Analysis the Influence of the Development of Information Technology on Education

Handong Wang[1, a]

[1]School of Information, Yunnan Normal University, Kunming, 650500, China

[a]634809315@qq.com

Abstract

The purpose of this paper is to explain "the revolutionary impact of information technology on the development of education" . Firstly, it starts with the concept of education and information, and summarizes the development of information technology. Secondly, the relationship between education and information technology is analyzed. Education should use information technology; Education should cultivate students' ability of information technology; The development of information technology has promoted the transformation of education. Finally, the application of the four categories of emerging information technology in education (especially how to promote the application of educational reform and innovation at all levels) is briefly, but representative and in-depth, which can grasp the key discussion.

Keywords

Information technology; Educational development; Information.

1. Introduction

In the field of education, the definition of "education" is varied, and different people have different opinions. People often define "education" from two different perspectives: one is social and the other is individual. The former Soviet Union and Russia generally defined "education" from the perspective of the society, while the British and American educationalists generally defined "education" from the perspective of the individual. To define "education" from the perspective of society, the definition of "education" can be divided into different levels. [1]

2. Education And Information

2.1. The Meaning of Education

In the narrow sense, education mainly refers to school education, which is an activity in which educators exert influence on the body and mind of the educates in a purpose-oriented and organized way according to certain social requirements and expect certain changes to happen to them. Education, in its broad sense, is not confined to school education, but refers to all social activities that teach people. It can also be defined as: all the activities that improve people's knowledge and skills and affect people's ideology and morality are education.

2.2. Meaning of the Message

In daily life, information refers to news, knowledge, circumstances, etc. In information theory, information is defined as something that removes the uncertainty of a situation. This essential definition of information indicates that information is only the representation of things, not the things themselves. Information is related to things, but exists independently and materially. The world is composed of three elements: information, matter and energy. The essential

definition of information reveals the essence of the world. In the same way, it also reveals the essence of education, which is an information activity.

When the same information acts on different information bodies, it will leave different traces, which leads to different presentation states of information. It can be divided into three categories: natural information, machine information and human information.

3. Information Technology

Information is one of the elements that constitute the world. Its development, utilization and management, like material, need technology. "Information" is the representation of the motion state and law of things. [2] The first "representation" and technology used was language. Information Technology (Information Technology, abbreviation IT), is mainly used in the management and processing of Information used in the general term of various technologies. It mainly uses computer science and communication technology to design, develop, install and implement information systems and application software. It is also often referred to as Information and Communications Technology (ICT). It mainly includes sensing technology, computer and intelligence technology, communication technology and control technology.

With the progress of society and the development of science and technology, more and more information technologies have been developed and utilized. The current understanding of the meaning of information technology refers to the representation of information, acquisition, storage, transmission, processing and utilization of technology.

Modern information technology refers to "the dynamic technology of acquiring, processing, processing, storing, spreading and using the information of sound, image, text, digital and various sensing signals by means of the combination of computer technology based on microelectronics and telecommunication technology". In the course of human history, with the development of society and the progress of science and technology, information technology has also been developing continuously. It has experienced five stages of development

3.1. The Production of Writing

Writing is used to express and record the natural language technology, so that spoken language can be separated from people into written language and independent existence, can store information permanently, and transmit to farther places, is a great progress of human history and civilization.

3.2. The Invention of Printing

Printing enabled the accumulation of knowledge through the ages to be stored and widely disseminated in the form of books and newspapers, greatly improving the scientific and cultural level of mankind.

3.3. The Invention of Radio and Television Technology

The invention of radio and television technology makes information transmission faster and farther. It can not only transmit language and written information, but also transmit images, which promotes the development of society.

3.4. The Birth of Computer and Network Technology

Computer was born in the 1950s, so far has experienced four generations of development. The fourth generation computer adopts large scale integrated circuit and multimedia technology which integrates graphics, image, sound and text, and applies network technology to realize mutual information exchange and resource sharing between computers. In recent years, the rapid development of network technology has been widely used in education.

Table 1. Information technology development stage

Age of appearance	Information technology (it)	Type
Tens of thousands of years ago	language	traditional
Six thousand years ago	Written language	
More than 1,300 years ago	Printing	
Late 19th and early 20th century	Telecommunications, radio and television technology	modern
Late 20th and early 21st century	Computer and network technology	

