

A Research on the Application of Task-driven method in Primary School Teaching of Information Technology

Yong Nie¹, Zhenghua Pei²

¹College of Education, Shaanxi Normal University, Xi'an Shaanxi 710062

²School of Foreign Language Studies, Qinghai Normal University, Qinghai, Xining, 810000

Keywords: Task-driven method; Primary School Teaching; Information Technology

Abstract: This research firstly presents the problems in the current information technology teaching in China, then applies task-driven method in the experimental teaching and analyses its effectiveness, and finally sums up the practical requirements for task-driven teaching.

1. Introduction

With the development of modern society's informatization, various countries have realized that children are the future of the motherland. Raising information capabilities of young people in various countries will be the basis for the development and growth of the country [1]. As a result, countries around the world have increased their attention to information technology education activities in primary and secondary schools [2]. After reviewing relevant data, we found that the basic education activities of various countries in information technology are mainly carried out through the following two approaches [3]. One is the establishment of compulsory information technology courses, and the other is the integration of information technology and curriculum. In the United States [4], information technology education is more advanced. The key to primary school education is to cultivate interest in learning, without emphasizing the information technology discipline system [5]. The information technology courses in middle schools can be roughly divided into two forms: setting up incomplete information technology courses and setting up a series of information technology required courses or elective courses [6], focusing on the cultivation of students' logical computing ability and abstract thinking ability [7]. In the 1970s, the United Kingdom began to increase investment and use the advantages of computers in teaching [8]. In the 1990s, the official inclusion of "information technology" in the national curriculum was aimed at cultivating students' ability to use the acquired information technology knowledge to solve practical problems encountered in life. In October 2000, the Ministry of Education promulgated the Notice on Popularizing Information Technology in Primary and Secondary Schools [9]. Since then, information technology has become an independent compulsory course [10]. The day is to strengthen the information technology education for young people and improve their information literacy. Literacy allows them to become the backbone of the information society [11].

2. Research background and method introduction

2.1 The teaching status of Information technology in China

Information Technology Course is formerly known as Computer Course. Many people still believe that information technology courses are entirely a technical course. In fact, these two are different. The overall objective of information technology courses is to enhance students' information literacy. The students' information literacy is listed as follows: access to information, processing, management, expression and communicative capabilities.

As an information technology teacher, one should hold social information trends, understand the renewal of the knowledge and skills. However, most information technology teachers are weak in knowledge and technology. The low ability of gaining and decomposition information causes them unable to grasp and absorb the meaning of information. Although primary and secondary schools in some rural areas now have professional full-time teachers majored in computer and electronic information or/and other related areas, the number is still very small. Because of the family economic conditions and the influence of various factors, the gap among students is very big. Very few students have computers at home, who can be very skillful in the operation of a computer, some of whom can even make their own homepage, animation and so on. As a matter of fact, there are quite a few students who can only type, draw, some of whom can't even boot a computer or have no contact with computer. Since the new curriculum reform, although there were some changes in the curriculum, it had new request in the evaluation of the content, manner, method, but the evaluation is centered around exam results and college entrance examination has been and is still the "baton" for school education in China. Therefore, teachers only test what is taught, ignoring teaching what won't be tested. Although the information technology is compulsory in primary and secondary schools/education, in most parts of China, it did not enter the entrance examination, and it is unimportant/not that important/insignificant) at school.

The misunderstanding information of technology education, Schools: the quality of a school is evaluated according to the school examination results, which causes the consequence that the school is now focusing on Chinese, Math, English and so on, whereas ignoring the educational quality of other subjects such as information technology education.

Parents: "if one does well in Math, Physics and Chemistry, he/she will succeed wherever he/she is" is still deep-rooted in the mind of most parents, because most parents want their children to succeed. Therefore, they won't support if their children spend time in information technology. So, the impression of many people is that: information technology is dispensable. Information technology teachers are treated as computer repairers in most of the time. The fact is that almost all information technology teachers are assigned to computer room management, campus network maintenance, without really taking any position in school.

