

Changes in the "Bring Your Own Device" Learning Method under 5G Mobile Internet

Yushuang Gao

School of Information and Science Technology, Yunnan Normal University, Kunming, 650092, China

Abstract

"Bring Your Own Device" learning method has great advantages for realizing students' personalized learning and the implementation of information teaching and other aspects. The advent of 5G is bound to bring changes to this way of learning. Starting from the "bring your own device" learning mode under 4G, this paper points out the changes of "bring your own device" learning mode under 5G mobile Internet by analyzing the characteristics of 5G network.

Keywords

5G; "Bring Your Own Device" method; Learning style; Changes.

1. Introduction

The third industrial revolution (also known as the information revolution) has brought earth shaking changes to our work, study, life and even the way of thinking. With the extensive and in-depth application of mobile Internet, the continuous innovation of technology and the continuous expansion of the functions of mobile terminal devices, mobile terminal devices under the mobile Internet are more and more favored by users. People not only combine the two for production practice, but also for learning and research. It is no longer a fixed platform for network interpersonal communication, but also an important tool for learning.

With the development of technology, 5g era is coming. 5g will bring great changes to people's lives, especially in education. The learning system supported by 5g network provides learners with a one-stop ubiquitous learning environment including online learning and mobile learning. 5g can realize the same class for many people in different places. It also supports different learning scenarios such as classroom, workshop, outdoor and mobile space. In this environment, the way of learning is bound to change.

Under the background of 5g, the learning style of "bring your own device" will change.

2. "Bring Your Own Device" Learning Style

2.1. The Connotation of the Concept of "Own Equipment"

From the school perspective, "self-contained equipment" refers to the technology application mode that allows teachers and students to carry their own equipment into the campus network to carry out teaching activities to improve teaching efficiency and learning effect. [1] According to the horizon report of 2016 New Media Alliance (higher education version), it is concluded that "self-contained equipment" learning is one of the important development directions of recent educational technology. [2]

Byod is the abbreviation of bring your own device, also known as byot. Byod originated from foreign companies and enterprises, which means that employees are allowed to bring their mobile devices (laptops, tablets, smartphones, etc.) to their work places and access company information and applications. With the Internet entering the campus, the self-contained

equipment is gradually accepted by the school. At first, it is the teacher with equipment teaching, and then it is gradually applied to the classroom learning and discussion of college students.

"Future education can be done at any time, anywhere, in any way, from anyone." [3] Although the self-contained equipment may bring challenges such as information security problems, more and more practices should be carried out. With the popularization of mobile intelligent terminal, the self-contained equipment will become a popular teaching tool, which has an important impact on information teaching.

2.2. The Characteristics of "Bring Your Own Device" Learning Style

Constructivism is the main supporting theory of "bring your own device" learning. According to Professor He Kekang's point of view, constructivism is student-centered. In the whole teaching process, teachers play the role of organizer, director, helper and promoter, and make full use of learning environment factors such as situation, cooperation and conversation to give full play to students' initiative, enthusiasm and initiative, so as to achieve the goal So that students can effectively achieve the purpose of meaning construction of the current knowledge. In this process, media devices are used to create situations, carry out cooperative learning and conversational communication, that is, as cognitive tools for students' active learning and cooperative learning. [4] In addition, Li Luyi believes that self-contained devices have the following characteristics: first, self-contained devices are user driven. Byod users use their own preferences and commonly used personal information terminal devices to actively obtain, share and apply information according to their own needs. The whole information service process is actively stimulated and driven by users. The characteristics of information devices are diversity and context integration. Second, the diversity of information equipment. Allowing users to use their own information terminal devices is a hallmark of byod. Due to the diversity of users and the diversity of current digital and network information equipment products, information equipment has diversity in byod context. Third, situational integration. Because users can integrate and apply the information terminal devices they use in their daily life to complete their learning tasks in the working situation, the working situation and life situation are organically integrated in essence. [5]

As the slide is gradually replaced by the electronic whiteboard, the projector and electronic sensor pen also come into the classroom. The mobile Internet and teaching electronic equipment are in the center of our teaching. In addition to the improvement of teachers' teaching equipment, students' learning equipment is also increasingly enriched. From books, abacus, dictionaries to electronic dictionaries, electronic calculators, to the last mobile terminal device, mobile phone or pad, books, electronic dictionaries and electronic calculators can be integrated into one. This will undoubtedly reduce the burden on students' schoolbags, and enable students to study with mobile terminal devices of their own choice, which is bound to transform the rigid requirements into the active choice of what they love, which is conducive to students' active learning and happy learning, and has brought great help to learning. At the same time, for some special learning groups, it provides a greater choice.

