic learning of in class knowledge, the overall utilization rate of electronic resources is relatively low (19.4%), which is related to two major limitations of search engines: First is that excessive pursuit of speed can weaken the process of deep thinking and knowledge internalization. The second issue is that the returned results are not filtered, and the accuracy and authority of the content are inconsistent, which can easily interfere with the system's learning. Therefore, in situations where rigorous mastery of subject content is required, students tend to rely more on paper resources or authoritative high-quality course platforms.

### **2.2. A high-quality Course Website with Authoritative Content but Limited Coverage**

Premium course websites usually provide structured online courses and related courseware, case studies, and other resources, with strong content targeting and high reliability. When learning in class knowledge, its utilization rate reaches 32.8%, indicating that students have a high recognition of it when they need to accurately and systematically master a certain subject content. However, such websites are often built around a fixed curriculum system, with limited resource update speed and synchronization with the forefront of disciplines, making it difficult to cover a large number of interdisciplinary or emerging field expansion learning needs. In addition, learning the entire course to acquire a specific knowledge point is inefficient, so in self-directed learning scenarios, its usage rate drops to 29.9%.

### **2.3. Subject Specific Websites with In-Depth Expertise but Narrow Audience**

Specific academic websites focus on a particular discipline or research field, we often provide cutting-edge scientific research achievements, professional databases, and high-quality academic materials, with the strongest authority in resources. However, the content is relatively profound, and some require paid access, with a high threshold for use. In the survey, the proportion of websites selected for in class learning and self-directed learning was only 6.0% and 1.5%, respectively, this reflects that it is still a niche tool in daily learning scenarios and is more suitable for advanced academic research or professional deepening needs. Overall, there are significant differences in students' choices of digital resources under different learning modes, reflecting the complex interaction between resource form, content quality, acquisition efficiency, and learning objectives. In the future, when promoting the construction and sharing mechanism of digital educational resources, attention should be paid to the

hierarchical design of resources, promoting platform interoperability, and strengthening quality audits, and guide students to form resource utilization strategies that match their learning goals, thereby improving the overall effectiveness and teaching quality of digital educational resources.

### **3. The Characteristics of Digital Educational Resources in The Use of Teachers and Students in Universities**

The application of digital educational resources in the group of teachers and students in universities presents different and more complex and diverse usage characteristics compared to the basic education stage. These characteristics deeply reflect the comprehensive influence of the learning mode, research needs, and technical literacy of teachers and students in higher education [7-8].

#### **(1) Scenario based and layered use of motivation**

University teachers and students exhibit a strong scene dependence on the use of digital educational resources, its motivation for use is deeply tied to specific learning, teaching, and research tasks. Digital resources occupy a central position in supporting students' self-directed and exploratory learning. Compared to course learning that focuses on systematic review and consolidation of knowledge, students' dependence on digital resources and initiative in using them have significantly increased when facing course papers, research projects, subject competitions, and problem-based learning (PBL). The learning mode requires students to cross the boundaries of textbooks, actively collect, identify, and integrate information. Therefore, digital resources represented by search engines, academic databases, and open course platforms have become the preferred tools. This characteristic is in contrast to the finding in reference [9] that "mobile network resources fill the gap but have a narrow application scope", this indicates that the application of digital resources is more in-depth and extensive in the context of autonomous learning in universities. In terms of assisting teachers in teaching and research innovation, the use of professional and in-depth features. The use of resources by the teacher community goes beyond simple courseware acquisition and presentation. In teaching, they tend to use digital resources for case updates, cutting-edge knowledge supplementation, and innovative teaching methods (such as blended learning and flipped classrooms). In scientific research, the use of digital resources is highly specialized, manifested in the deep and frequent use of specific subject databases, the latest journal literature, professional simulation software, and large-scale instrument sharing platforms. This requires resources not only to be "accessible", but also to be "precise", "authoritative", and "cutting-edge", placing higher demands on the quality of resources.