2.2 Task-driven approach overview

To understand the concept of task-driven approach, it should be elaborated separately from the "task" and "drive" of these two parts. Only after clarifying these two concepts can we accurately define the task-driven approach. First of all, the key to task-driven approach is to make "tasks" run through the classroom. The teachers, based on the analysis and sorting of the teaching content and objectives, implicitly add the knowledge and skills that the students need to master in the task, and guide the task content. The learner analyzes the task, knows what knowledge points the task contains, what methods and steps are needed to complete the task. With the help of a teacher, learners can find information needed to solve tasks through self-study and collaboration with peers. In this process, they develop a habit of active learning and improve team spirit in communication

and mutual assistance. In addition, we must understand the essence of “driving”. The main driver is the learner, specifically the internal learning interest and motivation of the learner, so that the student himself can actively participate in the problem solving process instead of allowing the teacher to force students to learn step by step through other means. In the teaching process of information technology, the task-driven approach can be summarized as requiring teachers to design typical teaching tasks (for example, making televisions, posters for promoting sunshine, etc.), and inspiring students in the context of attractive and real problems. Learning interests—contribute to actively learning under strong desire for knowledge; and—awareness of the close relationship between information technology and other disciplines, life, and work, and with them, students can accomplish tasks through self-study or collaborative learning, and they can also improve acquisition and form the ability to exchange information.

2.3 Task-driven teaching process

Teachers, students, and tasks are the three elements of the task-driven approach. The three interact and interact. The task-driven method is effective in classroom teaching. Many experts and scholars put forward their own opinions on the basis of teaching practice. However, it is generally believed that there are mainly five links in the teaching process based on the task-driven approach. As shown in Fig 1.

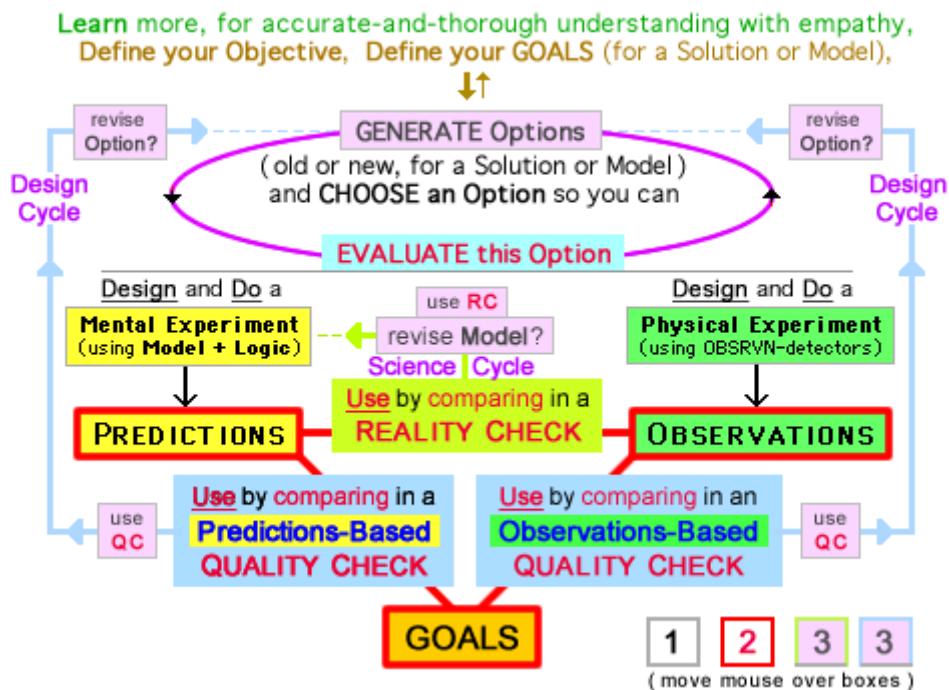


Fig.1 Task-driven teaching process

It's best not to use "What we're going to accomplish today is... ". Start a class with this kind of discourse. This will make students feel like they're attending classes to complete the task, but they don't know why they're going to complete such a task and what is the role of learning. So information technology teachers need to create problem situations in different ways, this situation is best to be true, students can come into contact with ordinary life and learning, so that it will help students to arouse the original knowledge base. Deepen the understanding of the task. After the task is put forward, the teacher needs to guide the students to discuss, discover the knowledge contained in the task, what problems to solve, and the materials, methods, etc , which are needed to complete

