Research and Application of the Network Learning Platform in Based on Big Data Analysis and Mobile Communication

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Abstract. With the development of computer information technology, the learning methods of college students have gradually changed, and the Internet-based online learning methods are becoming more and more prosperous. This article uses big data analysis to explore the reasons for the application of the economic management network learning platform in colleges and universities and the impact of these reasons on the learning effect. Finally, some suggestions are put forward for the construction of the network learning platform. The research results not only provide new ideas for the continuous development of online learning platforms, but also have practical guiding significance for the improvement of teaching quality in colleges and universities.

Keywords: Big data, online learning platform, online learning effect.

1. Introduction
The online learning platform is an improved design based on the open source Dokeos system, which can provide real-time and non-real-time education consulting services for students and enterprises. At present, there are still some doubts about the application of online learning platform in colleges and universities, so it is very important to conduct related research on the application of online learning platform.

The research hotspots of online learning platforms at home and abroad are mainly concentrated in three aspects: 1. Development and design of online learning platforms; 2. Application of online learning platforms; 3. Comparison of online learning platforms. Regarding online learning, foreign researchers have done less research on the factors that affect the effect of online learning, but there are more studies on online learning. The research on online learning can basically be divided into two categories, one is the basic theoretical research on the definition, value and significance of online learning. For example, Rabe-Hemp and Humiston pointed out that online learning can help social learners formulate their own learning plan and uninterrupted their own learning career, by establishing real-time communication and asynchronous communication between learners, to solve the time and space problems between learners [1]. On the other hand is the practical research of online learning. Foreign scholars combine theory with practice and conduct related research through projects. Foreign researchers are also paying more attention to the various factors that affect the performance of online learning, and have studied the relationship between these factors and the learning performance of
learners. For example, Neena and Benjamin use experimental methods to investigate and evaluate online learning resources [2]. Compared with foreign countries, domestic research on online learning mainly focuses on the concepts and behavior characteristics of online learning, the evaluation system of online learning effects, and the influencing factors of online learning effects.

Since the State Council formally issued the "Outline of Action to Promote the Development of Big Data" in 2015, the development of big data has become a social consensus [3], and big data technology has become increasingly mature. In the relevant research of the network learning platform, many complicated data will be encountered. This article will use big data analysis to explore the reasons for the application of online learning platforms in colleges and universities, and the impact of these factors on learning effects.

2. Application analysis of online learning platform

This part mainly discusses the reasons for the application of the economic management network learning platform in colleges and universities, and the influence of these factors on the effect of students' network learning.

2.1. Analysis of the application reasons of the online learning platform

Through big data analysis, it is concluded that students' application of online learning platform mainly has subjective and objective factors. Subjective factors include intrinsic motivation, such as: learning professional knowledge, going abroad for further study, etc.; objective factors include external motivation, such as: earning credits; platform resources, such as: course content, course quality; platform design, such as: beautiful interface, operation Convenience; teacher's personal charm, such as: teacher's popularity, teacher's humor, etc.

2.2. Analysis of the effect of online learning platform application factors on online learning

With the reform of the educational system of colleges and universities, more and more learning platforms have also entered the students' campus life. Then, what is the impact of the students' application of the online learning platform on the effect of their online learning? Researcher's concern.

1) Propose hypotheses

Learning motivation is the motivation that motivates students to complete their learning goals. According to the different sources of learning motivation, it can be divided into intrinsic motivation and extrinsic motivation. This article believes that regardless of internal motivation or external motivation, it will have a significant impact on the effect of college students' online learning. In Wang Yuetong's research on the factors influencing college students' online continuous learning, it is confirmed that learning motivation is the most important factor [4]. Therefore, this research proposes the following hypotheses:

H1: Intrinsic motivation has a significant impact on the effect of online learning.
H2: Extrinsic motivation has a significant impact on the effect of online learning.

Many scholars have pointed out that the curriculum resources and platform design of the learning platform often affect the effect of online learning. The platform resources include: the practicality of the courses, the richness of the courses, and the timely update of the courses. Platform design includes: ease of operation, clarity of picture quality, and speed of resource downloading. Zhang Lei's research on the factors affecting students' effective learning in the online learning environment confirmed that resource factors have a positive impact on effective online learning behavior [5]. In Li Yanyun's research on the influencing factors that affect the effectiveness of college students' online learning [6], it is confirmed that the platform design has a significant impact on the effect of online learning. Therefore, this research proposes the following hypotheses:

H3: Platform resources have a significant impact on the effect of online learning.
H4: Platform design has a significant impact on the effect of online learning.

The teacher factor has always been an important factor affecting students' learning effect whether online or offline. The teacher's personal charm may have a significant impact on the effect of online learning.
learning. This has been proved a lot in the research of Jia Bin [7] and others. Therefore, this research proposes the following hypotheses:

H5: Teacher's personal charm has a significant influence on the effect of online learning.

