

TRAINING ACQUISITION SKILL AND INFORMATION PROCESSING FOR STUDENTS OF BIOLOGY 11

Le Thanh Oai - Vietnam Journal of Education (VJE)

Received: 05/09/2017; Revised: 20/09/2017; Accepted: 30/09/2017.

Abstract: One of the important and necessary competencies that students need to require in learning is self-study skill. In order to obtain self-study skills, students need to learn skills for acquisition and processing information. In this article, we focus on some main measures that can be used to train those skills to students when learning Biology at grade 11.

Keywords: Acquiring information, processing information, skill in acquisition and processing information, Biology.

1. INTRODUCTION

In the Global General Education Curriculum (2017), self-study competency is defined as a core competency needed for learners. Training self-study for students is an important task for every teacher and subject in general school. The author Tran Ba Hoanh also said that “Self-learning is not only a method and mean to improve teaching effectiveness but also a goal of teaching ...” [1; page 49]. One of the skills required for self-study is the acquisition and processing of information. In particular, teachers need to ask students through listening, viewing, reading, feeling, etc. to perform the task of learning. However, the current state of general education is mainly that students answer teachers’ questions by exploiting some information in the textbook. In order to help students acquire information processing skills teachers need to use a variety of methods such as using pictures, diagrams, videos, experiments, etc.

2. CONTENT

2.1. Acquisition and processing information skill

According to the Psychology dictionary, information is a piece of news or data about the world, and the processes that are happening in which humans or special devices are received, stored, processed, and transmitted [2; page 821].

According to the Vietnamese dictionary, *acquisition* is “taken in and from many sources and at different places” [3; page 958].

According to Nguyen Quang Huynh (2006), “acquisition information is received through the senses, computers, physical activities combined thinking activities to grasp the actual situation of the experience, the data... [4].

Information processing is the process in which people acquire information from outside, thereby deciding the behavior [5].

Information processing in learning is the process in which the learner receives information outside, analyzes, evaluates that information, decides to select, sorts out and links similar information to a technical system. So, learning is actually a process of acquiring and processing information. According to Nguyen Quang Huynh (2006), information processing is understood as the process in which thinking is derived from the task assigned, based on available knowledge and experience to analyze and summarize information to make the product.

Thus, *information processing* in learning can be understood as a stage after acquisition process, which takes place in the minds of learners, including thought processes (analysis, comparison, collation, generalization ...) and information gained. This leads to the result that learners will remove unnecessary information or content that is not basic, then systematize the knowledge, and integrate new knowledge into their own knowledge to provide more diversity of knowledge.

Acquisition and processing information skill in learning is understood as the ability of the learner to manipulate the thinking to bring the information received into the relationship concerned, ensuring that information is used effectively. When considering the process of teaching biology, the concept of acquisition and processing information is understood as a combination of skills and experience in learning activities to efficiently process information to achieve goals, the mission of the teaching process. Information acquisition and processing skills include basic skills groups: information acquisition skills, information processing skills, report writing skills, and presentations [5].

2.2. Mechanism of receiving and processing information

Based on the information-processing model of Richard Atkinson and Richard Shiffrin (1968) (6), Brian Beitzel [7] applied the following model for teachers:

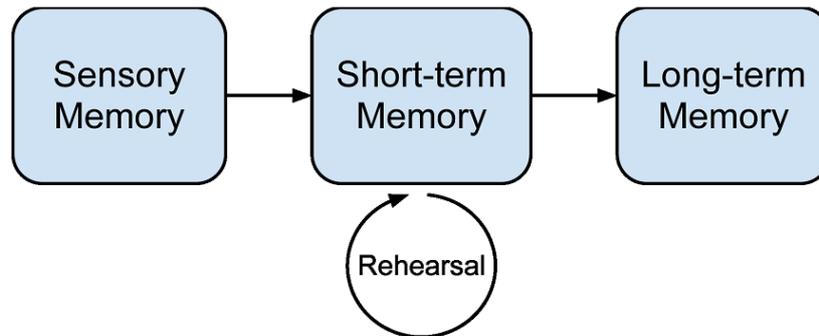


Fig. 1. Atkinson and Shiffrin's (1968) information-processing model.

