Curriculum and Teaching Reform From the Perspective of Media History

QIU Defeng  
Southwest University, Chongqing, China  
QUAN Xiaojie  
Chongqing Normal University, Chongqing, China

The development history of education is actually a history of the change of media technology. From the perspective of historical development, different periods of media technology have different forms of education. As the two core elements of education, curriculum and teaching are also deeply influenced by the development of media technology.

With the continuous emergence of new media, especially in the context of artificial intelligence, the curriculum has experienced the change from attaching importance to subject knowledge to the cultivation of students’ innovation ability and core literacy; from static, paper-based, single to dynamic, online and network-based curriculum form; from fixed, unified, limited to personalized, unlimited and open curriculum change is tolerated. Teaching has also experienced two major changes: the optimization of teaching forms and the adjustment of teaching subject role. In order to actively cater to the development of the future science and technology society, the future curriculum and teaching should focus on sustainable development education; focus on the cultivation of key abilities in the 21st century; focus on improving the “three scientific and technological literacy” education; and strengthen the humanistic care of curriculum and teaching.

Keywords: media history, science and technology, curriculum, teaching, paradigm change

Thousands of years ago, mankind was still in the period of slash and burn cultivation. The emergence of agricultural revolution brought human society into the farming civilization of manual labor. Hundreds of years ago, the industrial revolution began, and people gradually put down their sickles and hoes and went to factories. Just a few decades ago, with the rapid development of science and technology, people can sit in the office, watch the screen, and tap the keyboard and mouse to generate a lot of social wealth. Human society has entered the era of science and technology and artificial intelligence. Artificial intelligence is a leap. Some scenes only found in science fiction movies are gradually becoming reality in the era of artificial intelligence, which greatly changes people’s thinking and lifestyle. With the help of artificial intelligence, driverless cars are running through the streets. Watson has become a medical consultant for oncology, helping doctors deal with complex medical problems. Siri, Alexa, Cortana and Xiaodu have become personal assistants. It can be said that artificial intelligence has been widely used in various fields of the current society, and profoundly promotes social change. The development of artificial intelligence technology has undoubtedly had a profound impact on

Acknowledgements: This research was funded by the Chongqing Social Science Planning Project (2019BS084) in 2019. QIU Defeng, Ph.D., lecturer, Faculty of Teacher Education, Southwest University, Chongqing, China; Quan Xiaojie, Ph.D., lecturer, School of Education Science, Chongqing Normal University, Chongqing, China.
education and promoted the transformation of education development mode. The core of education reform lies in the transformation of curriculum and teaching paradigm. Curriculum focuses on what to teach, while teaching focuses on how to teach. From the perspective of historical development, curriculum and teaching have experienced many changes, and each change can be attributed to the results of new technological changes. This study attempts to analyze the evolution of educational form in the process of technological development, focus on clarifying the development context of curriculum and teaching, and focus on the paradigm change of curriculum and teaching under the background of artificial intelligence, so as to provide reference and Enlightenment for the development of curriculum and teaching in the future.

The Development and Change of Education From the Perspective of Media History

The degree of social development is determined by the level of productive forces, which to a large extent is reflected by the innovation of production technology and production tools. In primitive society, the productivity was extremely low. Stone tools were the main production tools of primitive human beings, and the types of labor were limited to simple hunting, picking and processing activities. With the emergence of smelting technology, metal tools began to replace the original working tools. In addition, with the accumulated experience of planting and animal husbandry, human beings entered the period of agricultural civilization. The agricultural society is long and long, and the mode of production is mainly accomplished by handicraft industry. In the 1860s, the invention of steam engine brought mankind into a new era of industrial society. During this period, machine production gradually replaced manual work, and mechanization became the main symbol of this stage. With the large-scale improvement and use of mechanization, the production level and production efficiency have been greatly improved. In the 1970s and 1980s, science and technology had a new leap. The invention of electricity pushed human society to a new level again. Productivity and production relations were greatly improved. Electrification was the landmark technological innovation of this period. In the 1940s and 1950s, with the tentacles of human cognition extending to the advanced fields such as atomic energy, aerospace technology, electronic computer, bioengineering, etc., the automation period has come. The new technology makes people’s thinking and life style have undergone profound changes, and knowledge economy has gradually begun to form. In the late 20th century, the rapid development of science and technology pushed human society into a new intelligent era. Emerging technologies such as the Internet of things, cloud computing, big data, intelligent production, 3D technology, human-computer interaction, personalized customization and other emerging technologies have entered various life fields such as economy, management, education and medical treatment. In the development and change of society, the renewal and development of science and technology and tools play a key role, and become the fundamental factor to promote social development.

