

# Ways to improve fragmented learning from the perspective of cognitive psychology

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**Abstract:** The popularity of fragmented learning has given rise to much concern about the negative effects that might be caused of this new form of learning. This paper tries to find out ways to improve fragmented learning outcomes from the perspective of cognitive psychology. First, the background of fragmented learning is introduced. Second, both the strengths and weaknesses of fragmented learning are discussed. Then the problems of fragmented learning, especially those that cause information processing failures are further analysed in light of the schema theory in cognitive psychology. Finally, suggestions are given to improve the outcome of fragmented learning based on the research findings.

## 1. Introduction

In the Internet age, the way of learning has been transformed. The information people get is instantaneous and fleeting, and it comes in all forms: texts, graphs, pictures, audios, videos and blended ones. According to Kee and Samsudin (2014) the young learners in this mobile-technology era can practice ubiquitous learning effortlessly. They can get full access to the required material from diverse resources in the web. [1] Compared with printed books and face-to-face learning, these information available tend to be more fragmented. Thus, how to identify, collect, and utilize these fragments has become an unavoidable question in this age.

## 2. Background of fragmented learning

### 2.1. Higher speed in information update

Since scientific and technological progress and information expansion, knowledge update is speeding up. The development of information technology enables people to access the Internet at anytime and anywhere by using smart terminals, which changes the way people acquire knowledge and gather information, as well as learners' learning concepts and methods.

### 2.2. Changes in reading carriers

With the large-scale development of mobile Internet, technology application has made a leap forward. Mobile terminals such as smart phones and tablets have become a new "organ" of human beings, opening up another "evolution" of human intelligence. Mobile learning presents learners with a variety of contexts where they can learn and experiment in real-world situations. [2] Students learn in different places and different times when mobile devices support them to learn anywhere-anytime. [3]

### 2.3. Changes in learner needs

China's education informatization development plan clearly points out that the goal is to "build a networked, digital, personalized, and lifelong education system, and build a learning society where everyone can learn, can learn everywhere, and learn from time to time." This is obviously also looking into the matter from the perspective of learners. The driving force is not on the teacher, but on the students. In order to save time generated reading fragments, trying to let people know more

in less time. Traxler describes mobile learning as “spontaneous, informal, bite-sized, light-weight...”[4]

### 3. Strengths of fragmented learning

#### 3.1. High flexibility

Fragmentation of learning content renders the learning time of each piece more controllable, which improves the flexibility of students’ learning time.

#### 3.2. Pertinence

Fragmented learning content is more accessible and approachable. Once the learning content is fragmented, students can focus on the parts that are more helpful or inspiring to them.

#### 3.3. Changes in learner needs

To learn a fragment of some learning content requires shorter learning time, shorter attention span, and lighter cognitive information load. And this makes it easier for learners to maintain their interest in learning

#### 3.4. Accessibility to various fields of study

Another effect of fragmentation is that it makes it possible to reach for learning materials from almost any field of study. Learners can pick up any micro lesson anytime anywhere, which means they are able to reach areas that they didn’t have a chance to try before.

### 4. Weaknesses of fragmented learning

Cognition is the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. The cognitive impairment caused by fragmentation of learning content is an important factor affecting the effectiveness of fragmentation learning.

#### 4.1 Fragmentation of learning content

Today, a great amount of useful essence information is mixed in countless fragments. Fragmentation learning materials are ever increasing. Excessive exposure to these fragments can cause failure of pattern recognition even though enough attention is payed, as shown in the following figure.

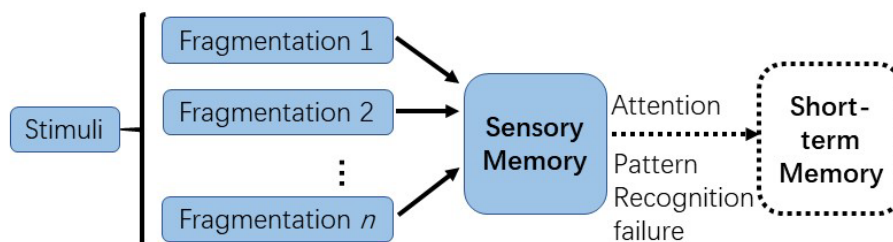


Figure 1: Pattern recognition failure.

#### 4.1.1. Multi-disciplinary learning content

The learning materials available on line can be from any discipline. These materials are cut and reframed into smaller sections in order to make them easier to be accessed and consumed. It totally depends on the learner himself to guarantee the steps and flow of learning, which makes giving up half way and turning to other learning materials quite often. When learners feel bored of one learning material, they simple shift to another one for a change.

#### 4.1.2. Lack of consistency

Fragmented learning materials lack consistency and systematism. Besides, learners’ frequent focus-shifting earning behaviors also give rise to the breakdown of systematism of a certain

discipline.

