

Reform of Curriculum System for Computer Major in Universities under the Background of “Internet + Education”

Yajing Liu*

Transocean Consulting (Tianjin) Co., Ltd., Tianjin 300457, China

*Corresponding email: yjl617286@outlook.com

Abstract

With the continuous development and technological iteration of computer disciplines, societal competency requirements for computer-related talents keep evolving. The curriculum system of computer specialty in higher education needs to keep pace with the times and be reformed continuously to meet the needs of social development. However, with the arrival of the “internet +” era, the application of “internet +” technology in the curriculum system reform of computer specialty is also providing technical support for the curriculum system reform of computer specialty. Computer network technology has greatly changed the way people live, work and study. At present, in the process of the development of Internet economy, “internet +” is a very important emerging form. Under the background of internet +, China’s education system has ushered in a change, not only in teaching methods, but also in course content. In addition, in the construction of curriculum system, we need to use Internet technology to establish a professional curriculum system compatible with the Internet. At the same time, this “internet +” curriculum system structure needs to be continuously improved and developed for a long time, so as to help students effectively improve their practical ability and meet the needs of society for computer talents. Therefore, from the perspective of “Internet + Education”, this paper puts forward the corresponding reform strategies, and provides professional reference materials for the reform of computer courses and the setting of curriculum system in colleges and universities.

Keywords

Internet +, Computer science major, Curriculum system reform, Educational mode

Introduction

The internet is the most common new tool for large-scale innovation and entrepreneurship. The new mobile Internet technology and related Internet platforms are closely integrated with traditional industries, thus forming a brand-new ecology, so as to promote the upgrading of traditional industries.

University computer majors need to integrate relevant teaching resources according to the development of the times and realize “internet + teaching” in all aspects of classroom teaching. This also requires schools to increase investment in hardware and software technology, comprehensively improve the teaching mode of computer specialty, and further realize the organic integration of “Internet + education” and the curriculum system of computer specialty in colleges and universities, which is also an important content of reform. In addition, combined with the actual situation of computer specialty, it is necessary to further deepen the reform. The

application of Internet technology in the fields of education, web design and web browsing enables more students to use the brand-new technology of “Internet + Education” to solve the problems they encounter in their life and study. However, the number and growth rate of college graduates in China from 2013 to 2022 are shown in Figure 1.

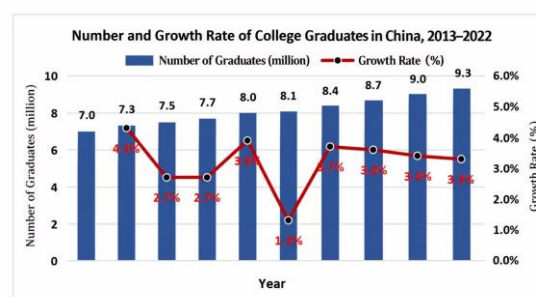


Figure 1. Number and growth rate of college graduates in China from 2013 to 2022.

As shown in Figure 1, the rapid development of higher

education provides a steady stream of talents for the development of society, especially in the teaching of computer specialty, which meets the needs of social development and opens up a new road for the development of education industry.

Internet + Education and Computer Major

The significance and influence of “internet +” education

With the gradual progress of “internet +” technology and the gradual development of education reform, an intelligent education, namely “Internet + Education” mode, has been formed. The progress of the “Internet + Education” program has made great contributions to the long-term sustainable development of education in China. At the same time, under the background of “Internet + Education”, education reform is progressing in an orderly manner. In addition, in the Internet era, smart mobile applications such as WeChat and QQ have gradually become popular. As a result, “Internet + Education” can combine the virtual with the reality and create a brand-new teaching mode. “Internet + Education” will provide professional technical support for education reform.