At the same time of social development and change, education almost keeps the same development trend. For example, in the primitive society, due to the extremely backward productivity, education was still a very fragmented and loose form, and there was no place for special educational activities. The education content was mainly limited to production and labor experience, life customs, religious etiquette, etc. The way of education also mainly depends on observation, imitation and simple oral transmission, lacking the carrier of special record and preservation of experience and knowledge. Although in the late primitive society, some simple recording methods appeared, such as carving contract, painting, tying rope, weaving shells and so on, but the efficiency was very low. In the agricultural society, the level of productivity has been relatively improved, especially with the invention of words, knowledge and experience can be preserved and recorded in a fixed way.
Parchment, papyrus, bamboo slips and so on have become the main carriers of recording knowledge. A large number of human life and learning experience have been continued, and the learning content has gradually transited from direct experience to indirect experience. With the deepening of development, social division of labor is becoming more and more detailed. Special learning institutions have emerged, schools have become the main learning places, and teachers have undertaken special teaching tasks. In the period of industrial society, the emergence of steam engine and the invention of electricity have greatly promoted the improvement of productivity. Accordingly, people’s life and learning style have also undergone profound changes. Driven by the maximization of efficiency and interests, the class teaching system and modern school system have been established, and a large-scale, centralized and procedural new learning form has emerged. Under the background of modern school system, education is becoming more and more formal, with fixed learning time and place, unified learning progress and content, standardized learning and assessment mode, and teaching efficiency has been significantly improved. With the advent of the information age, productivity has undergone a fundamental change. With the help of computer and Internet, learning becomes diversified, personalized, sustainable and lifelong. The object of learning has changed from a specific group to the popularization of the whole nation. Everyone can learn, can learn all the time, and can learn everywhere. Education presents a new prospect.

The Change of Learning Style in Media Reform

With the changes in historical stages, profound changes have taken place in the boundaries of knowledge and media technology, and the forms of education and learning have also become very different. From the perspective of technological change, the development of human education has experienced five periods of oral transmission, manual transcription, printing, electronic communication and digital media (Guo, 2011). Correspondingly, the learning forms and characteristics of different periods also have obvious differences. For example, in the oral transmission period, learners acquire knowledge and experience mainly through face-to-face, informal, scattered, and non-organized direct communication. The content of the course is mainly stored in people’s minds, and the teaching methods mainly rely on precepts and deeds. Humans themselves assume the role of media. During the manual copying period, the form of knowledge transmission transitioned from language symbols to paper. Bamboo slips papyrus and parchment became the main knowledge carriers and educational media tools. Knowledge and experience can be recorded, preserved and disseminated in a fixed way. The emergence of manual copying has allowed the content of the course to be solidified, which has greatly reduced the forgetting and loss of human experience. For example, with the help of papyrus, Aristotle carried out the first organized academic research in human history; through manual transcription, Alexandria established the largest library in the world at that time, and in ancient Greece and ancient times The teaching activities of grammar, rhetoric, astronomy, eloquence and so on in Roman schools were also based on written materials. In the printing age, with the formal use of papermaking technology and printing technology, knowledge has been greatly preserved and disseminated. People can record a large number of text symbols in a short period of time. Teaching resources are no longer rare, and learning objects are gradually becoming more oriented. Many groups. At the same time, the continuous improvement and maturity of printing technology has accelerated the establishment and formation of the modern school system and class teaching system, and standardized textbooks and books and materials have become the main course carriers. In the era of electronic communication, although the class teaching system is still the main organizational form of teaching and
learning, the separation of teaching and learning has begun to appear. Distance education and radio and television universities have gradually played their important roles. The course carrier is not limited to paper books. Materials, video resources, and online resources have also become important courses. In the era of digital communication, learning has become an activity that can occur anytime and anywhere, especially with the deepening of Internet technology, the boundary between teaching and learning has become very blurred, and learning has become a borderless activity.

