An Analysis of the Status Quo of College Students' "Fragmented" Learning and Its Countermeasures*

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Abstract—In the post-industrial society, science and technology are highly developed, and the popularity of mobile terminals such as mobile phones and tablets provides people with good technical support for obtaining information whenever and wherever possible. But at the same time, it also completely tears the information, making the fragmented learning of college students show a normal trend. Fragmented learning, because of its subjective and constructive characteristics, better implements the learning concepts advocated by constructivist psychology and humanistic psychology. But it also affects the learning effect of college students because of the cognitive barriers in knowledge construction. This article, starting from the status quo of "fragmented" learning for college students, analyzes the causes and results of "fragmented" learning, and gives specific recommendations, that is, in the future, it should be devoted to the development and promotion of learning strategies and modern education technologies that transform fragmented knowledge into systematic knowledge.

Keywords—fragmented learning; status quo; countermeasures

I. INTRODUCTION

The concept of "fragmentation" originally belonged to the research scope of postmodern culture. American scholar Frederic Jameson believes that fragmentation is the basic form of postmodern cultural phenomenon. The popularity of mobile terminals such as mobile phones and tablets, and the emergence of self-media such as Weibo and WeChat have provided effective technology supply and interactive platforms for people to obtain information anytime, anywhere, but at the same time this also completely tears information. Fragmented learning has become an inevitable product of huge amounts of information and mobile terminal upgrades. Fragmented learning refers to formal and informal learning that uses fragmented time (when waiting for a car or waiting in line) through fragmented media (mobile phone, PAD, computer, etc.) and fragmented resources (Weibo, WeChat, Micro-Course, essay) without clear goals and guidelines. In 2012, the Ministry of Education commissioned China Mobile Lab to conduct a project study of "learning and teaching at any time". According to the "China Mobile Learning Report", nearly 57% of students are accustomed to using mobile electronic products for learning, and they spend an average of up to 4 hours a day on mobile electronic products. Among them, compared with video, text reading is more. [1] According to data, fragmented learning has become an important way for college students to acquire knowledge, and it has affected and changed the way college students learn to a certain extent.

In recent years, scholars' research on fragmented learning has focused on the following aspects:

A. Study on the Characteristics, Advantages and Disadvantages of Fragmented Learning for College Students from a Descriptive Perspective

As a product of the information age, fragmented learning presents new characteristics compared to traditional systematic learning. Based on the descriptive perspective, scholars have summarized their characteristics. Scholars such as Wang Zhuli (2016), Zhang Meifen (2016), Zhang Keyong, Li Yujia, Yang Xue (2015) have studied fragmentation. [2] [3] [4] [5] According to research, fragmented learning has obvious advantages such as more controllable and flexible learning time, easier learning content after segmentation, more efficient use of fragmented time, and improved absorption of knowledge. At the same time, the disadvantages of fragmented learning are also obvious. According to the research, the connection between fragmented knowledge is broken, which is not conducive for individuals to associate fragmented knowledge and build a personal knowledge system. However, researchers have summarized the characteristics of fragmented learning from the perspective of current situation description, which lacks the research on the deep mechanism of its disadvantages. Understanding the deep mechanism of the disadvantages of fragmented learning can help to better overcome the shortcomings of fragmented learning.

B. *Proposal of a Solution to the Deficiency of Fragmented Learning from a Theoretical Level*

In order to overcome the lack of fragmented learning, scholars such as Wang Xianghui (2016) and Huang Ling (2016) proposed that teachers should follow the following principles in teaching design [6] [7]: First, high flexibility. The learning content should be divided into several segments to make each learning segment more controllable and achieve the effect that the learning can be ended at any time; second, strong pertinence. Teachers should make personalized learning content according to the needs of learners; third, mixed timeliness. Instructional design should highlight the timeliness of knowledge and use the latest knowledge to enable learners to gain a new understanding and vision to ensure that learners accumulate and improve the new knowledge system. However, these teaching principles are large and vague and lack practical reference value for teaching practice. Facing the fragmented learning of college students, college teachers often lack practical coping strategies.

The phenomenon of fragmented learning among college students is very common and an inevitable trend in an information society. However, there is still a lack of research on the teaching design of fragmented learning for college students, especially to overcome its disadvantages. How to overcome the disadvantages of fragmented learning and improve the efficiency of fragmented learning for college students? So far, most researchers have analyzed the characteristics of fragmented learning from the perspective of description, but have not explored its deep mechanism. The countermeasures are mostly metaphysical methods and ideas for the disadvantages of fragmented learning, which lacks corresponding empirical research. Research in this field is conducive to improving the efficiency of fragmented learning for college students, and promoting college students to better adapt to future social development, which has important application value.