After social development has gradually entered the era of Internet economy, this brand-new model of Internet has gradually merged into Internet finance, e-commerce, online film and television and other industries, and has been widely used in many fields of social economy. At present, both the Party and the government attach great importance to the development of the Internet, and at the same time, the rapid development of the Internet has also attracted great attention from people from all walks of life. Therefore, under the background that the Internet has gradually become a development trend, it is essential to carry out the reform of traditional teaching patterns, and the teaching model must keep up with the pace of social development in order to continuously provide applicable and high-quality talents for the society. With the maturity of Internet technology and mobile Internet infrastructure, and the large-scale migration of users' habits to online, China's online education industry has shown a continuous warming situation in recent years, and the market scale and user scale have been growing. In the next few years, the market scale of online education in China will continue to decrease year-on-year, but the growth momentum will remain steady. The market scale of online education in China in 2012-2022

is shown in Figure 2, and the user scale of online education in China in 2012-2022 is shown in Figure 3:

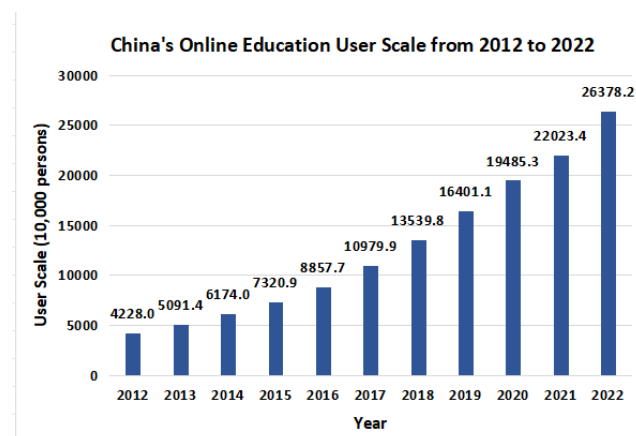


Figure 2. Online education user scale in China (2012-2022).

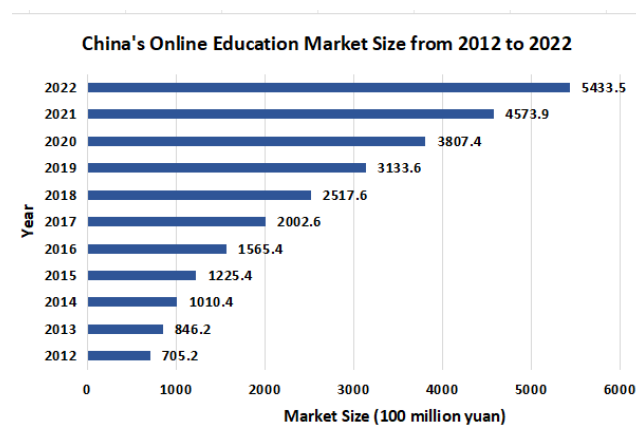


Figure 3. China's online education market size (2012-2022).

Insufficient application of “Internet+” technologies in computer science programs

In the process of applying “internet +” educational technology, colleges and universities did not fully apply “internet +” educational technology but only applied “internet +” educational idea in a few courses. For example, many schools adopted “internet +” educational idea in web design courses, but its “internet +” educational technology application effect was average, and sometimes “internet +” educational technology application was inappropriate, which could not reflect “internet +” educational idea.

And because “internet +” educational technology is the key factor to promote the reform of the curriculum system of computer specialty in colleges and universities, it is necessary to ensure the organic integration of “internet +” educational technology and the curriculum system of computer specialty in colleges and universities.

Only by organically integrating technology with practice can we promote the development of reform. At present, “internet +” educational technology is not properly used, which is mainly manifested in the fact that “internet +” educational technology is mainly used in the course system reform of computer specialty in colleges and universities in “internet +” education, but “internet +” educational technology is not integrated in other practical teaching contents.

The challenges faced by the teaching of computer major in colleges and universities

“internet +” deeply integrates modern IT technology with education, and promotes the emergence of open, interactive, collaborative and shared wisdom education characterized by networking and intelligence. Today’s education should reshape campus learning ecology with intelligent learning environment and innovate traditional education mode with “internet +” technology. “internet +” is a set of information technology based on the Internet, including the diffusion and application process of mobile Internet, cloud computing and big data in economic and social life. Education in the era of “internet +” refers to the effective implementation of teaching activities by teachers and students in a new form of education with the support of network and technology. Computer major, as the core force of education informatization construction and IT talents training under the “internet +”, is playing an increasingly important role. The theoretical and practical requirements of computer professional courses are strong, and the conventional “PPT + chalk-and-talk” teaching method can arouse students’ interest to some extent, but there is a disconnect between theoretical teaching and computer practice.

