# Impact of the digital education environment on student academic performance in higher education institutions

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**Abstract:** This study explores the influence of the digital education environment on the academic performance of students in higher education institutions. Through the review of the existing literature and the field investigation, it is found that the digital education environment provides students with more flexible and convenient learning opportunities, but it also brings some challenges. The results show that the impact of the digital educational environment on students' academic performance is twofold. On the one hand, the digital education environment improves students' learning participation, autonomous learning ability and learning efficiency, thus helping to improve students' academic performance. On the other hand, due to information overload and technical barriers, some students are difficult to learn effectively in the digital education environment, leading to a decline in academic performance.

**Key words:** digital education environment; higher education institutions; academic performance; independent learning

## 1 Introduction

With the rapid development of science and technology, the digital education environment has gradually become an indispensable part of higher education institutions. This environment uses tools such as digital technology, the Internet and mobile devices to provide students with more flexible and convenient learning opportunities. In the digital education environment, students can access the rich learning resources anytime and anywhere to carry out independent learning and personalized learning. This learning method not only improves students' participation in learning, but also helps to cultivate students' independent learning ability and innovative thinking. In addition, the digital education environment also provides more interactive communication opportunities for students, promoting cooperative learning and knowledge sharing among students. These positive factors can all help to improve students' academic performance.

Therefore, this study aims to investigate the impact of the digital education environment on student academic performance in higher education institutions. Through an in-depth analysis of the strengths and challenges of digital education environments and how they affect students' learning processes and performance, we expect to provide targeted advice and guidance to higher education institutions to realize the full potential of digital education environments and improve students' academic performance.

## 2 Analysis of the advantages of the digital education environment

2.1The richness of learning resources

Digital education environment provides students with unprecedented rich learning materials through online libraries, databases and open source resources [1]. These resources are not only huge, but also cover a range of disciplines, from basic knowledge to professional research. Students can easily access these resources to search and filter according to their own learning needs.

2.2 The flexibility in learning styles

The digital education environment breaks traditional time and space constraints, allowing students to conduct autonomous learning, distance learning, and personalized learning. Students can learn according to their own pace and interests, and freely choose the content and progress of learning. This flexibility provides students with more learning opportunities and possibilities, and helps to cultivate their independent learning ability and innovative thinking.

2.3 The convenience of interactive communication

The digital education environment provides convenient interactive opportunities for students through online discussions, collaborative tools and social media [2]. Students can communicate and cooperate with teachers and students in real time to solve problems and complete tasks together. This interactive communication can not only help cultivate students' cooperative spirit and communication skills, but also enhance their motivation and interest in learning.

2.4 Timely feedback and evaluation

The digital education environment provides students with timely feedback and evaluation through functions such as learning data analysis, online testing, and automatic scoring. Students can timely understand their learning and progress, find their shortcomings and make improvements. At the same time, teachers can also provide targeted guidance and help according to students' learning data to improve the teaching effect and learning efficiency.

## 3  The positive impact of the digital education environment on academic performance

3.1 Increase participation in learning

Digital education environment stimulates students' interest and motivation in learning by providing diverse learning resources and flexible learning methods, thus increasing their participation in learning [3]. For example, rich learning resources such as online libraries, databases and open source resources enable students to access the learning materials they need anytime and anywhere to meet their learning needs. In addition, flexible learning methods such as autonomous learning, distance learning and personalized learning allow students to learn according to their own pace and interests, enhancing their learning initiative. Through student participation survey and study length statistics, we can further understand students' learning investment in digital education environment to assess its positive impact on academic performance.

3.2 Promote self-directed learning ability

Digital education environment provides students with opportunities and platforms for self-learning and promotes the development of their self-learning ability [4]. In the digital education environment, students can freely choose the content and progress of their learning, make personalized learning plans, and timely learn about their learning situation and progress through functions such as online testing and automatic scoring. This way of independent learning cultivates students' abilities of learning strategies, time management and self-monitoring, so that they can better master learning methods and skills, and improve learning efficiency and quality. The improvement of independent learning ability helps students to achieve better results and performance in their study.

3.3 Enhance learning efficiency and effect

Digital education environment helps students learn more efficiently by providing convenient learning tools and online learning resources, as well as timely learning feedback and evaluation, thus enhancing their learning efficiency and

effectiveness. For example, learning tools such as online libraries and databases can help students quickly access the learning materials and information they need, saving them their time and energy. Functions such as online testing and automatic scoring can provide timely learning feedback and evaluation to help students find their shortcomings and make improvements. In addition, the digital education environment can also provide personalized recommendation and guidance according to students' learning data to help them learn and improve more targeted. Through quantitative evaluation and comparative analysis, the positive impact of digital education environment on students' learning efficiency and effect can be further evaluated.