II. DEFICIENCIES OF "FRAGMENTED" LEARNING FOR COLLEGE STUDENTS

Based on previous studies, the shortcomings of fragmented learning are reflected in the following three aspects: One is the obstacle to the individual construction of fragmented knowledge. The learner's knowledge is not "cluttered" in the head, but "structured" in the head according to a certain logical connection, thereby forming a certain knowledge structure and having a certain level. The various knowledge points form a complicated network connection through various associations and inferences. In the study of fragmented knowledge, learners must understand the existing fragmented knowledge and construct a new learning system through the learning process. At the same time, for some relatively scattered knowledge points and knowledge structures, knowledge fragments need to be reprocessed. Fragmented learning on the Internet is prone to a variety of cognitive impairments. The cognitive impairment caused by fragmentation is reflected in four levels: sensory perception, attention, memory, and thinking. At the sensory perception level, fragmented learning easily

brings two types of illusions to learners. One is to give learners the illusion that they will be eliminated if they do not browse the information in a timely manner and the other is that they think that they have acquired a lot of knowledge and skills in daily reading and learning. In terms of attention, the network fragmentation information is updated quickly and the upload mode is independent, which is likely to cause learners to lose their attention. The strong irritation of fragmented information can easily make learners pay more attention to network information, and exclude other reading methods, which affects the effect of systematic learning. In terms of memory, fragmented information is apt to cause memory disorders due to its weak correlation. In terms of thinking, fragmented learning easily causes individuals to form jumping thinking, which breaks the normal thinking mode, causes breakpoints in logical thinking, and fails to effectively train logical reasoning and deductive abilities, forming thinking obstacles. In summary, unlike systematic learning, fragmented learning can easily cause obstacles in sensory perception, attention, memory, and thinking of individuals, which makes it difficult to correlate and construct the knowledge they have learned, and therefore it is difficult to solve practical problems. The second is the obstacle to the social construction of fragmented knowledge. Individuals acquire a large amount of knowledge through fragmented learning, but due to the lack of a learning community and corresponding contexts, fragmented knowledge cannot be effectively socially constructed. How to integrate the knowledge acquired inside and outside the classroom organically, bridge the boundary between realistic teaching and online learning, and promote the social construction of fragmented knowledge is the second problem that college students need to solve in the context of fragmentation. The third is that fragmented learning easily interferes with systematic learning. The time spent browsing through a smartphone or other mobile terminal occupies a lot of time for individuals, which has led to repeated "phubbers" appearing in the classroom. The characteristics of fragmentation in the Internet era are very significant. College students tend to bring smart phones, mobile communication devices, etc. into the classroom, which has made traditional classroom teaching lose their appeal, and the contradiction between fragmented learning and systematic learning has become increasingly prominent. How to alleviate this contradiction and promote the mutual promotion between fragmented learning and systematic learning is the third problem that fragmented learning needs to solve.

III. THE PSYCHOLOGICAL FOUNDATION OF KNOWLEDGE CONSTRUCTION

Knowledge is not scattered in the brain, but acquired through construction. People themselves are the subjects that stimulate information processing and behavioral activities. The knowledge that is transmitted and communicated can only be grasped and applied under certain circumstances after it is understood and explained after being reconstructed by another person, and connected with the knowledge already in the learner's mind. The construction of knowledge includes two parts: individual level and social level.

The disadvantages of fragmented learning are mainly reflected in the lack of knowledge construction at the individual level and the construction at the social level. The construction of knowledge at the individual level consists of two parts: vocabulary and concept, which are closely related. The construction of vocabulary is stored in the human brain in the form of a mental dictionary. External stimulus messages such as symbols, words, sentences, and speech must be identified when they come into contact with an address in the mental dictionary of the human brain. [8] The word or vocabulary in the mental dictionary is not arranged in alphabetical order like the English dictionary. It is arranged and retrieved according to the category of things or the link after association. [9] When a word or vocabulary enters a person's cognitive structure system and evokes the word or vocabulary of the mental dictionary, it will promote the connection between the word and vocabulary associated with it. This arousal will promote the subsequent process of contacting words and vocabularies that are semantically connected to it. This is called the semantic initiation phenomenon, which is also the process of individual constructing concepts. According to the research on priming effects in cognitive psychology, it is found that priming effects can cause new representations of stimulus information for a long time. [10] However, this new representation is gradual, rather than a new connection between any stimulus information after a single attempt. Individuals must go through multiple implicit learning to establish a new connection principle between concepts. According to the law of the process of constructing knowledge at the individual level, fragmented knowledge is difficult to construct a system due to the cognitive barriers it causes.