After the 19th National Congress, hardware popularization was basically completed, and the era of education informatization 2.0 began to enter the customer-oriented software and service market, and the market was in the racetrack preemption period. With the support of national policies, the market scale of computer system integration in China’s education industry shows a steady growth trend. According to relevant surveys, the market scale of China’s education industry informatization in 2019 was about 436.84 billion yuan, up by about 7.3% year-on-year. It is preliminarily estimated that the information market size of China’s education industry will be 469.1 billion yuan in 2020. The scale of China’s education industry informatization

market from 2013 to 2020 is shown in Figure 4:



Figure 4. Distribution of Information Market Size of Education Industry in China from 2013 to 2020.

Problems in the curriculum system of computer specialty under the background of “internet +”

“internet +” education under the outdated computer education content

Under the background of “internet +”, the content of computer curriculum system in colleges and universities is often updated slowly. Even though a few colleges and universities in China have adjusted the computer curriculum, the results are not as good as expected. In fact, the core idea of “internet +” itself has not been applied to the curriculum of computer major, which leads to the outdated curriculum system and teaching mode of computer major in universities, and the course content has not changed substantially.

However, many higher education institutions in China have not reformed computer courses according to the needs of social development. Some professional contents needed by society provided by traditional courses are mostly educational contents in 1990s. Nowadays, the introduction of “internet +” teaching mode makes the curriculum system reform include some “internet +” courses, but most of the curriculum reforms are not so perfect, and the core thinking of “internet +” teaching is not fully reflected in the reform. In addition, the reform process of computer curriculum system in colleges and universities must be carried out around the educational thought of “internet +”, and the course aims at cultivating high-level computer professionals to meet the needs of social development.

Curriculum system structure is too disciplinary

For a long time, the curriculum system structure of computer major in Chinese universities is fixed, and the curriculum is also seriously rigid. In recent years, with the development of science and technology, although

there have been some changes in colleges and universities, due to the slow reform of the education system, the reform of the curriculum system of computer specialty in colleges and universities is still lagging behind, which simply can't keep up with the development of the Internet. The curriculum system is not scientific enough. Computer programs for university setting usually include programming language, application foundation and database. If you don't study hard, it will be difficult for students to become experts in the computer industry and truly master the practical application ability. Most computer majors can only operate some office software without programming ability after graduation, and their computer application skills are relatively poor. There are still serious disciplinary problems in the current curriculum system of computer specialty. With the introduction of advanced teaching concepts and models, the topic of college computer curriculum reform has attracted more and more attention.

The so-called discipline, like the previous teaching, is to impart knowledge according to the discipline. Teaching is also the main form of education in China. Even though it has great value, its shortcomings are very obvious. With the development of science and technology, the emergence of the new normal has also had a great impact on computer professional courses. Therefore, colleges and universities must break the past constraints, gradually change the status quo and improve the computer curriculum system.

Measures for the reform of computer specialty in colleges and universities under the background of internet +

Reform the curriculum system and combine it with multimedia and Internet of Things

Courses are the foundation of professional teaching in schools. The reform and adjustment of curriculum structure is very important for teaching. It can not only change the whole education and promote the integration of educational resources, but also lay a solid and excellent foundation for the long-term development of the school. Therefore, in this case, colleges and universities should actively carry out the curriculum structure reform of computer specialty, innovate the curriculum system structure, reflect the value of higher education itself, and meet the actual needs of "internet +

teaching".

The main teaching goal of university computer major is to train more applied professionals for the society. Therefore, when setting up computer majors, universities should focus on setting up courses with multiple application types and put them in the main position. At the same time, lay a good theoretical foundation and focus on the cultivation of students' operational ability and skills. With the gradual popularization of campus computer system and the construction of smart campus, the demand of school computer system integration is mainly reflected in infrastructure construction, wireless network construction, safety monitoring design and installation. The school can realize the effective integration and connection of the whole campus infrastructure and solve the wireless network problems through the computer system integration service. The specific needs are as follows:

Table 1. School Computer System Integration Requirements.

Demand	Main content
Infrastructure construction	Through the security, property and office infrastructure of each sub-business Effectively integrate and connect, and collect, analyze, transmit and process information. Achieve efficient, energy-saving and coordinated operation.
Wireless network construction	Through computer system integration to solve the campus wireless network authentication login, Outdoor coverage, parallel lines in crowded areas and wireless deployment of special buildings.
Safety monitoring design and installation	The platform can easily build intrusion monitoring, video monitoring and emergency intelligent systems, and the orderly cooperation and intelligent linkage between systems will turn passive monitoring of personnel into active processing of the system. Through system integration, the response and processing speed of emergencies on campus can be enhanced, and the labor intensity of staff can be effectively reduced.