2.3. The Advantages of "Bring Your Own Device" Learning Mode

2.3.1. "Bring Your Own Device" Learning Meets the Requirements of Constructivism Theory

Constructivism holds that learning activities include four elements: situation, cooperation, communication and meaning construction. To a certain extent, the teaching application of "bring your own equipment" conforms to the constructivist learning theory. In the classroom situation, each student has at least one personal device, which will directly lead to more students to participate in learning activities and experience the fun of knowledge construction. At this time, communication and cooperation between teachers and students, students and

students through their own equipment. Each student, as the main body of learning, shares his or her own equipment, and with the help of teachers and students, carries out meaningful construction according to his or her own learning needs. In this process, the teacher is the guide in the teaching process, helping students realize personalized learning and cooperative learning.

2.3.2. "Bring Your Own Device" Learning to Meet The Practical Needs of Mobile Learning

With the development of economic level, especially the outbreak of this year. With the rapid expansion of mobile intelligent terminal users in China, the post-90s and post-90s teenagers have gradually become the main force of mobile intelligent terminal users. Many students need to learn through mobile intelligent terminals during the epidemic period. According to the 2014 mobile Internet data report released by talking data, an independent third-party data service provider in China, the number of mobile intelligent terminal users in China reached 1.06 billion in 2014. Among them, students have gradually become an important force of mobile Internet. Mobile terminal is an important learning tool for students. It is light, portable, fast networking, powerful and so on. Mobile learning will become an important part of basic education. At the same time, various educational applications make mobile devices powerful learning tools. Using byod strategy, combined with the traditional classroom, mobile learning will continue to develop. With the support of the school and other management departments, the application of byod in teaching will continue to meet the needs of students' mobile learning. [6]

2.3.3. "Bring Your Own Equipment" to Reduce the Investment of Educational Informatization

Although China's education informatization has made some achievements, the phenomenon of waste of educational resources and unbalanced development of education still exists. Students bring their own equipment to school, will greatly reduce the government's investment in education informatization, can also avoid the waste of resources caused by the replacement of educational equipment. The government can invest in the construction of campus network environment and education information service platform.

2.3.4. "Bring Your Own Equipment" to Enrich Information-based Teaching Activities

The application of "self-contained equipment" learning method and classroom teaching help to realize the deep integration of information technology and curriculum, and give full play to students' learning enthusiasm. In the information environment, students can easily carry out various learning activities such as autonomous learning, inquiry learning, research-based learning, collaborative learning and so on by using their own devices to retrieve information, transfer information, share information, process information and evaluate information. [7] Students can realize the "blended learning" combining traditional classroom and virtual classroom by using their own equipment. In the teaching application of byod, not only students' digital learning methods continue to expand, but also teachers' information-based teaching activities have been constantly enriched. Students can use their own devices to realize the "blended learning" of traditional classroom and virtual classroom. Teachers can choose teaching methods more freely, such as combining online education with traditional classroom teaching methods, letting students watch teaching videos with their own devices, and then discussing the "flipped classroom" method of finding problems in class, or choosing the teaching method of group cooperation, and using their own devices to support group communication and sharing.

3. Disadvantages of "Bring Your Own Device" Learning Mode under 4G Mobile Internet

Under the 4G Mobile Internet, "bring your own device" learning mode has some disadvantages.