#### **(2) Diversification of acquisition channels and centralization of search engines.**

The channels for university teachers and students to obtain resources are extremely diverse, but universal search engines still play an irreplaceable role as the "entrance". Search engines are the "first touch point" and "problem-solving tool" for information discovery. Whether it's students exploring a topic initially or teachers quickly searching for a concept or case, search engines have become the most commonly used tool due to their convenience and breadth of coverage. It is

mainly used for preliminary resource positioning, factual queries, and obtaining publicly available academic information. However, excessive reliance on search engines has also brought about problems such as fragmented information and uneven quality. Teachers and students need to have strong information screening abilities.

Specialized platforms are the "main battlefield" of deep learning. After initial positioning through search engines, teachers and students will quickly turn to specialized platforms for in-depth acquisition. These platforms include academic databases (such as China National Knowledge Infrastructure, Web of Science, IEEE Xplore), MOOCs and open course platforms (such as China University MOOCs, Coursera), institutional knowledge bases and subject specific resource libraries, as well as various digital resources subscribed by libraries.

The resources provided by these channels are systematic, authoritative, and reliable, and are the foundation for completing high-quality academic work. Socialized and collaborative platforms have become a "new space" for informal learning and communication. Academic social media platforms (such as ResearchGate), professional forums, communities (such as GitHub for code sharing), and academic groups within instant messaging tools are increasingly becoming important channels for teachers and students to access cutting-edge news, discuss academic issues, and share informal resources (such as preprints and academic report PPTs). This sharing model reflects the practice of the "co construction and co governance" concept advocated in the "Difficulties and Relief of the Construction of Digital Education Resource Sharing Mechanism" at the informal level.

#### **(3) Multi screen collaboration and task adaptation for terminal devices.**

College teachers and students flexibly choose and use different terminal devices based on the nature of their learning tasks, forming a composite usage mode of "multi screen collaboration". Traditional personal computers are the "main workstations" for handling complex tasks. When conducting literature review and annotation, programming development, data processing, paper writing, complex graphic design, and learning and research tasks that require running large-scale professional software. Personal computers have become the undisputed preferred choice due to their powerful computing performance, comfortable experience with large-sized displays, complete file management system, and strong compatibility with peripherals such as multiple displays and drawing boards. It supports long-term, high-intensity deep cognitive activities.

Mobile smart terminals (smartphones/tablets) are "flexible assistants" that support fragmented and contextualized learning. Mobile devices are mainly used for accessing information anytime and anywhere, reading e-books and lightweight literature, watching lecture videos, receiving academic information push notifications, participating in classroom interactions or online discussions, and taking simple note taking. Tablets, especially devices equipped with a stylus, provide a better experience in reading annotated PDFs, performing handwriting calculations, and mind mapping. Mobile terminals greatly expand the spatiotemporal boundaries of learning, but their use is mostly auxiliary and lightweight.

The usage mode presents the characteristics of "task diversion" and "cross screen relay". Teachers and students

often switch devices according to the scene: using computers for core work in laboratories or offices, quickly browsing summaries or listening to audio on mobile phones during commuting, and displaying or reading on tablets in conference rooms or libraries. Different terminals are connected through cloud storage and synchronization tools to achieve seamless workflow integration.

(4) The Differences in Information Literacy between Teachers and Students and the Internalization of the "Digital Divide".

The information literacy of teachers and students within universities is not homogeneous, and their differences profoundly affect the efficiency of resource utilization. Although the overall literacy of university teachers and students is relatively high, there are still differences in their ability to apply specific technical tools. Young teachers and students may have an advantage in mastering new software and utilizing new academic social platforms. Some senior teachers may have more experience in deep subject resource retrieval and professional analysis tool usage, but they are slower to accept some emerging digital teaching tools. There is also a gap in the mastery of technical tools among students due to their academic backgrounds and personal interests. The deeper differences are reflected in the ability to critically evaluate, effectively screen, organically integrate, and creatively apply massive amounts of digital information. This advanced information literacy determines how much academic value digital resources can ultimately be transformed into. The imbalance of this ability is the key factor affecting the depth and effectiveness of resource utilization, and it is also the core challenge of information literacy education in universities.