Note that short-term memory is now more commonly known as working memory

The study analyzed the process of information processing through sensory memory, short-term memory or working memory, and long-term memory. Stages include: receiving information, processing information, storing and reproducing information for use.

The information goes into the memory through five senses and is constantly stored via continuous activities. The memory cannot store information for long time, because it constantly receives information from outside. Many researchers believe that the information is stored for a few seconds. So not all information will be processed, but only a few will be transferred to working memory or short-term memory. This information relates to the task that we are doing.

Working memory is the place where thinking activity occurs, where the learner will process the lesson content that has been instructed on how to perform the task. However, working memory is also capable of storing very little information. The main activities are gathering information into working memory, processing information to transfer the appropriate information to long-term memory, and using information in working memory to provide the response of body to the stimulus outside the environment.

Long-term memory represents the permanent storage of information. In order to achieve long term memory, information must be fully processed in working memory. In other words, working memory is the only route to long-term memory. How does the information be

processed in full working memory? In order to be able to transfer information from working memory to long-term memory, information needs to be processed, sorted, and organized. It is also necessary to link the new information with the available one in long-term memory and this new

information must be included and available in the information system.

Thus, in order to learn effectively, it is essential to use a variety of methods, including the use of exercises related to reality, tasks that link previous knowledge and new knowledge of students. At the same time, it needs to use a variety of methods, combining the acquisition of student information from different senses.

2.3. Process of receiving and processing information

Based on the research conducted by Le Dinh Trung, Phan Thi Thanh Hoi, and Nguyen Thi Kim Anh (2015), the process of acquisition and processing information includes the following stages:

Table 1. Process of acquisition and processing information

Steps	Detail	Essence of each step
1. Acquire information	Determine the learning task.	Students analyze tasks, and predict product expected after implementation.
	Identify and select sources of information, and related materials.	Find sources of information that provides relevant content and select the main source of information. If the

		instructor has provided sufficient information, the selection of information sources may be omitted.
	Gather related information.	Gather information from various sources, textbooks, teacher solutions, television, internet, etc.
2. Process information	Select information from the source collected. Prepare summary, outline, and make the table.	The information collected should be analyzed and sorted according to criteria and synthesized logic: summary, outline, diagram, tables of reading information.
3. Complete reports and presentations	Write reports, essays, presentations, and tasks Edit reports	Write reports, presentations or essays on the basis of information received and processed. Get back to task. review, edit and complete the report.

2.4. Some methods to train information acquisition and processing skills in teaching biology grade 11

We will now illustrate the process by using different tasks as training methods for acquisition and processing of information.

2.4.1. Using the available information, students read the information and process it in the form of answering questions, outline, mapping, and tabulation, etc.

Please read the following excerpt and perform the following tasks:

In humans, lack of growth hormone during the growing children will cause pituitary gland disease. In general, the body is balanced development, but smaller than normal. Children are 10 years old only like children who are 4-5 years old. Children aged 20 equal to 7 years old children. The disease can be treated by the injection of growth hormone produced by gene technology or

extracted from the pituitary gland of the dead. If the growth hormone of animals injected for children with dwarf disease does not work.

If the growth hormone that is secreted by the pituitary gland is too much during childhood, it will cause a giant disease. The manifestation of the disease is the tissues, the organs grow rapidly and excessively, the body is too large than normal. Giant patients are more prone to hyperglycemia and are more likely to develop diabetes. Most of the giants have not a longlife expectancy.

If the growth hormone is secreted too much when the body has matured, it will cause disease of big bone head. The bones, such as the bones of the hands, the bones of the feet, and the bones of the head develop abnormally. The expression is big head, the jaw and forehead protruding, the hands and feet are enlarged, and sometimes the patient is humpbacked due to spinal deformity.