the task. It is difficult to fully analyze this, and it is necessary for the teacher to point it out to the students in a proper and appropriate manner. But it should be noted that it is impossible to raise all the questions once in a session. Some existing problems can only be achieved by the students personally. Only in one step is it possible to discover and propose. In the face of the questions raised, teachers should not directly tell students how to do. Instead, students should be provided with clues to solve the problem, where to obtain relevant information, etc., so that students can get a clearer idea, so that they can complete tasks more smoothly. This task is actually operated by students. Teachers supervise student practice process, encourage students to help students, control the progress of the entire class, student feedback and exchange. In the completion of the task, students are mainly trained to develop white students' learning ability and collaborative learning ability.

2.4 Behavior tree

Generally speaking, game AI is divided into two layers, decision making and behavior. The behavior layer can be understood as a middleware in the game. The upper layer is the decision logic, and the lower layer is the animation resource. The goal is to translate AI requests into animated playback requests. A puppy's behavior may be defined as follows: walk, run, sleep, eat, drink, etc. These can be thought of as a series of actions, or logical actions. These actions form a collection called behavior pools. The behavior tree is a way of organizing these behaviors effectively.

The behavior tree is a data structure that improves and replaces finite state machines. The finite state machine is a set of states and rules that transform these states according to conditions. Finite state machine can be used to describe the intelligent behavior of NPC. However, when the status of the role needs to be handled gradually, the finite state machine will become very difficult to understand and maintain because of the explosive growth of scale.

Here's an example of the behavior of a soldier in a game to introduce the structure of a behavior tree. Fig.2 shows the behavior tree of a soldier.

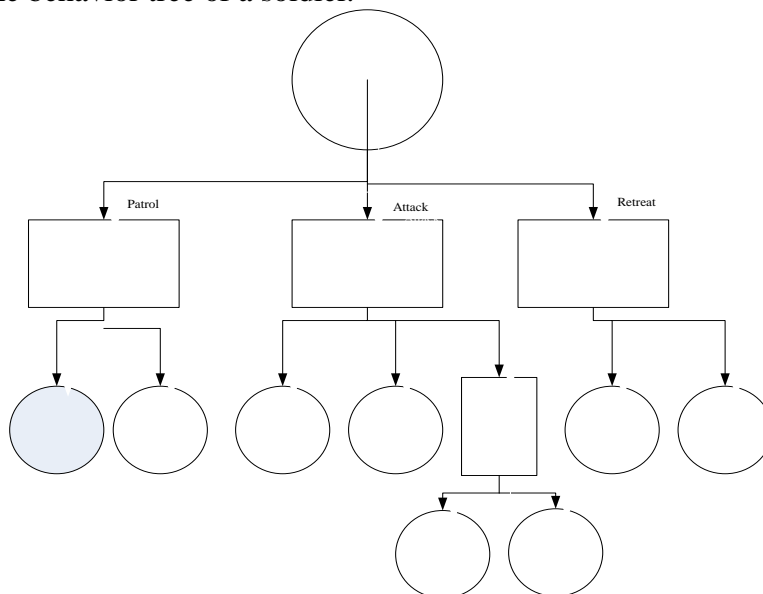


Fig.2 Structure of soldier's behavior tree

3 Instructional Design Based on Task-driven Approach

3.1 Teaching content and teaching objectives analysis

Before teaching information technology courses, teachers need to analyze and formulate lesson plans and formulate teaching plans according to the teaching content. Teachers focus on the overall teaching goals, choose the content of the lectures and compile their degree of difficulty, and carefully analyze the links in these contents, lay the foundation for the arrangement of the teaching sequence, and make full preparations in the future task design. In this textbook, the teaching content to be taught is summarized with the classification analysis method. The specific teaching content is shown in Figure .3

