Advantages and Disadvantages of Fragmented Learning and Recommendations

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Abstract   The development of information technology has changed people's learning methods. Fragmented learning, as an informal learning method, has become an important way to accept new knowledge and learn new technologies. Through analyzing the connotation, characteristics, and advantages and disadvantages of fragmented learning, this paper came up with reasonable recommendations for fragmented learning. To truly become systematic and holistic knowledge, fragmented knowledge must be explored, understood, integrated and internalized. This paper is expected to play an important guiding role in building a lifelong learning society.

Key words   Fragmented learning, Fragmented information, Advantages and disadvantages, Fragmented thinking, Feasible recommendations

1   Introduction

The pace of life is accelerating, and the fragmented time is increasing day by day. The rapid development of new generation information technologies such as cloud computing, mobile Internet, and big data is affecting and changing the way people live, learn, and work. Large volume of information flows to our lives and learning. In the fragmented time of work and life, people can use Wifi network, smart phones, tablets, QQ, WeChat and other platforms for free learning. Such diverse learning methods provide strong technical support for personalized learning. Therefore, obtaining meaningful knowledge fragments in a large volume of information has become an inevitable learning trend. At present, mobile Internet has become an important part of life, work and learning[1], and the whole society has entered the era of fragmented learning[2].

2   Background of fragmented learning

Fragmented learning can be traced back to the " three places of learning" (on the horse, one the bed, and on the toilet) of Ouyang Xiu in the Northern Song Dynasty. In 2014, Premier Wen Jiabao of the State Council also advocated using the fragmented time for learning. Fragmented learning usually refers to informal learning without clear objectives using the fragmented time through fragmented media and fragmented resources[3-5]. The emergence of fragmented learning has led to appearance of many related terms, such as fragmented content, fragmented thinking, fragmented reading, fragmented time, *etc.*, and their common characteristic is " fragmentation". Fragmented learning makes knowledge more accessible, learning time and place become more flexible, and the knowledge absorption rate becomes higher[6]. Fragmented learning conforms to the value orientation of learning in the era of

big data. However, the content of fragmented learning shows strong fragmentation and incompleteness, lack of summary and innovation[7], and it is difficult to form a systematic knowledge system[8]. In this study, we systematically analyzed the connotation characteristics, advantages and disadvantages of fragmented learning and came up with recommendations, in the hope of helping learners to obtain valuable knowledge fragments from big data by using new thinking and new ways.

3   Characteristic connotation of fragmented learning

Fragmented learning is an embodiment of the social pluralism[9]. Fragmented learning is the the process of learners using the fragmented time with the aid of mobile terminal and Internet resources, in fragmented and non-fixed time and space, using the fragmented learning thinking, to extract, consolidate, and process fragmented information, to obtain valuable knowledge, accordingly to realize the transformation of fragmented learning thinking to aggregated thinking. Fragmented learning has the following characteristics.

3. 1   Fragmentation and diversification of learning tools   In the information age, new media supported by emerging tools and new technologies represented by the Internet and digital devices have emerged. They are interactive, digital, personalized, integrated, and popular. Through mobile devices, they can access Internet, to realize diversified learning and communication tools. The emergence of new media has provided strong technical support for fragmented learning, greatly enriching the learning environment and overcoming the limitations of time and space in traditional learning. Besides, learning methods become more diversified. Fragmented learning does not require a complete knowledge system and standardized learning materials. Learners can take advantage of the media resources for learning and communication, so the flexibility and initiative are high. In addition, fragmented learning breaks the continuity and unity of traditional learning behaviors, fully reflecting the diversity of learning behaviors.

3. 2   Fragmentation and pertinence of learning contents   The

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source of knowledge information is rich and diverse, but the content is fragmented. Miniaturized and fragmented information greatly enriches the learning content, making "learning on-demand" and "personalized learning" possible. The emergence of large volume of micro-resources provides high-quality resources for fragmented learning. Both the sources and forms of information resources are characterized by fragmentation. In all, there is no fixed logical structure between information fragments. Specifically, they have characteristics of diversified sources, rapid updating, and diversified presentation methods[10]. They can expand the breadth and depth of learning content, and the learning content can be easily accessed by mobile devices. Learners can choose learning content according to their own needs, and can learn difficult and important points time and time again, which can save learning time and improve learning efficiency.

3.3　Fragmentation of learning time and space　Fragmented time and unfixed locations are ideal for micro-reading and micro-writing. As long as there are communication tools and wireless networks, it is able to do fragmented learning, there is no limitation of time and space. The fragmented time is usually a few minutes to ten minutes. It usually appears in situations such as waiting for a car, waiting for people, queuing, taking a car, *etc.* It has the short-term, random and fragmented characteristics. Based on the convenience of Internet media and the fragmentation of learning time, learners can use fragmented time and massive information resources to do fragment learning in any time and any place with intelligent mobile terminals.