#### **4. Suggestions for Efficient Utilization of Digital Educational Resources by College Teachers and Students**

Based on comparative analysis of the characteristics of various learning terminals and combined with empirical research data, it can be clearly observed that student groups exhibit structural preferences in the use of digital educational resources. When completing the learning tasks assigned by the course, students are clearly more inclined to rely on traditional materials such as textbooks and teacher provided lecture notes, rather than digital resources.

This is mainly because the core course content system is relatively stable, the update cycle is long, and the textbooks have achieved low-cost and high reliability circulation through large-scale printing, making the advantages of digital resources in terms of accessibility and dissemination speed not significant. More importantly, due to the close association between course learning and academic evaluation, students are particularly sensitive to the accuracy and authority of resources. However, the quality of digital resources in the current network varies greatly, making it prone to errors or inconsistencies with classroom teaching priorities. The lack of credibility has become the main reason why students avoid using them.

On the other hand, when engaging in autonomous and expansive learning, students' choice logic undergoes a reversal. This type of learning involves a wider range of knowledge and often requires tracking academic frontiers. If relying solely on paper materials, it will face high economic costs and delayed information updates. At this point, the

advantages of digital resources in real-time updates, massive access, and low-cost dissemination are fully utilized. Meanwhile, independent exploration often encourages divergent thinking and does not require a single standard answer, which precisely alleviates the potential lack of precision in digital resources.

It is worth noting that whether in course learning or self exploration scenarios, when students choose to use electronic resources, accessing general search engines through personal computers is still the most frequent behavior. Compared to mobile devices, computers have significant advantages in presenting complex academic content such as formulas, special symbols, and multi format documents, effectively avoiding common display errors on mobile devices. Compared to systematically reviewing paper materials, the core competitiveness of search engines lies in their efficient retrieval capabilities. Although irrelevant information is often mixed in the returned results, optimizing keyword strategies can significantly improve the efficiency of information localization.

Based on the above analysis, the most important factors that students pay attention to when choosing digital teaching resources can be summarized as accessibility and usability, comprehensive costs (including economic, time, and cognitive costs), and content reliability. Based on this, the following improvement suggestions are proposed:

##### **4.1. Establish a Sound Quality Assurance Mechanism and Enhance the Credibility of Resources**

In the context of course learning, digital resources face trust bottlenecks due to accuracy issues. It is necessary to strengthen control from the source, establish a systematic content review, continuous updating, and error correction mechanism, especially to ensure that digital resources matched with specific courses are synchronized with the teaching syllabus and the error rate is minimized. By building a reliable resource system and gradually rebuilding students' confidence in using it, we can tap into a large amount of underutilized high-quality resources (such as excellent courses in various universities).

##### **4.2. Optimize Acquisition Efficiency and Cost Structure, Strengthen Inherent Advantages**

When students choose digital resources, their decisions are constrained by multiple cost factors. Therefore, on the one hand, it is necessary to continuously optimize technological facilities, improve the accuracy and response speed of search engines, and expand the coverage of open sharing of educational resources to reduce students' time and cognitive load in accessing resources. On the other hand, schools and relevant institutions should actively explore more inclusive delivery models for high-quality courses or academic databases with strong professionalism and high quality requirements. For example, by reducing access barriers through group procurement, institutional authorization, and other means, high-quality resources can widely benefit the student population.

##### **4.3. Deepen Mobile Scene Adaptation and Support Personalized Learning**

The current usage rate of mobile terminals in formal

learning is still low, which contrasts with the trend of technology popularization. This is certainly limited by factors such as screen size, interaction mode, and battery life, but the unique portability and real-time online characteristics of mobile devices are precisely the natural advantages of supporting fragmented and contextualized learning. The construction of digital resources should actively design for mobile scenarios: developing micro content suitable for short-term reading, refined visual courseware, lightweight interactive practice applications, and offline learning tools. This will effectively help students utilize informal time to learn at their own pace and interest, thereby promoting personalized learning and enhancing the practical value of mobile resources.