3.1. Hardware

A large number of mobile devices access to the school network, but also face the risk of server crash;

"When the vast majority of foreign byod devices use WiFi to access the network, they are more likely to be attacked, cheated and cracked, there is a high risk of information leakage, and even bring a significant impact on the overall campus network environment." [1] Under 4G network, there are also security problems in the learning mode of "bring your own device";

under 4g mobile Internet, there is also delay in the communication between networks, so it is very likely that teachers or students may have different information steps when they communicate through devices, thus greatly reducing the efficiency of teaching;

If many people surf the Internet together, the mobile phone clearly shows that there is a network, but it can't, because the 4G network speed can't guarantee so many people's high-speed Internet access at the same time, and 4G doesn't support such a high density of connections.

3.2. Software

When students and teachers bring a large number of different mobile devices into schools, they will be faced with different operating systems and self-contained software of mobile devices, which makes it difficult to ensure the implementation of teaching effect; due to the immature development of various technologies under

4G mobile Internet, students may have a lot of problems when using software in the learning process, such as insufficient interactivity.

Finally, in terms of students' sense of experience. Taking AR technology as an example, the current 4G network speed can not meet the requirements of picture quality and low delay. After AR technology is applied to teaching, students' perception of the real world is not realistic or close to things in real life, and there are time delays and low interactivity in gesture sensing. As a result, students' textbook knowledge and reality can not get the ideal effect of construction.

4. The Change of Learning Style of "Bring Your Own Device" under 5g Mobile Internet

4.1. 5g Mobile Internet and Its Characteristics

5g (5th generation mobile networks), the fifth generation communication technology, is the latest generation of cellular mobile communication technology.

The characteristics of 5g mobile Internet include interconnection, security, wide coverage and low delay.

4.1.1. All Things Are Connected

Not only people and things can be interconnected, but also things can be interconnected. In the learning process of "bring your own devices", media devices are used to create situations, carry out cooperative learning and conversation communication, that is, as cognitive tools for students' active learning and cooperative learning. Mainly through the initiative of students to achieve students' self construction of knowledge, so as to learn knowledge.

4.1.2. Safety

Not only people and things can be interconnected, but also things can be interconnected. In the learning process of "bring your own devices", media devices are used to create situations, carry out cooperative learning and conversation communication, that is, as cognitive tools for students' active learning and cooperative learning. Mainly through the initiative of students to achieve students' self construction of knowledge, so as to learn knowledge.

4.1.3. Wide Coverage

Wide coverage means that 5g communication technology has dense network structure, which can realize the online perception of everything. [8]5g can achieve extensive coverage, and will cover all parts of our lives. For example, in the case of 4G, high mountains and valleys do not necessarily need to be widely covered, because there are few people living there. However, if 5g can be covered, the monitoring of landforms and earthquakes can be completed. In addition, 4G can't cover crowded shopping malls or underground garages, while 5g can solve this problem.

4.1.4. Low Delay

Compared with 4G network, 5g has higher speed. 5g network communication technology has obvious advantages in the transmission speed, and the improvement of transmission speed has great advantages in practical application. 5g network communication technology is applied in the process of file transmission, the improvement of transmission speed will greatly shorten the time required for the transmission process, which plays a very important role in improving work efficiency. This means that in the data transmission, 5g network conditions, people need to wait time will be greatly reduced.

Under 5g mobile Internet, the change of learning mode of "bring your own device" is mainly reflected in the following aspects:

4.2. Changes of "Device" under 5g Mobile Internet

With the support of 5g technology, the function and performance of various electronic products also change. In the future, our electronic devices may become more portable and cost-effective. For example, when we carry the "device" in our daily life, it may only be as big as the palm of our hand. When we are in class or watching videos in our daily life, we can enlarge the screen or even project it onto the wall at any time, which is convenient for us to watch and operate. For another example, in the classroom dominated by "bring your own device", teachers can observe students' learning state through their own "device", and remind students through "device" when they find that students are distracted or thinking wrong. For example, click the position of the students on the screen, and the corresponding student's screen will shake.

This change of "equipment" will undoubtedly increase the interaction between teachers and students, students and students in and out of the classroom, and make communication more convenient. It will promote the cooperation between students, and make teachers know students better, which is helpful to teach students in accordance with their aptitude.