(Source: *Growth and Development, Book "Biophysical Materials in High School - Animal Physiology"*, pp. 144).

Task 2: Answer the following questions:

1) Why are pituitary glands too little or too much growth hormone in the child stage causing dwarf disease and giant disease?

2) The most important hormones in growth regulation in humans are

- A. GH and Estrogen B. GH and Juvenile.
C. GH and Tyrosine. D. GH and FSH.

3) Please circle true or false statement in each of the following statements:

Statement	True or False
The injection of growth hormone of animals has the effect on making children with dwarf disease to grow normally.	True/False
The effects of growth hormone on children and adults are different.	True/False
Persons with dwarf disease or lack growth hormone have a problem with intelligence.	True/False

4) If you know a person with dwarf disease due to lack of growth hormone (GH), which stage should be injected of GH? Why?

2.4.2. Exploring information from pictures, students answer questions and write paragraphs

The picture below is the path of an ant walking. Take a look at the pictures and perform the following tasks:



Task 1: Answer the questions:

- 1) Which behavior of ants belongs to?
- 2) Why do people say activities in the life of low-level animals are mainly innate behaviors? Are all innate behaviors invariable and never changing in the life?
- 3) Please circle the True or False in each of the following statements:

Statement	True or False
Any stimulus can cause a certain behavior in animals.	True/False
The higher the level of the nervous system, the more complex the learning is.	True/False
The innate behavior is specific for species.	True/False
The learning behavior can be changed variously	True/False
The mouse's running action when hearing the cat's sound is the innate behavior.	True/False

4) Analyze the scientific basis of animal training?

Task 2: Based on the above picture, write a paragraph of about 300 words about the behavior of the herd.

2.4.3. Exploiting data from the table of data, students answer questions and write paragraphs.

Biological productivity levels can be theoretically obtained in different geographic areas when using up to 5% of solar energy:

Latitude (degree)	Solar radiation (kcal / ha)	Biological productivity (ton / ha)
60 - 70	2,0 - 1,0	25 - 12
50 - 60	3,5 - 2,0	40 - 25
40 - 50	5,0 - 3,5	70 - 40
30 - 40	6,0 - 5,0	90 - 70
20 - 30	9,0 - 6,0	110 - 90
10 - 20	10,0 - 9,0	125 - 110

(Source: As you know, Advanced Textbook Biology 11, pp. 45)

Task 1: Answer the question

1) Research the table of data above and show how does the relationship between geographic location (latitude), solar radiation energy, and biological productivity relate?

A. Lower latitude → Decrease radiant power → lower yield.

B. Higher Latitude → Decrease the radiant power → lower yield.

C. Lower latitude → Increase radiant power → higher yield.

D. Higher Latitude → Increase radiant power → lower yield.

2) Analyze measures to improve crop yields?

3) Explain: Cultivation is the "business" of solar energy

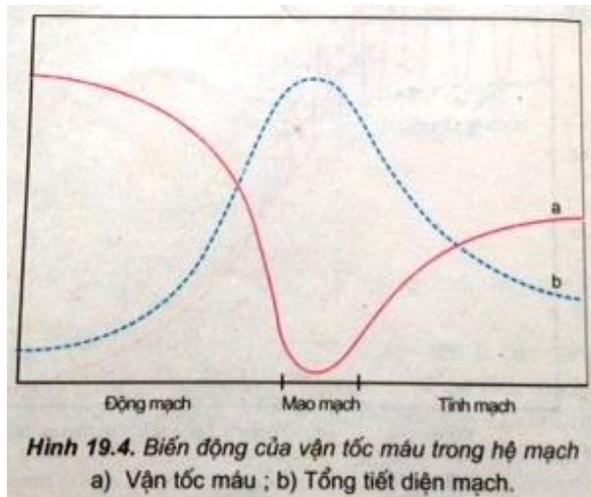
Task 2: Write a paragraph of about 300 words using the information from the table above.