#### **4.4. Promote Differentiated Development of Terminals and Achieve Complementary Functions**

Research feedback shows that students generally do not tend to engage in long-term, in-depth text reading on their mobile phones, and such tasks are still best experienced on the computer. Therefore, the construction of mobile resources should be based on their scene characteristics, focusing on developing the following functions: convenient query tools, knowledge point explanations in the form of short videos, lightweight interactive exercises, and lightweight content push and communication based on social platforms or knowledge communities. By forming complementary scenarios with other terminals, rather than simply transplanting content, the integration effect of digital teaching resources on different devices can be fully utilized.

### **5. Conclusion**

Developers and suppliers of digital teaching resources must have a deep understanding and precise grasp of the real needs of target users. At the same time, carefully evaluate the comprehensive costs (including time, money, and cognitive load) that users are willing and able to bear in order to obtain services, and closely integrate these insights with real teaching scenarios and practices in order to design and develop truly efficient and usable digital educational resources. Only in this way can users' expectations for high-quality teaching resources be transformed into tangible products and services, ensuring that well-designed courses and dynamic information reflecting the forefront of the subject can be quickly discovered, adopted, and internalized by student groups, ultimately achieving the maximization of

the benefits of digital educational resources.

### **Acknowledgements**

The first author would like to express gratitude for the support from Yibin University and Water Transport Economy Research Center (No.SYJJ2024B07).

### **References**

- [1] Liu Mingzhuo, Guo Sai Research on the Allocation of Digital Education Resources under Policy Guidance [J]. *Modern Education Technology*, 2020, 30 (08): 73-79.
- [2] Wang Qian, Tang Erzi Research on Improving Resource Utilization in University Libraries: Algorithms, Theory, and Practice Practice [J]. *New Century Library*, 2021 (01): 62-68.
- [3] Guo Jiong, Chan Hui, Ding Lijun Research on Adaptive Allocation of Educational Resources Based on "Cloud School" Research on Digital Technology Promoting High Quality Development of Rural Education [J]. *Distance Education in China*, 2024, 44(01):46- 54.
- [4] Ke Qingchao, Liu Lili, Bao Tingting, etc National Smart Education Platform Empowers Regional Education Numbers The Four Mechanisms of Character Transformation [J]. *China Electronic Education*, 2023 (03): 30-36.
- [5] Yang Zengqiao, Golden Ocean, Hidden Snow High quality courses under the background of integrated construction of ideological and political courses in primary, secondary, and tertiary schools Exploring the Co construction and Sharing of Cheng Resources [J]. *School Party Building and Ideological Education*, 2024 (01): 54-60.
- [6] Xianwei Hong Research on the Construction and Service of Open Educational Resources (OER) in University Libraries—Taking the Open Education Librarian Community Practice of the British Columbia College Alliance in Canada as an Example [J]. *Journal of Academic Library*, 2022, 40 (04): 120-127
- [7] He Wentao, Zhou Rui, Zhou Yueliang, etc Based on knowledge modeling graph in the context of digital transformation Research on Crowdfunding Mechanism of Digital Education Resources [J]. *Education Development Research*, 2023, 43 (21):39- 48.
- [8] Li Suli, Xu Xiaodong. Research on the Strategy Mechanism and Implementation Path of Educational Data Resource Services Research Based on the Perspective of Platform Ecosystem [J]. *Research on Electronic Education*, 2021, 42 (06):67- 73.
- [9] Xu Minglei. Research on Strategies for Enhancing the Informationization Teaching Ability of Vocational School Legal Affairs Teachers under the Background of Smart Education [D]. *Qufu Normal University*, 2025.