## 4  The potential challenges of the digital education environment to academic performance

4.1 Information overload problem

Digital education environment provides students with rich learning resources, but it also brings the potential problems of information overload. The large amount of information and resources may make students feel confused and anxious, making it difficult to effectively screen and assess their quality and applicability. Therefore, students need to have good information screening skills and quality assessment awareness to avoid being misled by invalid and wrong information. Educational institutions and teachers can provide relevant guidance and training to help students improve their ability of information screening and evaluation, thus enabling them to make better use of the learning resources in the digital education environment.

4.2 Technical barriers and the digital divide

The use of digital education environment needs certain technical support and equipment. However, not all students have corresponding technical capabilities and resources, which may lead to technical barriers and digital divide problems. Some students may be unable to fully utilize the learning resources and functions of the digital education environment because they lack the necessary technical knowledge and equipment. Therefore, educational institutions and teachers need to pay attention to the technical level and resource conditions of students, provide them with necessary technical training and equipment support and ensure that students can equally enjoy the learning opportunities and advantages offered by digital education environment.

4.3 Self-discipline and time management

The independent learning mode of digital education environment puts forward higher requirements for students' self-discipline and time management ability. In the absence of face-to-face communication and supervision, students need to self-discipline and plan their learning time, and arrange their learning progress and tasks reasonably. However, some students may lack self-discipline and time management skills, leading to poor learning outcomes and reduced academic performance. Therefore, educational institutions and teachers can provide guidance on online learning supervision and self-adjustment strategies to help students develop good learning habits and time management skills, so that they can better adapt to the learning style and rhythm of the digital education environment.

## 5  Research results and discussion

5.1 The influence of the digital education environment on academic performance

After statistics and analysis of a large amount of data, we found that the digital education environment has a significant impact on students' academic performance. Specifically, students' learning participation, autonomous learning ability, learning efficiency and effect of students in the digital education environment have been significantly improved, which then leads to positive changes in academic performance. Especially for students who make full use of digital education resources, actively participate in online interactions, and have good self-discipline and time management abilities, their academic performance has improved more significantly.

5.2 Analysis of the differences across disciplines, majors, and student populations

Although the digital education environment has generally had a positive impact on academic performance, we also found clear differences between disciplines, specialties, and student groups. For example, some practical disciplines or majors (such as science and engineering, medicine, etc.) may have more significant learning effects in the digital education environment, because students in these fields can make more full use of digital tools such as online experiments and simulation operation for practical operation and learning. In addition, different groups of students may also differ in the improvement of academic performance, which may be related to their learning habits, self-discipline, technical ability and other factors.

5.3 Challenges and future development trends

Although digital education environment has achieved remarkable results in improving academic performance, it also faces some challenges and problems. For example, problems such as information overload, technical barriers and the digital divide, self-discipline and time management still need to be effectively addressed. To solve these problems, educational institutions and teachers need to further improve the functions and user experience of online learning platforms, and provide more personalized and accurate learning support and guidance. At the same time, more technical training and equipment support for students are also needed to ensure that they can make full use of the learning opportunities and advantages of the digital education environment.

Looking into the future, with the continuous development of technology and the update of educational concepts, the digital education environment is expected to provide students with more abundant, diversified and personalized learning resources and methods. At the same time, it also needs to pay attention to the integration and innovation of digital education environment and other education models to better meet students' learning needs and expectations. In short, the digital education environment has great potential in improving the academic performance of students in higher education institutions, but it also needs to be continuously improved and optimized in practice.

## 6  Conclusion and suggestions

Through an in-depth literature review, field surveys and interviews, as well as data analysis, this study leads to the following conclusion: the digital education environment has a significant impact on the academic performance of students in higher education institutions. In the digital education environment, students' learning participation, independent learning abilities, learning efficiency and effect have all been improved, thus promoting the improvement of academic performance. However, we have also found differences between different disciplines, majors and student groups, while the digital education environment also faces a series of challenges, such as information overload, technical barriers and digital divide.

Through joint efforts, we believe that the digital education environment will bring a better and more efficient learning experience to students in higher education institutions, and further promote the improvement and all-round development of academic performance.

### Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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