Knowledge construction at the social level means that the knowledge acquired by learners needs to be communicated and shared with others, and a learning community learning context is required to effectively promote the explicitization of implicit knowledge. Most of the fragmented knowledge is obtained by the learners alone through the Internet, and it lacks communication with the learning community. Therefore, the fragmented learning method is not conducive to the social construction of knowledge.

IV. COPING STRATEGIES FOR COLLEGE STUDENTS' "FRAGMENTED" LEARNING

Adopting modern information technology to promote the construction of fragmented knowledge at the individual level and the construction of the social level, and organically combining fragmented learning with systematic learning are ideas to overcome the disadvantages of fragmented learning.

The Mind Map of modern information teaching technology is a good mental tool to promote knowledge organization. Mind Map was created by British psychologist Tony Buzan in the 1970s. [11] It allows people to clearly describe the line and level of thinking in the form of pictures, stimulate the left and right brains at the same time, and to concretely and visually present divergent thinking in the most familiar image representation of the brain. It is an effective tool for organizing and interpreting and expressing knowledge. Mind Map organizes and elaborates in the form of diagrams, and expresses the invisible knowledge of the human brain graphically, so that learners can see its cognitive schema or conceptual framework, and can find connections and absorb new knowledge from new knowledge to promote internalization of new knowledge and effective meaning construction. Flipped Learning is a further extension and development of the Flipped classroom. Traditional learning is centralized learning [12] [13] [14], where everyone gathers together is the process of knowledge transfer, and after everyone separates, it is the process of internalization and consolidation of knowledge. Flipped Learning is just the opposite. When everyone is separated, they carry out individualized learning through the Internet and other channels, and when they come together, they share, exchange, practice, create, deepen, consolidate and innovate knowledge. The learning content is no longer limited to textbooks and syllabuses, but more independent learning through the Internet. This method is conducive to the individual's explicit knowledge of tacit knowledge and the construction of a knowledge society.

Therefore, under the theory of knowledge construction, this research intends to use two modern information technologies: mind map and flipped learning mode to promote the construction of fragmented knowledge at the individual level and the social level to improve the efficiency of college students' fragmented learning.

A. Mind Mapping Can Effectively Promote the Construction of Fragmented Knowledge at the Individual Level

The teaching effect of the class using the mind map teaching method is better than that of the class using the ordinary teaching method. Mind maps can make full use of the rich information and vivid audio-visual effects in the classroom to improve students' motivation for learning, increase their interest, and reorganize the cognitive structure to students through multiple channels, and finally complete the construction of cognitive structure. Therefore, compared with the traditional teaching mode, the teaching method of mind map is more conducive to the construction of knowledge by students, and then improves the learning effect. Through interviews with students in the experimental class and the control class, experiments were designed to study the differences in cognitive characteristics (including sensory perception, attention, and memory characteristics) of learners on the same learning materials under the mind map teaching method and the ordinary teaching method. To learn the learning materials presented in mind maps and the learning materials presented using mind maps in the study of ordinary texts is helpful for learners to obtain content information, improve memory effects, and effectively promote knowledge construction. Mind maps use keywords and different colors to display, graphically display key content scenarios, and structured knowledge content, which increases the possibility of learners to enhance visual memory processing and has a positive impact on improving content memorization. In the process of presenting the content in the mind map, the human brain is in an active state from beginning to end, and

constantly exchanges the contents of the current working memory with the information in the long-term memory to form a better memory effect [15] [16] [17].

B. Flipped Learning Can Effectively Promote the Construction of Fragmented Knowledge at the Social Level

Since the boundary between network and reality teaching has been broken, and an effective learning community has been formed, adopting a flipped learning model can promote individual knowledge construction at the social level. Experiments were also designed in the experimental and control groups. The expected assumption is that the knowledge acquisition and use of college students in the flipped learning mode is better than that of the college students in the traditional learning mode.

C. It Can Have a Good Effect to Use Smart Phones to Optimize Classroom Teaching

Using notification, check-in, grouping, discussion, voting and other functions in the smart phone platform to carry out teaching research can increase the attractiveness of classroom lectures, and organically combine fragmented learning with systematic learning to improve learning results.

V. CONCLUSION

Therefore, aiming at the three major problems of fragmented learning: the individual construction of fragmented knowledge, the social construction of fragmented knowledge and the contradiction between fragmented learning and systematic learning, this research intends to use the current information technology-mind map and flip learning, and introduce smart phones and mobile Internet into the classroom. With the help of mind maps, it enables college students to better organize and explain expression of knowledge; using flipped learning to share, communicate, consolidate and innovate knowledge can promote the social construction of fragmented knowledge; using smartphones and mobile Internet technologies to optimize classroom teaching can organically combine fragmented learning with systematic learning to build a modern Internet classroom, with a view to improving the efficiency of fragmented learning for college students and better adapting to the development of the times.

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