3.4　Fragmentation and jumping of learning thought　The accelerating work and learning rhythm makes the jumping thinking mode gradually become the mainstream, but it lacks holistic thinking, and it is difficult to form a systematic knowledge system in a short period of time. Fragmented learning has such characteristics as diverse content, time, spatial discontinuity, and media tools. These characteristics determine that learning thinking is also discontinuous[11]. Faced with large volume of information fragments, due to high specificity and independence of information content, learners often adopt a new kind of jumping thinking and break the traditional way of thinking, so the thinking is more flexible.

3.5　Free, flexible and diverse learning methods　Learning can be achieved in many places, through diversified learning resources, with the aid of mobile terminal devices. Fragmented learning is an informal learning that learners use fragmented time, fragmented resources, *etc.*, the learning is simple, transmission is convenient, and often free and random[13]. Learners can conduct decentralized learning of fragmented knowledge through intelligent mobile devices, which is a new flexible and diverse learning method to improve knowledge and skills.

4　Advantages of fragmented learning

As a new learning method, fragmented learning is undoubtedly a "double-edged sword". It has the following advantages.

4.1　High flexibility and strong pertinence　Fragmented learning breaks the traditional knowledge structure and adopts the strategy of "breaking the whole up into parts". It can make full use of network information resources and self-learning with high flexibility in amateur time, so as to supplement knowledge and make time more controllable, and make up for the shortcomings of formal learning. Learners can select learning contents in a targeted manner according to their own conditions, the flexibility is high and the learning efficiency is high.

4.2　Convenient learning and high time efficient　With the development of Internet technology, both learning resources and learning methods have shown high mobility. Learning is not limited to the classroom. Mobile devices can be used for active knowledge charge at any time. Such learning environment can strengthen learning interest and stimulate learning motivation. Besides, the knowledge fragments are short and succinct, so learners are more likely to maintain their interest in learning without causing mental decline and reducing cognitive load, and it can enhance interaction, expand communication scope, and significantly improve learning efficiency. Furthermore, learning resources are wide and have large capacity. They often involve some new and hot information knowledge. Learners can learn and master many new knowledge and technologies in a short time through fragmented learning. In this manner, it is favorable for their keeping pace with the times, following up the leading fields. Thus, fragmented learning has become an important way for learners to quickly master new technologies, new knowledge and new technologies.

4.3　Convenient for establishing lifelong learning system　The fast pace of life makes the centralized time less and less, while learners often use a variety of platforms to learn. Learning time is characterized by randomization, personalization and fragmentation. What is more, the learning place is not subject to time and space. Fragmented learning can be made in traditional classrooms and on various virtual teaching platforms, which is favorable for the establishment of a lifelong learning system.

5　Disadvantages of fragmented learning

It is true that the fragmented learning conforms to the value orientation of learning in the era of big data, but the content of fragmented learning shows strong fragmentation and incompleteness. It has the following disadvantages.

5.1　Fast knowledge update frequency but lack of comprehensiveness and rigor　The rapid development of Internet technology promotes the growth of fragmentation information in geometric progression, but the proliferation of information often leads to conflict and inconsistency problems. The fast update frequency of knowledge leads to a short life cycle of knowledge fragments[14]. Due to the lack of opportunities for digestion, absorption and accumulation, the improvement of learning effects and thinking ability will be influenced to varying degrees. If there is no correct judgment on quality information, learning time will not be used in a proper manner. Fragmented information generally simplifies complex knowledge, simplifies the process of logical deduction, and neglects the interrelationship between things. As a result, the knowledge is fragmented, not comprehensive and not rigorous. For learners, it is difficult to make an in-depth analysis on things and accordingly weaken their thinking ability.

5.2　One-sided thinking, not favorable for cultivating speculative capacity　A large volume of fragmented information aggra-

vates the information overload, increases the cognitive load of the brain and the difficulty of selection, often leading to the cognitive bias. Due to lack of logical reasoning and deduction, fragmented learning is not favorable for the development of learners' overall logical thinking, making it impossible for learners to undertake deep learning for a subject of knowledge. Besides, false components in fragmented information often block valuable information and knowledge. In addition, the fragmented knowledge is relatively simple, there is a lack of connection between knowledge, and it is impossible to form a complete system. It often only describes the superficial phenomenon of things, it is neither comprehensive nor rigorous. In consequence, learners will lack in-depth study and thinking, and their thinking ability and speculative capacity will gradually decline.

5.3 Fragmented learning time, not favorable for systematic thinking

Fragmented time is characterized by inconsistency and discontinuity, so it is not favorable for concentration of learners and is not favorable for the memory of knowledge. The increasingly miniaturized information is not complete and comprehensive, and it is difficult to establish connection with existing knowledge. Therefore, it is no favorable for the diffusion and migration of learners' logical thinking. It is difficult to systematically think under the fragmented knowledge system.

5.4 Scattered and disorderly fragmented knowledge

Fragmented knowledge is scattered, structure is disordered, and its original integrity is lost. Thus, learners have to spend time and energy to reorganize and understand the logical system and hierarchical relationship between knowledge. The environment of fragmented learning is too loose and relaxed, and the learning style is diverse. It is difficult to leave the learners with deep impression and fail to achieve the desired results. Fragmented learning lacks a certain depth and breadth, it is difficult to form a comprehensive and systematic knowledge, and it is difficult to realize the application and migration of knowledge[15].