2.4.4. Exploiting information from charts and graphs

Table 2. Blood pressure fluctuation in adult vasculature

Type of blood vessel	Main artery	Big artery	Small artery	Capillary	Small vein	Main vein
Blood pressure (mmHg)	120-140	110-125	40-60	20-40	10-15	≈ 0

The table above is about blood pressure variations in adult vasculature and a graph of blood flow velocity in the vascular system.



Hình 19.4. Biến động của vận tốc máu trong hệ mạch
a) Vận tốc máu ; b) Tổng tiết diện mạch.

(Source: Biology 11, pp. 84)

Task 1: Answer the questions

1) How is the change of blood pressure in the vascular system? Explain why and analyze the meaning of those changes.

2) How does the change of blood flow in the vascular system? Explain why and analyze the meaning of those changes.

3) Why do people with asthma often have heart failure?

4) Choose the correct answer

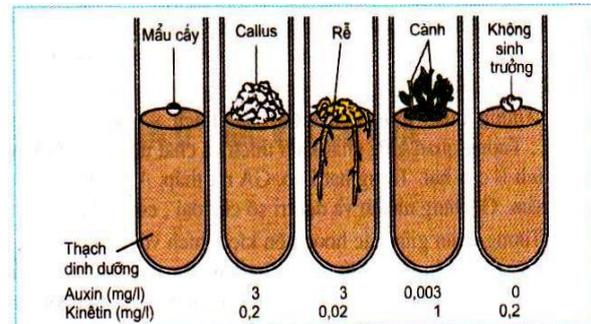
In double circulation system

- A. arteries bring rich oxygen blood
- B. veins bring rich oxygen blood
- C. pulmonary veins contain rich oxygen blood
- D. capillaries contain mixed blood.

Task 2: From Figure 19.4, write a paragraph of about 200 words to present the relationship between the blood flow and the total area of vessel.

2.4.5. Exploiting information from experiments / exercises

The experiment was performed and the results are shown in Figure 35.3 (Biology 11 textbook). Take a look at Figure 35.3 and describe the experiment, then comment on the role of kinetin in bud formation in plant tissue culture.



Hình 35.3. Ảnh hưởng của kinêtin đến sự hình thành chồi ở mô callus (xitôkinin được dùng trong nuôi cấy tế bào và mô thực vật)

3. CONCLUSION

Acquisition and processing information is one of the skills needed to help students in self-studying. Therefore, teachers need to perform this process appropriately, and make use of a variety of methods to both stimulate the learner and develop their information processing skills so that students can study themselves in all their life. So, we have introduced 5 methods teachers can use in teaching biology 11 in order to train the acquisition and processing information skills for learners.

REFERENCES

- [1] Tran Ba Hoanh (2007). *Innovation in teaching methodology, curriculum and course books*. University of Education Publishing House.
- [2] Vu Dung (2008). *Dictionary of Psychology*. Encyclopedia Dictionary Publishing house.
- [3] Hoang Phe (2003). *Vietnamese Dictionary*. Danang Publishing House.
- [4] Nguyen Quang Huynh (2006). *Some educational theories and innovation in teaching methodology*. Hanoi National University Publishing house.
- [5] Le Dinh Trung - Phan Thi Thanh Hoi - Nguyen Thi Kim Anh (2015). *The process of training acquisition skill and information processing in Biology 11*. Journal of Science and Education, Vietnam Science and Education, Vol. 116, pp. 12-14.
- [6] Richard C. Atkinson - Richard M. Shiffrin (1968). *Human memory: A proposed system and its control processes*. In *The psychology of learning and motivation*, Vol. 2, pp. 89-195. Academic Press, New York.
- [7] Brian Beitzel (2012). *Information-Processing Theory for Classroom Teachers*. OpenStax - CNX module: m42774.