2) Data analysis

This paper calculates the relevant data to obtain the Pearson correlation coefficient between the application factors of the economic management network learning platform and the network learning effect as shown in Table 1.

Table 1 shows that there is a positive correlation between the effect of online learning and the other five factors. Among them, the effect of online learning has the strongest relationship with platform resources ($r=0.860$), followed by intrinsic motivation ($r=0.856$) and platform design ($r=0.839$), teacher's personal charm ($r=0.813$), extrinsic motivation ($r=0.772$).

| Intrinsic motivation | Extrinsic motivation | Platform resources | Platform design | Teacher's personal charm | E-learning effect |
|----------------------|----------------------|--------------------|-----------------|--------------------------|------------------|
| Pearson Correlation  | 1                    | .550**             | .740**          | .702**                   | .560**           | .858**           |
| Significance         |                      | .000               | .000            | .000                     | .000             | .000             |
| N                    | 2360                 | 2360               | 2360            | 2360                     | 2360             | 2360             |

| Extrinsic motivation | Pearson Correlation  | 0.740**            | .586**          | 1                        | .729**           | .612**           | .860**           |
| Significance         |                      | .000               | .000            | .000                     | .000             | .000             | .000             |
| N                    | 2360                 | 2360               | 2360            | 2360                     | 2360             | 2360             | 2360             |

| Platform resources   | Pearson Correlation  | 0.702**            | .602**          | 1                        | .571**           | .839**           |
| Significance         |                      | .000               | .000            | .000                     | .000             | .000             | .000             |
| N                    | 2360                 | 2360               | 2360            | 2360                     | 2360             | 2360             | 2360             |

| Platform design      | Pearson Correlation  | .560**             | .573**          | .612**                   | .571**           | 1                | .813**           |
| Significance         |                      | .000               | .000            | .000                     | .000             | .000             | .000             |
| N                    | 2360                 | 2360               | 2360            | 2360                     | 2360             | 2360             | 2360             |

| Teacher's personal charm | Pearson Correlation  | .856**             | .772**          | .860**                   | .839**           | .813**           | 1                |
| Significance         |                      | .000               | .000            | .000                     | .000             | .000             | .000             |
| N                    | 2360                 | 2360               | 2360            | 2360                     | 2360             | 2360             | 2360             |

After obtaining the Pearson correlation coefficient between the application factors of the economic management network learning platform and the effect of the network learning, this paper conducted a multiple regression analysis on the data. The regression analysis results are shown in Table 2 and Table 3.
Table 2. Test table of goodness of fit of the final model.

| Model | R   | R Square | Adjusted R Square | Std Error of the Estimate |
|-------|-----|----------|------------------|--------------------------|
| 1     | 0.969 | 0.938    | 0.937            | 3.17760                  |

a. Predictors: intrinsic motivation, platform resources, teacher's personal charm
b. Dependent variable: e-learning effect

Table 3. Regression analysis of the effect of online learning.

| model                          | Unstandardized coefficient | standardized coefficient | t    | Sig. |
|--------------------------------|----------------------------|--------------------------|------|------|
| (constant)                     | 3.662                      | 1.163                    | 3.147| .002 |
| Platform resources             | 2.142                      | .157                     | 13.654| .000 |
| Teacher's personal charm       | 1.735                      | 0.087                    | 19.941| .000 |
| Intrinsic motivation           | 1.679                      | .098                     | 17.050| .000 |

Taking the five factors of intrinsic motivation, extrinsic motivation, platform resources, platform design, and teacher's personal charm as independent variables, and the effect of online learning as the dependent variable, a stepwise linear regression analysis can be used to obtain the intrinsic motivation, platform resources, and teacher's personal charm. The three factors reached the level of significance, but the external motivation and platform design did not reach the level of significance, so no regression analysis was performed. F=0.937, indicating that the goodness of fit is good.

From this, we can also infer in this way that, relative to internal motivation, platform resources, and teacher’s personal charm, the impact of external motivation and platform design on the effect of students’ online learning is negligible.

3) Results discussion

Through the above analysis of the data, we can get that Hypothesis 2 and Hypothesis 4 are not valid.

Hypothesis 1, the test result holds. Intrinsic motivation has a significant impact on the effect of college students' online learning, and it has a positive impact.

Hypothesis 2, the test result is not true. Extrinsic motivation has no significant influence on the effect of college students' online learning. Compared with intrinsic motivation, external pressure exerts less influence on students' online learning effects. After sorting out the data, it is found that when students only complete the tasks assigned by the school or the teacher, the effect of learning will be greatly attenuated.