6 Recommendations for fragmented learning

To a certain extent, fragmented learning conforms to the trend of the times and is a better learning method. Fragmented learning has the characteristics of fast pace and high degree of fragmentation, and it sets forth higher requirements for learners' self-control and time concept. Those learners with high self-control can learn without being disturbed by useless information in accordance with their clear and definite objectives. Besides, learners can skillfully use fragmented time to properly match fragmented knowledge. In the process of fragmented learning, learners are free from time and space limitations and can use a variety of media tools to obtain fragmented knowledge according to their learning needs. However, at the same time, in the process of learning, due to the limitations of fragmented information, fragmented thinking, and fragmented time, *etc.*, the problems highlighted by such fragmentation are becoming more and more prominent. At the same time of bringing convenience to our work and learning, fragmented learning also makes us trapped in information overload and cognitive disorder, which requires us to improve our ability to select, process and summarize information. It is expected to gradually im-

prove the rapid response of learners to fragmented information.

6.1 Scientific exploring and managing knowledge fragments

The source of fragmented knowledge is wide and complex. It is recommended to reduce the interference of redundant information and make scientific management of knowledge fragments, so as to help learners make better use of meaningful knowledge fragments. Learners should screen and explore meaningful information according to their learning needs and objectives. Besides, it is recommended to consider how to incorporate new knowledge points into the knowledge structure system according to the learning needs, think about how to link the acquired knowledge, and decisively delete the knowledge points that have no value. In addition, it is recommended to explore and screen knowledge points, to establish a fragmented learning resource library, and these fragmented knowledge resources can be extracted from the resource library according to the learning themes. If the knowledge fragments are separated from the whole knowledge system, they will lose their original meaning. Therefore, establishing a knowledge structure system is an important prerequisite for fragmented learning. Furthermore, it is recommended that the logical thinking of the system should be incorporated into the construction process of the knowledge structure system to prevent the learner's thinking from being too isolated and one-sided, and to promote the effective exercise of reasoning.

6.2 Expanding thinking and optimizing teaching design

It is recommended to explore the principle, necessity and possibility of a single knowledge point through searching the data and information. Besides, it is recommended to effectively incorporate the fragmented knowledge into the knowledge structure system to expand the thinking network and effectively promote deep learning. The teaching design should meet the needs of learners in accordance with the understanding of learning tasks, extracurricular self-learning, and teacher-student interaction, to solve problems in the teaching process. Learners can understand the key points and difficulties of the learning content through the classroom explanation, and then use their spare time to learn independently and use social tools for interaction.

6.3 Restoration and reconstruction of fragmented knowledge

Although fragmented resources are characterized by "fragmentation", fragmented resources are actually interconnected with each other. Through sorting, it is able to restore the "fragmented" knowledge to the original knowledge system and maintain the integrity of the knowledge. Besides, learners can reconstruct knowledge according to learning themes and goals, and reconstruct the fragmented knowledge into comprehensive knowledge that suits their needs. The reconstructed knowledge can be different from the original knowledge structure system. Compared with "restoration", the reconstructed fragmented knowledge often has a specific structure. It generally collects, filters and processes fragmented resources focusing on a certain knowledge point, and finally forms a comprehensive and systematic knowledge[16].

In summary, the rapid development of information technology, the emergence of big data processing technology and new media have brought us unprecedented development opportunities

application effect has been improved. The total number of visits to the platform has reached 65. 89 million. There are 94 739 registered users, 90 906 student users and 3 457 teacher users.

At present, teachers have built 967 courses (total 1 735 courses/times) in the platform. Various types of teaching resources of more than 600 courses are relatively complete. Relying on the platform, 371 courses carry out homework assignment and correction, and 338 courses conduct network Q&A activities. The effect of online and offline mixed teaching is obvious (Fig. 1).
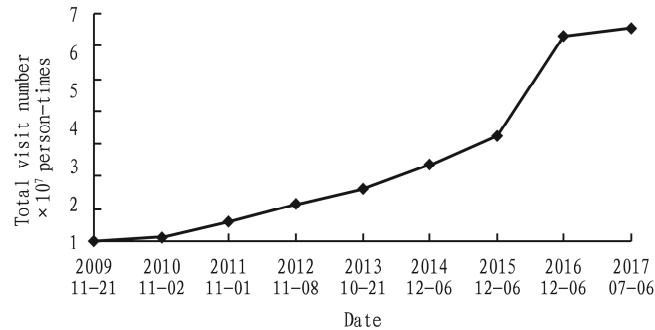

Fig. 1   Total visit chart of the integrated network teaching platform (person-time)

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and also great challenges. Fragmented learning is an unavoidable historical trend. It is recommended to set up correct attitude and behavior towards fragmented learning, neither let the fragmentation cut out learning path, not make the fragmentation break our learning atmosphere. In all, we should fully understand the characteristics, advantages and disadvantages of fragmented learning, maximize the advantages and minimize the disadvantages, so as to make better use of the fragmented learning in an efficient manner.

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