4.3. New Learning Mode of "Bring Your Own Device" under 5g Mobile Internet

From the characteristics of 5g Internet, 5g mobile Internet can completely solve the hardware and software problems of 4G Mobile Internet. At the same time, students' sense of experience and interaction with the real world will also be enhanced.

5g media devices are more intelligent, have wider coverage, and create more real situations. The development of AR technology makes the learning environment more specific. When students study, they can make their own experience more real, and make students feel immersive, so as to make the acquired knowledge more solid and impressive. At the same time, the high speed and low delay of 5g network make it more convenient to study in different places

at different times. It can make full use of educational resources, communicate with students from different places in the same class, and carry out thought collision and cooperative learning. The arrival of 5g makes the interaction between teachers and students more convenient and efficient. In the case of "own equipment", teachers and students, students and students communicate and cooperate through "own equipment". After class, micro class is released and homework is arranged to guide and evaluate students' performance. Teachers can also use more advanced big data technology under 5g to monitor each student's learning situation in real time and promote the implementation of personalized teaching.

Students bring their own equipment into the classroom is helpful to realize the deep integration of information technology and curriculum, and give full play to students' learning enthusiasm. In the information environment, students can easily carry out various learning activities such as autonomous learning, inquiry learning, research-based learning and collaborative learning by using their own devices to retrieve information, transfer information, share information, process information and evaluate information. [7] Under the support of 5g network, it can realize the interaction between people and objects, obtain and process information in the interaction, and simulate the reality to operate. In the maximum range of ability to cultivate students' practical ability, effectively solve the problem of the separation of theoretical knowledge and real life. In the "hands-on practice" can also be real-time evaluation, in the step-by-step improvement to learn knowledge, enrich knowledge.

5. Summary

In 2010, Brian glozare, director of Intel global education industry, proposed that education in the future will give students more freedom, put the process of knowledge transfer outside the classroom, and put the process of knowledge internalization in the classroom, so as to make students have more communication. The self-contained equipment based on intelligent education is to strengthen the data analysis of learning and the social connection of students, effectively assist, support and stimulate students' learning and promote the improvement of learning ability. The essence of learning with self-contained equipment is that students can have intelligent learning terminals and use them to carry out learning. After the evaluation of the researchers, it is found that students can bring intelligent equipment into the campus to mobilize the enthusiasm of learning, and can support the integration of living situations and classroom situations, virtual classroom and traditional classroom, formal learning and informal learning. So how to better integrate the living situation with the classroom situation, virtual classroom and traditional classroom, formal learning and informal learning are the problems we should consider constantly when using our own equipment for learning. 5g is undoubtedly giving us new ideas and new ways. Based on better technology, it will make the learning mode of "self-contained equipment" more perfect, and students' learning will be more efficient and convenient.

References

- [1] Xiaofei Zhao,Huimin Han: The analysis of WiFi security risk in byod era of campus,Journal of Customs and Trade,vol.34(2013)No.06,p.100-105.
- [2] Horizon report of New Media Alliance (Higher Education Edition 2016).
- [3] Jie Luo:Information technology drives learning reform -- from classroom learning to virtual learning, mobile learning to ubiquitous learning,(2014)No.01,p.15-21+34
- [4] He KeKang:constructivist teaching mode teaching method and teaching design,Journal of Beijing Normal University(Social Sciences),(1997)No.05,p.8.

- [5] Luyi Li, Yanli Zheng: BYOD Practice in American Primary and Secondary Schools and Its Inspirations, *Modern Distance Education Research*, (2012) No.06, p.71-76.
- [6] Huichen Zhao, Zhenliang Du: The Problems and Recommendations about the Application of the BYOD in Education Under the Concept of Blended Learning, *China Educational Technology* (2015) No.12, p.126-131.
- [7] Pengge Yao, Wang Cao, Xiaojia Zhang, Yang Yang, Shimin Cheng: Investigation and Analysis on the application of "Bring your own device" in postgraduate study -- Taking South China Normal University as an example, *Educational Information Technology*, (2015) No.03, p.59-63.
- [8] Haifeng Li, Wei Wang: Online Collaborative Learning Configuration in 5G Era: Characteristics and Model, *China Educational Technology*, (2019) No.09, p.31-37+47.