Hypothesis 3, the test result holds. Platform resources have a significant impact on the effect of college students' online learning, and it has a positive impact. The more practical the content of the course, the richer the presentation, and the more timely updates, the better the effect of online learning for college students. Among them, the richness of platform resources has the most prominent impact on students' online learning effects.

Hypothesis 4, the test result is not true. The platform design has no significant influence on the effect of college students' online learning.

Hypothesis 5, the test result holds. The teacher's personal charm has a significant impact on the effect of college students' online learning, and it has a positive impact. Teachers play an important role in the learning of students. Teachers are humorous and well-known. They will naturally attract students to listen to their lectures, and their learning effects will be better.

3. Suggestion

In response to the results of data analysis, this article puts forward the following suggestions:
3.1. Ensure the practicality, richness and timely update of course resources

Based on data analysis, there is still room for improvement in online course resources. In the production of courseware, it is necessary to do what students like, and use more animation, video and audio content to cultivate students' interest, stimulate students' curiosity, and let students learn knowledge happily. At the same time, it is also possible to set a time limit for each teacher to update the content of the course, so that they can update the content in a timely manner within the specified time limit. With new content, students will become active and learn. The school's courses on its own platform should also be more connected with universities from all over the world, so that students of this school can also experience the courses of other colleges and universities.

3.2. Optimize resources for online learning

Based on data analysis, choosing PPT courseware is the most helpful for students, followed by learning goals, important and difficult points, and database. However, the proportion of Q&A discussion, coursework and course expansion is very small. Therefore, teachers should pay attention to the reasonable use of PPT courseware, learning objectives and key points, and database. For PPT courseware, more diagrams and animations can be combined. The learning objectives, important and difficult points, and the database should be as streamlined and organized as possible, so as to improve the quality of these learning resources and help students learn. At the same time, the sections that are not used too much can be integrated or eliminated according to their importance, so that students will be more concise and clear when they enter the interface to learn, thereby improving the efficiency of students' learning. In addition, you can also set up a preview section in the learning section, so that students can understand the important and difficult points of each lesson before class, and the learning effect will be higher with questions.

3.3. Improve the design of the network learning platform

Based on data analysis, the network learning platform has problems such as difficult to operate functions, unclear images, and slow resource download speeds. Therefore, the designer of the platform should improve the software configuration of the platform, increase the download speed of its learners' resources, reduce the stuttering phenomenon of video playback and simplify the operation of the platform. For learning platforms in colleges and universities, we can coordinate with network operators to expand the coverage of wireless and campus networks. At the same time, we can train platform designers to apply more advanced technological achievements to the design of online platforms. Increase the capital investment in the construction of school computer rooms, timely check and update its hardware equipment, and reduce the phenomenon that the damage of the hardware equipment affects the learning effect of students when they take online courses.

4. Summary

This article uses big data analysis to explore the reasons for the application of the economic management network learning platform in colleges and universities, including objective and subjective reasons, and then in-depth research on the impact of these reasons on the effect of college students' network learning, and finally proposes the network learning platform based on the results obtained Made some suggestions. With the reform of the educational system of colleges and universities, students' learning methods have become more and more flexible, and the application of "Internet + education" has become more and more extensive. The research results of this article not only provide new ideas for the continuous development of online learning platforms, but also have practical guiding significance for the improvement of teaching quality in colleges and universities. However, the research in this article is only limited to the economics and management network learning platform of colleges and universities, and the scope is relatively narrow. In the future, it is necessary to continuously learn new technologies to study the application of the network learning platform on a larger scale.
References

[1] Rabe-Hemp, C., & Humiston, G.A. Comparative of Student Engagement, Learning and Satisfaction in Lecture Hall and Online Learning Settings. Quarterly Review of Distance Education, 2009, 10 (2), 207-218.

[2] Neena Randhawa, Ben Jamin Tan, Ayan Baner Jea, James Catton, Lisa Whisker. An evaluation of higher surgical trainees' expectations from an online-learning resource [J]. International Journal of Surgery, Volume 11, Issue 8, October 2013, Pages 694.

[3] The State Council issued the "Outline of Action to Promote the Development of Big Data" [J]. Radio and Television Information, 2015 (09): 13.

[4] Wang Yuetong. Research on the Influencing Factors of University Students’ Online Learning Willingness to Continue Learning [D]. Northeast Normal University, 2019.

[5] Zhang Lei. Research on the influencing factors of students' effective learning behavior in the network learning environment [D]. Northwest Normal University, 2018.

[6] Li Yanyun. Research on the Factors Affecting the Effectiveness of College Students' Online Learning [D]. Liaoning Normal University, 2011.

[7] Jia Bin. Research on the influence of teacher-student interaction on online learning performance [D]. Liaocheng University, 2014.