#### 4.1.3 Lack of systematism

Although most of online courses are complete and well organized, students still face the challenge of disorderliness of some learning materials, since a larger number of students prefer learning materials which seem to be less demanding and more interesting. And some websites choose to stay competitive in learner attraction even at the cost of orderliness, depth and profoundness of a subject.

#### 4.2 Fragmentation of learning time

The development of mobile internet technology makes it easy for everyone to communicate, and allows everyone to be disturbed at any time. For most students, it is difficult to have an hour or more without any interruption. For such a short period of learning, one can hardly finishes a complete information process as shown in Fig.2.

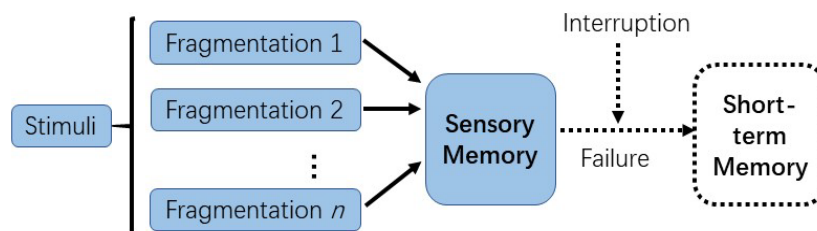


Figure 2: Attention failure.

##### 4.2.1. Lack of meditation and reflection process

In Piaget’s opinion, one’s whole knowledge is always divided into parts, and then the parts are integrated into a new whole knowledge. It is necessary to invest considerable time and energy to establish this knowledge system and knowledge structure. It takes a lot of learning to weave a web of this known knowledge. After forming a network, the knowledge block is reorganized and constructed.

##### 4.2.2. Schema activation failure caused by disorder of information received

When the new information received is in the order of disarrangement or dislocation, the difficulty in information encoding and retrieval is raised, so it is likely that the corresponding schema cannot be activated. And this is demonstrated in Fig. 3.

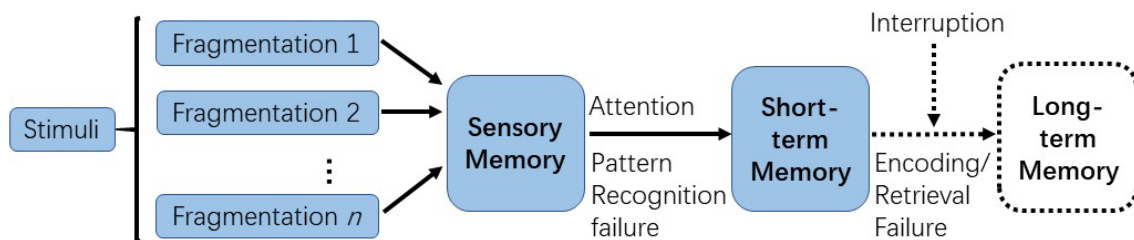


Figure 3: Failures caused by lack of meditation and reflection

In fragmented learning, first, stimuli are presented as fragments of knowledge, which means information input in the cognitive process is not systematic. Lack of systematism in the input information adds difficulty to the further information procession after it is transferred to sensory memory. Second, due to the fact that fragmented learning is considered to be less formal and less serious, interruption is allowed to occur more frequently than in classroom learning. Once further procession is interrupted after the information is transferred to sensory memory, it might fail to be stored in short term memory.

## **5. Ways to overcome the weaknesses**

### **5.1. Establishment of a knowledge framework**

Think about one's actual needs. The knowledge related to achieving this goal should be decomposed and organized. The ability to build an application-oriented knowledge system is the primary factor in the success of fragmented learning. Without this framework, even one's learning behaviour lasts for a long time, the knowledge learned could still be fragmented.

### **5.2. Conscious reorganization of knowledge network**

Fragmentation learning requires learners to consciously sort out their knowledge networks when they accumulate a certain amount of information through fragmentation. Learners should explore and screen according to knowledge points or knowledge modules under the guidance of the theory of new constructionism. [5]

### **5.3. Externalization of knowledge**

Externalize the knowledge accumulated through fragmentation learning through oral narration, writing composition, and the like. The process of output is a process of deep reorganization, integration, and construction of the knowledge that is known.

### **5.4. Rational selection**

Over-richness in information sometimes causes paralysis in one's rational selection. So, if a knowledge point cannot be incorporated into your cognitive system, give it up. The selection criteria are whether these fragmented learning resources meet their needs, whether they can solve the specified problems, and whether they can help their growth.

## **6. Conclusion**

From the perspective of cognitive psychology, fragmented learning has some innate problems. However, it is an inevitable trend to learn. Therefore we need to consciously take some measures to remedy the drawbacks of fragmented learning to ensure its effectiveness.

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