With the continuous emergence of new technologies and new media, especially in the context of artificial intelligence, learning has undergone profound changes. From the perspective of learning orientation, learning becomes a personalized activity. Personalized learning emphasizes providing personalized guidance for the characteristics and potential of the learning subject during the development of learning activities (Zheng, 2015). In the traditional class teaching system, due to the contradiction between the limitation of resources and the expansion of talent training needs, personalized teaching has become an educational pain point that is repeatedly pursued but hindered. However, artificial intelligence technology gives more possibilities for personalized learning. Smart wearable devices can track and observe learners’ learning habits, personality characteristics, cognitive styles, and existing foundations. Based on the digital portrait of the learner’s learning process, it can be formulated for learners. Differentiated learning services, develop personalized learning content, learning methods and learning process. To break the traditional education that pursues the “one size fits all” situation in pursuit of the scale of talent training, highlighting the individualized differences of learners. From the perspective of learning methods, learning has transformed into a mixed cognitive activity, that is, a mixture of formal learning and informal learning. Formal learning and informal learning Just like the relationship between consciousness and unconsciousness, informal learning will have a profound effect on the overall development of individuals. From the perspective of the nature of learning, the learning of learners is no longer an exclusive activity in the school education field, but towards a sustainable and lifelong development activity, and artificial intelligence is this sustainable development activity. It provides great convenience. Individuals only need a mobile terminal to obtain information and engage in learning activities anytime and anywhere. At the same time, more importantly, artificial intelligence has cleared the boundaries between real learning and virtual learning. Artificial intelligence products also play the role of teachers. Learners realize the interaction between people and products, even if the teacher is not present. Simulate real teaching dialogue and communication. For example, the United States developed the PLATO intelligent learning guidance system as early as 1960 to provide students with personalized guidance through simulated teacher teaching. From the perspective of learning content, learning has gradually transformed into a private customized activity. Affected by the test-oriented education, traditional education methods pay more attention to test scores, and less attention to the real needs of students in other aspects. In addition, due to differences in individual interests, thinking styles, cognitive styles, etc., the needs of learners are actually very diverse. Artificial intelligence based on big data analysis technology can provide learners with personalized and adaptive learning content.

The Change of Curriculum Paradigm in Media Reform

The speed and form of knowledge dissemination change due to changes in media technology, which forms different social communication ecological environments, and also derives different education systems and curriculum teaching models (Shang, 2018). Curriculum paradigm has undergone changes in the following forms due to the development and evolution of educational media: (1) oral transmission period with human
brain as the carrier, manual copy period with papyrus, parchment, and bamboo slips as the carrier; (2) artificial paper as the carrier The period of printing and dissemination; (3) the period of electronic dissemination with tapes, video tapes, CDs, records, televisions, etc.; and (4) the period of digital dissemination with hard disks, the Internet, cloud disks, and artificial intelligence products. It can be seen that the relationship between the educational medium and the curriculum is first reflected in the curriculum carrier and the way of curriculum communication. For example, in terms of communication methods, before the advent of printing technology, knowledge and experience belonged to individuals, and the transmission of knowledge also occurred between individuals or minority groups. After the advent of printing technology, the cost of communication has been significantly reduced, the efficiency of communication has been greatly improved, and the audience of courses has also been significantly expanded. In the era of electronic communication, course communication has escaped the limitations of time and space, and is no longer limited to the face-to-face format. The course itself has also crossed from books and teaching materials to video and television. In the era of digital communication, with the help of the Internet and artificial intelligence, it is truly realized that human knowledge and experience can be shared and co-created.