4. Education And Information Technology

4.1. Education Should Use Information Technology

From the primitive society to the information society today, education has to use information technology, and education is more and more dependent on information technology. The application of modern information technology in education gives rise to a subject of modern educational technology (audio-visual education or educational technology). In the primitive society, education, in addition to acquiring information personally, mainly relied on language to convey information to understand more things. The invention of writing and printing, education can use words to store information resources, can use books to teach more students.
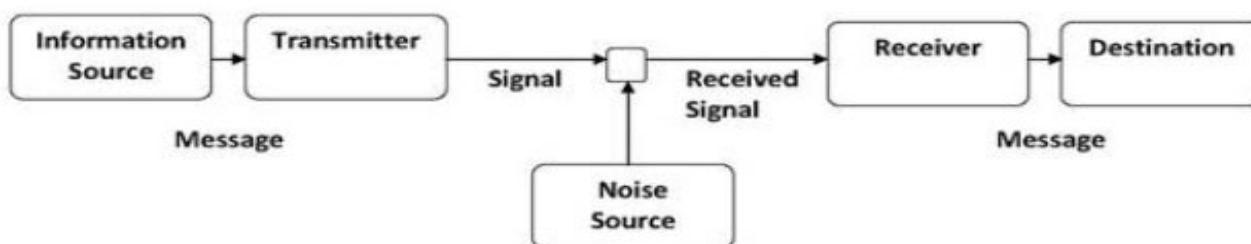

Figure 1. Shannon-Weaver weaver mode of communication

After the emergence of modern information technology, the earliest and fastest use of these technologies in education, China uses slide, film, television, computer and other technologies in education, collectively referred to as "audio-visual education". The United States is called audio-visual education, educational communication, and educational technology. The education from the primitive society to the information society requires the use of information technology, which is the technology of acquiring, transmitting, storing and processing information. It is the main technology of education, is an important component of education.

To sum up, education is an information activity process in which information is acquired from information sources and processed into human information body (as shown in Figure 3). Education is an informational activity.[3]
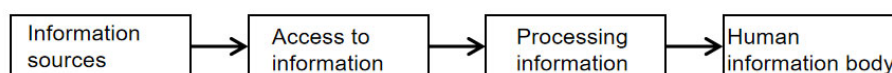

Figure 2. Education is an informational activity

4.2. Education Should Cultivtate Student's Ability of Information Technology

Education should cultivate students' professional knowledge of the subject and become a kind of professional talents needed by the country. Therefore, the majors of physics, chemistry, biology, electronics, business and so on are offered to students to acquire the corresponding professional information knowledge and ability. In addition, there is a more important goal of education, which is to cultivate students' ability in information technology.

Now is the information society, a lot of information is stored in the form of words, sound, image symbols in recording equipment, video equipment and computer network storage. We need to learn and be equipped with modern information technology in order to get news from these media. Therefore, in recent years, information technology courses have been set up in schools and colleges to cultivate students' ability of modern information technology. Even teachers and civil servants should be trained in the ability of information technology. Because in the past in the school study did not learn and master the knowledge and ability of this aspect. Education should cultivate students' ability of information technology, from language, characters to modern information technology, in education accounts for a large proportion. Because of the information technology ability, can use freely self-study, lay the foundation for lifelong learning.

4.3. The Development of Information Technology Has Promoted The Reform Of Education

Based on the close relationship between information technology and education, with the development of information technology, each information technology revolution has promoted the fundamental reform of education.

5. Infromation Technology Has A Revolutionary Impact on the Development of Education

Information technology has gone through five revolutions, each of which has promoted the development of social civilization and led to fundamental changes in the way of education. In the stage of language technology, education can only be transmitted by parents through production practice and language, so that the offspring can acquire knowledge and skills, which is a way of family education. In the text technology stage, the later generation has to get information from the text. Therefore, to learn and master the ability of writing technology, to understand the meaning of the word, to learn to write. It was first written on bamboo slips, cotton silk, and later on paper. Thus, the emergence of full-time teachers, education left the family, the emergence of professional teachers to take the role of full-time education. In the printing stage, there appeared textbooks, which stored a large amount of information in ancient and modern times, Chinese and foreign countries. Students could not only get information from the words and deeds of professional teachers, but also get information from books. As a result, a teacher no longer taught a single person, but many people at the same time, the school and the school class education style. In the technological stage of telecommunication, broadcasting and television, besides textbooks, numerous audio-visual educational media have appeared, such as slide, projection, recording, video recording, computer courseware, etc. These media store sound, still image and moving image information besides text, thus learners' learning has entered an era of multimedia education. At the stage of computer and network technology, the computer has integrated text, sound and image to realize multimedia learning. With the rapid development of network technology, the information stored by computers can be quickly transmitted and exchanged, which realizes the way of network distance education. As can be seen from the above, information technology will bring about a fundamental change in the development of education, that is, have a revolutionary impact.