In fact, university teachers can combine the mobile terminal platform with the curriculum system from the perspective of actual teaching content, teaching methods and evaluation strategies. As for the educational content

in the course, new content can be added to the original content (such as file management, equipment management and storage management), such as the innovation of database operation method under the background of data growth and mobile data era. In addition, we can also introduce new media platforms to change the traditional teaching methods. For example, real-time screen recording of course content can be realized through platforms such as MOOC and Weibo. In the actual assessment, teachers can also design corresponding test questions and conduct performance evaluation.

The Internet of Things can enable ordinary objects that can perform independent functions to connect and communicate with each other. It mainly includes three levels: perception layer, transmission layer and application layer. At the same time, the combination of the Internet of Things and the university curriculum system can also be understood as: Based on the above structure, the curriculum system is constructed in three areas: induction recognition, Internet transmission, new media equipment and technological innovation. The basic courses include the basic knowledge of database principles and Internet of Things principles, and the professional courses include more detailed research on the theory of Internet of Things control and wireless. In the design of practical training courses, universities can use relevant equipment according to their own teaching conditions. In addition, they can also actively cooperate with social groups to jointly carry out research activities on the Internet of Things. Internet-experienced enterprises can be invited to universities to participate in classroom activities or conduct online learning.

Realize the combination of “Internet + education” and computer major in colleges and universities

Now, in the process of reforming the curriculum system of computer specialty by using “internet +” education, until the 1990s, some educational contents have not met the social needs and the employment requirements of modern enterprises. “internet +” education can be integrated not only into the hardware, but also into all aspects of the computer professional curriculum system. However, at present, the computer courses in Chinese universities obviously can't keep up with the development of science and technology in the era of “internet +”. To change this, universities need to integrate the core meaning of the Internet and integrate

the “internet +” teaching into the curriculum system of computer specialty.

The application of “internet + Teaching” in the curriculum system of computer specialty in colleges and universities can reform the traditional teaching mode, update the outdated teaching content and promote the innovation of the teaching system of computer specialty in colleges and universities to meet the requirements of modern society. Under the background of “Internet + Education”, it is an important teaching reform plan to realize the combination of “Internet + Education” and computer major in colleges and universities. University computer majors need to integrate relevant teaching resources according to the progress of the times and realize the integration of “internet + teaching” in all aspects of classroom teaching. In addition, increase investment in hardware and software technology, and comprehensively improve the teaching mode of computer specialty. Realizing the combination of “Internet + Education” and computer specialty is an important content of education reform, and it is necessary to continue to deepen the reform in combination with the actual situation of computer specialty.

In order to realize the reform of computer course system, we must set up the teaching content reasonably and change the original teaching structure. At the same time, the course content is also the basis of teachers' teaching, and scientific and reasonable teaching content can improve students' learning efficiency. If colleges and universities want to play an active role in talent training, they should actively integrate teaching resources, edit professional teaching materials, apply the technology of “Internet + Education”, and combine the updating of the curriculum structure of computer major with the educational characteristics of colleges and universities to cultivate applied talents, so as to achieve the best reform effect. With the help of the reformed classroom teaching content, the practical ability of computer specialty can also be greatly improved. With the practical focus and theoretical supplement, practical teaching will also help more students achieve the best results. Courses such as Photoshop application, film and television production and web design are set up in the curriculum system of computer specialty. The combination of digital teaching mode and internet technology can improve students' willingness to participate and improve classroom teaching efficiency.

Improve teachers' professional ability and professionalism.

Teachers are the main body of teaching activities, and their professional knowledge and ability are essential to implement the new teaching mode of "internet + Teaching". Therefore, in order to improve the overall teaching level of teachers, colleges and universities should understand the new trend of Internet development through books, the Internet and other channels, and improve the professional level of teachers. In addition, we can also combine the hot spots of the times in the classroom to stimulate students' enthusiasm for learning and achieve excellent teaching results.