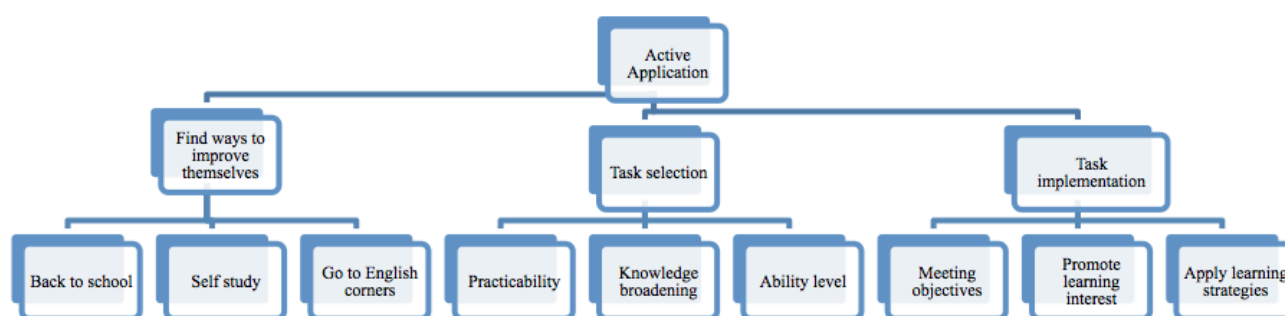


Fig.3 Image acquisition and processing learning process

The formulation of teaching objectives must be considered from the overall development of students. Some teachers value the acquisition of knowledge and skills in teaching, whereas neglect the education of students' emotions. Therefore, teaching objectives now need to be “knowledge and skills” and “processes”. Formulate with methods, emotion attitudes and values, and guide the design of tasks based on this three-dimensional goal.

3.2 Task design analysis

Teachers must carefully analyze the teaching content before class and formulate teaching objectives that are suitable for students' all-round development, and design tasks based on the basic analysis of the previous period. Because the knowledge involved in the teaching content is not the same, it is impossible to learn all the knowledge points through the same type of task. The teaching researcher proposes different types of tasks through the teaching practice. In this study, the task is divided into closed tasks. There are two kinds of open tasks.

Features subject matter belongs to closed task, the task of specific demands to achieve the goals and related hardware and software resources are pre-ordained teachers, require students to be able to accurately complete accordance with the requirements of the completion of the task. This type of task requires that every student has mastered the knowledge points and skills involved in it, and lays a foundation of knowledge for the completion of follow-up tasks. After the task arrangement by the teacher, students need to be led to jointly analyze the difficulties contained in the task, so that the students can clearly define the objectives of the task. Students have their own new ideas based on the completion of tasks. Such tasks generally require students to self-exploration and they can also use group collaboration methods. For example, the knowledge and skills involved in the teaching case of "making a TV" require all students to master it.

4. Teaching sample

From the chapter of “Image Acquisition and Processing”, the “Image Synthesis” teaching case was selected and the implementation of the task-driven approach in class teaching was discussed in detail.

4.1 Textbook analysis

The contents of this lesson are selected from the fourth section of “Image Acquisition and Processing”. This lesson is the last lesson in "Image Acquisition and Processing". Before the students had learned the magic wand tools, rectangular tools, layers, filters and other related knowledge, they have certain basic skills in image processing, this section the content of the lesson is a comprehensive exercise containing the knowledge learned in previous lessons.

4.2 Student analysis

After the introduction of Photoshop-and related exercises in previous lessons, the foundation for the synthesis of learning images has been laid. Students have a certain level of knowledge transferring and self-learning ability; they hope to achieve their own achievements through the production of perfect works. In addition, junior high school students are curious and will be induced by some harmful information online or synthetic images that are based on spoofs. Teachers need to be guided by them to establish a healthy sense of image synthesis.