Under the artificial intelligence vision, the curriculum has undergone changes in value, goals, content and form, showing a brand new look. First, in terms of curriculum value orientation, from training “professional people” to developing “free people”, there is a transition from “being a thing” to “being yourself”. Education in the industrial period used standardized production models to educate people and shape practitioners who could adapt to social order and meet social needs. Artificial intelligence will replace mechanized and linear thinking positions, and the uniqueness of human beings from machines is extremely precious. The value of the curriculum lies in the promotion of the individual’s self-development and improvement, and the realization of free and full development, which is to “become oneself” rather than “become a thing”. Second, in terms of curriculum goals, from emphasizing established subject knowledge to emphasizing creativity and core literacy. This can be seen from the STEM course, which aims to enhance the creative ability and innovative spirit of learners, and realizes the integration of science, technology, engineering and mathematics (Yu, 2015), thus overcoming the lack of deep integration and wide intersection between disciplines. In the era of artificial intelligence, people can easily and quickly access massive amounts of information, established static knowledge is devalued, and society needs compound talents with creative spirit and practical ability. Therefore, courses break disciplinary barriers, from emphasizing their own subject teaching knowledge (PCK) to focusing on integration based Technical subject teaching knowledge (TPCK). Third, in the form of courses, from static, physical, single to dynamic, virtual and networked. Traditional courses are mostly based on physical objects such as bamboo slips and paper. Whether it is hand-written or printed courses, they are developed through a set of complex procedures. The revisions, supplements and updates cannot be followed up in real time, showing a relatively static state. Characteristics, and the connection between the curriculum and the curriculum is difficult to occur, showing the characteristics of simplification. However, in the era of artificial intelligence, courses have become a dynamic development process with virtual numbers and networks as carriers. In the learning process, machine learning and deep learning technologies can continuously collect learners’ learning data. Courses can adjust the content structure according to learners’ learning progress and effects, and incorporate new knowledge content in time to achieve self-development and update. In addition, online courses can not only make the access and dissemination of courses flexible and open, but also establish connections between
course resources to form an interconnected network course structure. Fourth, in terms of course content, it has shifted from being fixed, unified, and limited to being customized, open and unlimited. The modern school education produced in the industrial period has been marked with a deep industrialization. The curriculum content under the class teaching system is the result of standardized production. The setting of the curriculum content is often based on the minimum requirements that all students must master, and has a strong homogeneity. At the same time, due to the static nature of the curriculum, the content of the curriculum is extremely limited, limited to the fixed content that is written, selected, and compiled. The development of artificial intelligence technology has enabled individuals’ experiences and interests to be taken care of. For example, adaptive learning technology can push individual learning resources for each student based on the evaluation of learners’ dynamic learning data, setting different learning scenarios, learning progress and difficulty in learning tools, the possibility of realizing private customized courses, and the content is rich and diverse, not restricted by the course carrier.

The Transformation of Teaching Paradigm in Media Reform

If the curriculum is simply understood as a question of what to teach, then teaching is largely concerned with the question of how to teach, that is, the process of putting course content into practice. From the perspective of media history, teaching has gone through the following stages of development since ancient times: (1) Simple word of mouth and demonstration stage. During this period, teachers themselves were the only media tools. Knowledge and experience were stored in the teachers' minds. Teaching was confined to a small number of individuals. It was a scattered, non-structural activity. The basic form of teaching is oral dialogue or demonstration. Learners use their brains to record the teacher’s teaching content through observation, imitation, and listening. At this stage, teaching has a certain degree of mobility, and there is no fixed teacher and teaching place. (2) Concentrated face-to-face lecture stage. With the advent of writing, human knowledge and experience can be preserved and recorded in the form of written symbols. The carrier has experienced oracle bones, stone carvings, papyrus, parchment and so on. Due to the advancement of media technology, teaching objects have expanded significantly. With the emergence of colleges, private schools and other school institutions, teaching objects have expanded from scattered individuals to specific groups. Especially after the class teaching system and modern school system are established, teachers can teach in a fixed time and place, and can use one-to-many face-to-face teaching. (3) Complementary teaching stage of separation of time and space. With the development of media technology, the electronic communication form of teaching began to take shape, which to a large extent is a supplement to the existing face-to-face teaching. Through electronic transmission, teaching content can be recorded on video tapes, CDs, disks and other storage spaces, and displayed to learners through broadcast and television. For the first time, there is a separation of time and space in teaching, and teachers and learners can not be present at the same time. This form greatly expands the scope of teaching dissemination, improves dissemination efficiency, and allows more learners to enjoy limited teaching resources, while also promoting the fairness of education to a large extent. (4) Intelligent teaching under the background of artificial intelligence. Teaching in the era of intelligence integrates advanced technologies such as “Internet +”, big data, and artificial intelligence, giving more new possibilities for teaching. From the perspective of the relationship between artificial intelligence and teaching structure, although changes have taken place in various teaching elements such as objectives, content, environment, and evaluation, the impact is the most direct and far-reaching in the following two aspects.
First, the teaching style has changed. The emergence of intelligent guidance systems, intelligent classrooms, MOOCs, and SPOCs in the artificial intelligence period has turned traditional classrooms over. Teaching is not a one-way implementation of textbooks, instruction books, and curriculum plans, but to achieve “self-study and teaching” and “online”. The combination of “offline”, teachers and students based on the support of existing resources, based on the process of mutual collision and creation of practical situations, emphasizes the liberation and expression of teacher and student subjectivity, creativity and individuality. Moreover, with the development of artificial intelligence-related technologies, the field of teaching has been greatly expanded and the forms of teaching have been enriched. VR virtual reality technology can realize the creation of a virtual world and bring people a realistic visual and auditory sensory experience. AR augmented reality technology can nest virtual and reality, and realize the combination of the two in the context. MR mixed reality technology can generate a new visual environment through the fusion of the physical world and virtual scenes, which is a combination of real + virtual + digital information (Computer newspaper, 2018). The above technology can make the knowledge that is abstract and difficult to understand in the traditional classroom and far away from the actual life experience can be presented in an intuitive and experiential form. For example, through VR technology, you can transform yourself into space-time travellers to witness the prosperity and decline of ancient civilizations, experience the vicissitudes of history first-hand, and travel through the vast universe to count the stars. Through AR technology, it is possible to walk into the interior of the atom, see its internal structure, penetrate into the human brain, and ascertain the direction of the arrangement of neural networks. These advanced technologies realize the simulation of the learning space, making students feel as if they are learning knowledge in a real situation, and knowledge becomes easy to obtain, understand and transfer.