5.1. The Emerging Information Technology Has A Great Influence on the Deepening Reform Educaiton

Since entering the 21st century, a variety of emerging information technologies have been rapidly integrated into the work, study, life and other fields of human society, especially in the field of education, which has exerted a significant and profound impact on the deepening reform of education at all levels and various types. [4] These emerging information technologies mainly involve four aspects: big data, cloud computing, artificial intelligence and Internet + education. The traditional information technology is generally regarded as the representative of computer and multimedia education applications; The application of computer education involves CAI (Computer Assisted Instruction) and CAL (Computer Assisted Learning) as well as all education, teaching process, teaching evaluation and construction of digital teaching resources based on computer hardware and software. In general, the application of computer hardware and software in school education (including assisting teachers to "teach", supporting students to "learn" independently, realizing teaching evaluation and management based on computer hardware and software, and providing digital teaching resources support) is collectively called "digital campus". In fact, the realization of digital campus is the concrete application of traditional information technology in education;

Now, with the rise of new information technology, the digital campus is transforming into a smart campus. About the above mentioned four types of function and connotation of emerging information technologies, including the front three categories, namely, large data, cloud computing and artificial intelligence are precise and clear, it is not easy to produce misunderstanding or generalization, but the Internet + education, at present there are a number of different academic paper - from the education service concept of the Internet age, education organization to understand, from Unicom learning environment, to explore collaborative interactive teaching mode; [5] However, if we only understand the role and connotation of Internet + education from the perspective related to the emerging information technology, it becomes relatively simple and clear.

5.2. About Cloud Computing Educaiotnal Applications

In recent years (especially since 2010), the application of cloud computing in education at all levels and of all kinds in China, especially in expanding the benefit range of high-quality education resources, promoting the joint construction and sharing of high-quality education resources, and making the high-quality and balanced development of compulsory education in the region, plays a vital role. "Interactive Response System" (IRS) is an information-based classroom teaching System, which mainly consists of the following parts: remote control, receiver and cloud platform software for teachers and students.Each user in the system has a remote control.

In the course of classroom teaching, any student can participate in the classroom interaction by choosing or responding to the questions set by the teacher, and can get feedback immediately. The functions of this system include collecting group feedback information, conducting automatic statistics and presenting statistical results immediately. The system integrates the functions of automatic evaluation, investigation, feedback, recording and statistics. The functions of this system include collecting group feedback information, conducting automatic statistics and presenting statistical results immediately. The system integrates the functions of automatic evaluation, investigation, feedback, recording and statistics. The design of "question stem" involves the compilation of multiple choice questions or judgment questions; The "options" should be 2 to 5 (not too many). Teachers post questions via a remote control, and students answer questions via a remote control controlled by their hands.[6]

5.3.   About Big Data Educaiotnal Applications

Big data is a technical term for information technology. It refers to massive amounts of data that are difficult to capture, manage and analyze with general software tools.[7] Compared with the traditional data, it has the following characteristics: large amount of data, unstructured, distributed, a large number of visual display. Now, the common view of information technology academia is that big data has the ability to transform the way of human education and learning; Some scholars even believe that big data technology can change the way people think.

5.4.   About "Artificial Intelligence" Educaitonal Applications

It is widely believed in the academic circles at home and abroad that the future will be an era of Intelligence, in which Artificial Intelligence (AI) will integrate with people's work, study and life, and profoundly change all aspects of human society (especially traditional industries and education). The view of the current situation of the application of intelligent education and the prospect of development in China can be represented by the view of Zhang Gao, general manager of the education division of Baidu. Dr. Zhang Gao believes that in the era of intelligence, artificial intelligence technology will not only "renovate" traditional industries -- through "artificial intelligence + traditional industries", there will be two scenarios in the future: one is that a lot of traditional and simple mental work will be replaced by artificial intelligence; On the other hand, after the deep integration of artificial intelligence in various industries, the traditional production and audio-visual education and research industry will be restructured, which makes the role of artificial intelligence achieve a qualitative change: from "improving efficiency" to "restructuring industry". [8]

In the field of education, artificial intelligence will have a profound impact on the field of education. The direct manifestation of this influence is that AI will make education closer to the essence, which is the process of systematically helping learners to improve their ideological morality and cognitive ability, and serving learners' personalized needs. For example, AI intention recognition technology can be used to explore the real needs of each user, and then provide corresponding personalized services according to this personalized needs. AI knowledge catcher technology can capture different types of knowledge points in articles, and recommend a variety of learning materials related to the knowledge points for users, so as to deepen the learning level and expand the learning boundary, so as to provide more effective learning support services for learners. AI of augmented reality (AR) in teaching of teaching technology, can provide knowledge service demand realization, namely by building AR scene (AR), the knowledge of the abstract, to achieve the three-dimensional vivid interpretation of the knowledge points, so as to improve the students' interest in learning and promote students in-depth understanding and mastery of knowledge; The virtual reality teaching (VR teaching) technology of AI can provide the service demand of multi-dimensional interactive experience, that is, to provide the classroom hardware, software, terminal and course complete solution required by virtual reality technology, thus creating an unprecedented immersive learning experience. AI's lightning scoring technique, can provide the service needs of entering a higher school. Using this technology, within 2 hours after the examination paper is handed in, the PC end and the APP end can achieve synchronous online real questions + analysis (within 4 days can reach 400 million visits); The first day of college entrance examination can serve 4 million examinees and their parents nationwide; The college entrance examination can cover 90 percent of the test areas. The intelligent lesson preparation technology of artificial intelligence has the function of providing teachers with intelligent lesson preparation service. It can push corresponding and high-quality lesson preparation resources to teachers according to the specific class teaching progress, so as to meet the personalized lesson preparation needs of teachers.