4.3 Teaching goals

Knowledge and skills: Through learning, students can summarize the concept and characteristics of layers, and master methods for adjusting the size of images and changing the shape of graphics.

Process and method: In the practical process, students can create novel image synthesis works through multiple graphics or pictures; through the collection of data, collaborative learning with students, which can improve their ability to tasks completion ~~and~~, collaboration and mutual assistance.

Emotional Attitudes and Values: In the course of completing the tasks, students can develop the habit of self-exploration to tasks completion, collaboration and solve tasks solving;; enhance the aesthetic sense and moral and legal awareness through browsing relevant excellent pictures.

5. Conclusion

The task-driven teaching method is a kind of method based on constructivism theory, which requires the task and goal of teaching situation, and creates with real task exploration for students. In this process, the students will continue to get a sense of achievement, and teachers can stimulate their desire for seeking knowledge, and gradually form a virtuous cycle of perception mental activities, which can cultivate independent exploration, and the courage to forge ahead self-study ability. Therefore, effective use of task-driven method in class can improve the teaching efficiency.

The content of information technology requires students to boldly try to find out the mysteries through the exchange of operation and practice. The research shows that using the task-driven method for classroom teaching, students give a high interest in learning, through the design of related tasks, learners have more time devoted to the process of self-exploration. In the process of completing tasks with groupmates, they also strengthen the awareness of cooperation and idea-exchange among students. This method is convenient for students to integrate their knowledge

and skills and solve practical problems. Maximize the overall information literacy of students.

Acknowledgments

The authors acknowledge the National Natural Science Foundation of China (Grant: 111578109), the National Natural Science Foundation of China (Grant: 1111121005).

References

- [1] Song, Weina. *Process heuristic didactics to information technology application and thinking course* [J]. *China audio-visual Education*, 2009, 4(4): 105-111.
- [2] Xu, Fuyi. *Learning and teaching in the Information age* [J]. *Audio-visual Education Research*, 2007, 12(21): 90-96.
- [3] Harris S E, Brightman H J. *Design implications of a task-driven approach to unstructured cognitive tasks in office work*[J]. *Acm Transactions on Information Systems*, 1985, 3(3):292-306.
- [4] Gang G, Siewerdsen J, Stayman J. *TH-CD-207B-09: Task-Driven Fluence Field Modulation Design for Model-Based Iterative Reconstruction in CT*[J]. *Medical Physics*, 2016, 43(6):3890-3891.
- [5] Diamant I, Klang E, Amitai M, et al. *TASK DRIVEN DICTIONARY LEARNING BASED ON MUTUAL INFORMATION FOR MEDICAL IMAGE CLASSIFICATION*. [J]. *IEEE Transactions on Biomedical Engineering*, 2016, PP(99):1-1.
- [6] Li K, Niu K, Wu Y, et al. *TU-EF-204-05: Task-Driven Cerebral CT Perfusion Imaging*[J]. *Medical Physics*, 2015, 42(6Part34):3621-3621.
- [7] Dehghan A, Kovacevic A, Karystianis G, et al. *Combining knowledge- and data-driven methods for de-identification of clinical narratives*[J]. *Journal of Biomedical Informatics*, 2015, 58(2):S53-S59.
- [8] Hanák A I, Herout A, Zemcik P. *Acceleration of detail driven method for hologram generation*[J]. *Optical Engineering*, 2010, 49(49):578-578.
- [9] Jia X, Meng M Q H. *A survey and analysis of task allocation algorithms in multi-robot systems*. [J]. *Neuroimage*, 2014, 84(1):141-158.
- [10] Chen Z, Calhoun V D. *Task-evoked brain functional magnetic susceptibility mapping by independent component analysis (χ ICA)*[J]. *Journal of Neuroscience Methods*, 2016, 261:161-171.
- [11] Li H, Chen H, Dolly Set al. *An integrated model driven method for intreatment upper airway motion tracking using cine MRI in head and neck radiation therapy*[J]. *Medical Physics*, 2016, 43(8):4700-4711.