Therefore, under the background of "Internet + Education", as an important driving force to promote the reform of computer professional classroom system, it is also the key to strengthen the training of computer professional teachers in colleges and universities and improve their comprehensive quality. Because the teaching level of computer major in most universities in our country is different, and students' knowledge is also different, improving teachers' professional skills has become an important topic. To provide learning opportunities for computer teachers in colleges and universities, so that they can enter the enterprise for further study, so that they can make a reasonable teaching plan according to the actual situation of the enterprise in the practice process. In addition, the backbone of enterprises with practical experience will be invited to give professional lectures and teaching guidance for students. Through mutual communication and learning, teachers can be more clear about their teaching tasks and help students majoring in computer science master relevant knowledge points quickly. The level of students' application of computer technology depends on whether teachers can carefully guide them. In addition, teachers should integrate teaching resources according to the class schedule and effectively complete the teaching plan.

Conclusion

"Internet + education" has brought many opportunities and challenges to colleges and universities. Integrating information technology such as "internet + Teaching" into the classroom of computer specialty, combined with the actual market demand, improves students' learning efficiency and teachers' teaching level, and sets up scientific and reasonable course teaching content for all students. Through investigation and analysis, it is found

that the positive influence of the Internet is very great in the teaching of computer major in universities. Under this background, colleges and universities should fully consider the actual needs, scientifically set up the curriculum system, adjust the curriculum structure, update the curriculum content in time and gradually improve it.

On the basis of the development of internet intelligence technology, the theoretical framework of "Internet + Education" is used to innovate the curriculum of Internet major in colleges and universities. First of all, we should establish the importance of new media network technology, abandon the single textbook-style traditional theoretical teaching mode, pay attention to the cooperation between universities and various enterprise organizations, focus on market development, curriculum arrangement and other aspects, create a learning atmosphere for students' autonomous learning and carry out school teacher training plans. As an important training base for talent training in China, universities should devote themselves to cultivating comprehensive talents that meet the needs of social development in the process of national development and promote the improvement of the country's comprehensive national strength.

In a word, "internet +" teaching provides technical support for the reform of the curriculum system of computer major in colleges and universities, and also provides a new concept of curriculum system setting, so that the curriculum system of computer major can meet the development needs of modern computer industry and cultivate high-level applied talents for enterprises.

Funding

This work was not supported by any funds.

Acknowledgements

The author would like to show sincere thanks to those techniques who have contributed to this research.

Conflicts of Interest

The author declares no conflict of interest.

References

- [1] Rahman, T., Malla, S. (2024) Emulating real world SE practices in computer science classrooms. *2024 IEEE Frontiers in Education Conference (FIE)*, 1-9.
- [2] Bu, L., Zou, J. (2024) Reform and exploration of

- university students' innovation and entrepreneurship course teaching based on federal learning under the "Internet+" perspective. *Journal of Combinatorial Mathematics and Combinatorial Computing*, 122, 197-205.
- [3] Tang, H., Zhan, X. (2019) Teaching reform of the computer engineering talent's innovation ability under the background of Internet +. *2nd International Workshop on Education Reform and Social Sciences (ERSS 2019)*, 47-50.
- [4] Ryoo, J. J., Tanksley, T., Estrada, C., Margolis, J. (2020) Take space, make space: How students use computer science to disrupt and resist marginalization in schools. *Computer Science Education*, 30(3), 337-361.
- [5] Yadav, A. K., Shrestha, D. P. (2025) Designing a student-centric computer science curriculum: enabling flexibility and personalised learning in secondary schools. *International Journal of Computer Science Education in Schools*, 7(2).
- [6] Gu, P., Wu, J., Cheng, Z., Xia, Y., Cheng, M., Dong, Y. (2025) Scaffolding self-regulation in project-based programming learning through online collaborative diaries to promote computational thinking. *Education and Information Technologies*, 30(12), 16243-16267.
- [7] Suleiman, A. D., Hou, D., Liu, Y., DeWaters, J., Shepherd, D. C., De Souza, J. G. (2025) Systematic literature review on project-based learning in computing education. *ACM Transactions on Computing Education*, 25(4), 1-53.
- [8] Yu, F., Gao, L. (2021) Research blended teaching based on "Internet +" - taking the course of computer network as an example. In *2021 International Conference on Internet, Education and Information Technology (IEIT)*, 346-349.
- [9] Tang, W., Du, J., Chen, S., Zhang, D. (2020) Course model research of OBE in "Internet +" Era. In *2020 International Conference on Computer Network, Electronic and Automation (ICCNEA)*, 196-200.
- [10] Yuan, X., Wan, J., An, D., Lu, J., Yuan, P. (2024) Multi-method integrated experimental teaching reform of a programming course based on the OBE-CDIO model under the background of engineering education. *Scientific Reports*, 14(1), 16623.