5.5. About The "Internet+Educaiton"Application

There are many different understandings and interpretations of the connotation of "Internet + Education" in academic circles, but if you only observe it from the perspective related to "emerging information technology", it becomes simple and clear.

Learning Cell System (Learning Cell System) is an Internet-based and open Learning platform specially designed to support deep Learning developed by a team led by Professor Yu ShengQuan from School of Educational Technology, Beijing Normal University.[9] The content of this platform involves some new concepts, such as "generation", "evolution", "adaptation", "social cognition", etc., taking the learning element as the minimum resource organization unit. The platform structure consists of six parts: learning element, knowledge group, knowledge cloud, learning tool, personal space and learning community. Among them, the functions to support deep learning include four modules: online deep learning behavior interaction support module, group collaborative construction of deep learning knowledge evolution module, multi-link deep learning behavior visualization and cluster analysis module, and deep learning development evaluation module.

6. Conclusion

Emerging information technologies mainly involve big data, cloud computing, artificial intelligence and Internet + education. The traditional information technology is generally regarded as the representative of computer and multimedia education applications; As mentioned above, the application of computer hardware and software for the whole school education (including assisting teachers to "teach", supporting students to "learn" independently, realizing teaching evaluation and teaching management based on computer hardware and software, and providing digital teaching resources support) is generally called "digital campus". It should be said that the application of traditional information technology in education, represented by the "digital campus", has indeed promoted the reform and development of education at all levels and of all kinds, and really played the role of "promoting the modernization of education through the application of educational informatization". However, objectively speaking, this kind of "promotion" is not broad enough, not deep enough, in this stage of development, "education informatization to drive the modernization of education" is more stay on the slogan, advocacy -- education modernization in the actual embodiment is only in a few areas of individual fields, far from universal.

Since the 21st century (especially) in the recent ten years, with the "big data" to "cloud computing" "artificial intelligence" and "Internet + education" and so on four types of emerging information technology increasingly widely used, this situation has gradually changed - emerging information technology because of the unprecedented characteristics and advantages, its application not only promoted the education reform and development of all kinds of education at all levels and also effectively support the education of all types and at all levels of change and innovation;

"Applying education informatization to drive education modernization" no longer stops at "slogans and advocacy", but quickly pushes the education at all levels and all kinds of education in the vast areas of our country (including some poor areas in the central and western regions) to the forefront of international education modernization.

References

[1] He Kekang, Wu Juan .Research on the Teaching Mode of Information Technology and Curriculum Integration (Third) "Inquiry" Teaching Mode [J].Modern Educational Technology,2008(09):5-10+27.

[2] Yang Yaping. Construction of Engineering Higher Vocational Mathematics Teaching Model under the Integrated STEM Education Concept [D].East China Normal University,2016.

[3] Li Yunlin. On Education and Information · Information Technology -- Four Discussions on "Information Education" and Interpretation of "Information Technology's Revolutionary Influence on Educational Development" [J].Research on Audio-visual Education,2013,34(03):11-15.

[4] He Kekang. The Significant Impact of Emerging Information Technology on Educational Reform since the 21st Century [J].Research on Electronic Education,2019,40(03):5-12.

[5] Chen Li, Zheng Qinhua, Lin Shiyuan. Opportunities and Challenges of China's Open University in the "Internet +" Era [J].Open Education Research,2017,23(01):15-20.

[6] Li Xueping.Cloud walk opens a new era of digital learning [J]. Information Technology Education in Primary and Secondary Schools,2017(11):30-33.

[7] FRIEDMAN U.Big data:a short history[DB/OL].[2018-05-10].http://www.foreignpolicy.com/articles/2012/10/08/big_data? Page=0,1.

[8] Zhang Gao. Integration and Innovation of AI and Education [R]. Baidu: China Internet Learning (Basic Education) Annual Conference,2017-12-21.

[9] Yu Shengquan, Duan Jinju, Cui Jingjing.Double helix deep learning model based on learning element [J]. Modern Distance Education Research,2017(06):37-47+56.