Second, the role of the teaching subject has changed. In traditional classroom teaching, teachers are the main body of teaching, and teaching and educating people is the teacher’s own job. Preaching, accepting profession, and solving puzzles can basically explain the main roles of teachers. However, in the context of artificial intelligence, the main role of teachers has been greatly impacted. Under the technology of machine learning and deep learning, intelligent robots have mastered a huge amount of information and knowledge, and they have become more and more “humanoid”, and can simulate human thinking to solve problems. At the same time, with the maturity of speech recognition and image processing technologies, human-computer interaction has become more harmonious and inclusive. Some technical and repetitive tasks can be replaced by artificial intelligence robots to a large extent. The role of traditional teachers obviously hit. Although the BBC reported a set of numbers that gave worryers a lot of comfort, the report pointed out that “the probability of teachers being completely replaced by artificial intelligence is only 0.4%” (Extracurricular master, 2019), however, with the continuous breakthrough of new technologies, human-computer interaction, The deep integration of human brain and computer connection, 0.4% is likely to be just a starting point, and the future possibilities will greatly exceed people’s expectations. Therefore, teachers and other educators should be cautiously aware of potential crises. In the “Beijing Consensus-Artificial Intelligence and Education” released by UNESCO a few days ago, it is also clearly mentioned: “Teachers should recognize the development trend of artificial intelligence in supporting learning and learning evaluation potential, and evaluate and adjust the curriculum to promote The in-depth integration of artificial intelligence and the reform of learning methods” (Weiyan Education, 2019), which means that in today’s vigorous development of new technologies, teachers need to work hard to improve their professional and artificial intelligence literacy in order to control the technology, and make artificial intelligence a key to their education and teaching. Helpers, not replaced by them. This puts forward higher
requirements on the role of teachers. Teachers must not only adapt to the current teaching ecological environment constructed by artificial intelligence, but also be able to timely insight and foresee the changes in teaching and learning caused by artificial intelligence in order to make roles in time Conversion and adjustment.

**Reflections on the Future of Curriculum and Teaching Under the Background of Media Revolution**

With the development of science and technology, the innovation of the media will inevitably lead to profound changes in the field of education. On the one hand, it greatly improves students’ learning opportunities, breaks the boundaries of learning, and realizes the organic integration of reality and virtuality. On the other hand, it provides great convenience for teachers’ teaching. With the emergence of new media, some traditional teaching problems have gradually become realistic possibilities. In the context of continuous changes in media technology, future courses and teaching should focus on the following directions:

First, focus on the cultivation of students’ key abilities in the 21st century. For example, creativity, communication, collaboration, and critical thinking (4Cs for short) (LEE, 2017), these human instincts are the greatest value that distinguishes humans from machines. With the development of science and technology in the era of artificial intelligence, a large number of occupations based on established knowledge and mechanical skills are at stake. Drivers, cashiers, and even lawyers, accountants and other occupations will be replaced by machines. Therefore, in order to meet the needs of the future talent market, courses and teaching should focus on the cultivation of learners’ core abilities, protect learners’ acuity and autonomy, curiosity and curiosity, independence and free will, and stimulate their creativity and criticality. Think, cultivate students’ empathy and compassion, communication and collaboration, highlight the scarcity of human values, and lead machine intelligence with human intelligence.

Second, focus on improving the “three major technological literacy” of students. Information literacy is the ability to effectively collect, filter, use, and evaluate the required information according to information needs (Shields, 2005). Data literacy is the ability to acquire, transform, analyze, evaluate, use, and make decisions about data (Deahl, 2014). Artificial intelligence literacy generally refers to the ability of individuals to use artificial intelligence technology to solve problems, including analytical thinking, experimental thinking, critical and metacognitive thinking, and interactive thinking. In the artificial intelligence era, knowledge becomes a relative tool, which no longer points to certainty, result, and uniqueness, but to openness, process and chaos. The “three major technological literacy” is conducive to learners to quickly locate and screen effective information and data in the complex information, rationally analyze the authenticity of information and data, convert information and data into problem solving paths, and verify creative solutions through screening problem to avoid learners getting lost in the boundless information vortex.

Third, strengthen the humanistic care of curriculum and teaching. The more advanced technology is, the more human nature will bloom. In the era of artificial intelligence, where technology is booming, courses and teaching must show humanistic care. Curriculum and teaching focus on the construction of individual meanings, creating fertile ground for each learner to take root and sprout the talent code. In this process, knowledge is connected with the individual itself, learners clarify who I am and what I want, curriculum and teaching are closely linked to personal needs, interests, and experience, providing a space for exploring the meaning of individuals, and using technology to expand people’s abilities. The positive significance of the above fully demonstrates the value of people in the age of science and technology.
References

Computer News APP news client. (2018). One article to understand the difference between VR, AR and MR [EB/OL]. https://www.360kuai.com/pc/9a2f60012e9b468df0?cota=4&ij_url=so_rec&sign=360_57c3bbd1&refer_scene=so_1

Deahl, E. (2014). Better the data you know: Developing youth data literacy in schools and informal learning environments (Unpublished master’s thesis). Cambridge: Massachusetts Institute of Technology.

Extracurricular master. (2019). Which occupations will be replaced by robots in the next 10 years|BBC analyzes the “probability of being eliminated” of 365 occupations [EB/OL]. https://www.360kuai.com/pc/9120e9d7740a84ed?cota=4&kuai_so=1&ij_url=so_rec&sign=360_57c3bbd1&refer_scene=so_1

Guo, W. G. (2011). The development history of “technology” in education. Peking University Education Review, 9(3), 137-157, 192.

LEE, Z. J. (2017). Skills teaching and student core literacy in the 21st century: Trends and prospects. Journal of Hebei Normal University (Educational Science Edition), 19(3), 72-76.

Shang, J. J., & Zhang, Y. L. (2018). “Internet +” and the reform of university curriculum teaching. Higher Education Research, 39(5), 82-88.

Shields, M. (2005). Information literacy, statistical literacy, data literacy. IASSIST Quarterly, 28(2-3), 6.

Weiyan Education. (2019). UNESCO officially released “Beijing Consensus-Artificial Intelligence and Education” [EB/OL]. https://mp.weixin.qq.com/s?src=11&timestamp=1571906184&ver=1931&signature=dTBWSfBb*Eb9GTDJWFl6mQArBQkBzhJU1sXlMnNy3H-RpNPrN3x8oXtvaKgLchILQg8jalbTxou7b9oA0kEhmRqemZuYmF-UeQRH1xCr4-pSjVz4

Yu, S., & Hu, X. (2015). STEM education concept and interdisciplinary integration model. Open Education Research, 21(4), 13-22.

Zheng, Y. X. (2015). Research on the teaching mode of college students’ individualized learning from the perspective of new constructivism. Journal of Distance Education, 33(4), 48-58.