

The practice of “Task-driven Small-step Fast-forward Teaching Method” in Computer Course

<https://doi.org/10.3991/ijet.v13i04.8481>

Haibin Wang^(✉)

Xingtai Polytechnic College, Xingtai, China
seashorewang@qq.com

Hua Sun

Xingtai Radio and TV University, Xingtai, China

Juanjuan Gao

Xingtai Polytechnic College, Xingtai, China

Xia Liu, Haili Liang

Xingtai University, Xingtai, China

Abstract—Due to many factors, the quality of students in higher vocational colleges has fallen sharply. It's a question worth studying to get more students to listen, study, understand and learn in class. The traditional "task-driven teaching method" cannot fully adapt to the present higher vocational classroom teaching. This paper introduces the "task-driven small-step fast-forward teaching method" to improve the traditional "task-driven teaching method," and verifies with two courses in practice.

Keywords—small-step fast-forward; task-driven; teaching quality; student quality

1 Introduction

Colleges and universities were originally the product of elite education, but with the expansion of colleges and universities everywhere and the decline in the number of students in recent years, elite education has gradually become mass education. Since 2012, the development of higher vocational colleges has met with great challenges, among which the problem of students has become the bottleneck that restricts the development of every higher vocational college [1]. The decrease in the quantity and quality of students makes the survival of higher vocational colleges face a serious crisis, in which how to guarantee the quality of teaching under the current quality of students? How to get students interested in learning and understand and learning the knowledge is an important subject that every higher vocational teacher must and deserves study. In recent years, due to the decrease in the number of students and the expansion of some colleges and universities, high school students gradually meet a

lower threshold of college entrance examination. Basically, as long as students finished the high school, passed the high school entrance examination and applied for college entrance examination, they can attend a college or university. As a result of the two factors mentioned above and the decline of undergraduate grade line, as well as the influence of no-batch admission for junior candidates after 2012 in Hebei Province, the quality of students in even the national exemplary higher vocational colleges has been falling sharply in recent years. The proportion of separate recruitment further expanded in 2017 in Hebei Province, accounting for 70% of the total admitted junior college students, and even the admission score line of ordinary college students is generally around 300 points. It's popular in higher vocational colleges that teachers said: “I have finished my lectures but students are still sleeping unscrupulously”; while students said: “I woke up and the teacher is still saying nothing” [2]. As a young teacher of a higher vocational college, I think we can't complain too much about students who disobey, don't listen to lectures and study since it's the current situation of our students. What we should consider more is how to try every means to mobilize their enthusiasm, stimulate their interest in learning, arouse their love and cherish for the university from ourselves, and then they will naturally study.

Therefore, in view of the declining quality of students, how to make these lazy students raise interest, want to study, study, understand and learn is a problem that perplexes the teachers of higher vocational colleges in China as well as an important subject that deserves researching as necessary [3].

2 Problems Description

At present, the mainstream teaching method of higher vocational colleges is "task-driven teaching method based on action ability orientation", which refers to an action-oriented teaching method in which “complete action” and comprehensive professional ability that must depend on every teaching, "the training process of ability must have designed "around the selected task of training students' abilities, and students should be the main body in the whole training process [4]. The action-oriented teaching method doesn't emphasize the systematization of knowledge, but the practical working ability and problem-solving ability that learners should possess, with the purpose of promoting the development of learners' professional ability, and the core of unifying the action process with the learning process. It's essential to attach importance to the teaching of "case" in teaching practice, "solving practical problems" and "self-management learning" [5]. The biggest function of this teaching method is that it not only enables students to master professional skills more quickly, but also develops students' ability to solve practical problems, social ability to work together with people and innovative spirit [6]. Task-driven teaching method refers to the task-oriented teaching method, which divides the teaching knowledge into several tasks according to the work process and work needs, and the classroom teaching develops around the "teaching task." Teachers lead students with tasks, carry out task analysis, and explain the necessary knowledge points to guide students to independently, spontaneously, enlightening and actively complete teaching tasks, and finally teachers summarize and

analyze the tasks [7]. The "task-driven teaching method" has greatly stimulated the interest of the students for a long time, and has also achieved good results. But for the current students, "task-driven teaching method" also presents its own problems: it's very difficult for students to use two classes to complete a teaching task under the guidance of teachers, that's, this teaching method is difficult to promote and implement to a large extent. It's necessary to introduce new teaching methods or improve the "task-driven teaching method" in order to guarantee classroom teaching and the quality of teaching students of poor quality [8].

The "task chain and knowledge chain small-step fast-forward teaching method" was first introduced by Professor Liu Qinghua of Vocational Institute of Xingtai Polytechnic College through one of the first demonstration schools of China. Professor Liu used many articles and works to illustrate the basic characteristics of this teaching method, and formed a strong teaching research and reform team in the institute to provide related research information. After careful study, I found that this is a measure that I have been exploring and carrying out experimental implementation in my teaching work in recent years, but there is no systematic and inductive teaching ideas and methods, and this has been a teaching method that I want to define.

3 Task-driven Small-step Fast-forward Teaching Method

Task-driven Small-step Fast-forward Teaching Method is the expansion and extension of “task-driven teaching method”, the re-research and expansion of task-driven teaching method, dividing a large teaching task into several small tasks according to the specific situation task-driven teaching method, and each task is independent but has a certain correlation, and follows a step-by-step process. Through the completion of small tasks, students finally achieve the goal of completing a large task. The division of tasks reduces the requirements for students as well as the difficulty, and students will have "sense of acquisition" and "sense of achievement" in the process of completing small tasks, so as to stimulate students' interest in learning, promote students to want to study, study, understand, and learn, getting better-adapted to the current situation of students in higher vocational schools. In the teaching process, the author has been exploring and implementing the task-driven small-step fast teaching method. After reading the materials provided by Professor Liu Qinghua, the authors have a clearer train of thought, and has achieved some teaching achievements in recent two years' teaching. A simple analysis and elaboration shall be carried out with one task respectively in "computer assembly & maintenance" and "Linux system management". In the implementation process of Task-driven Small-step Fast-forward Teaching Method, authors divide the process into three stages according to their own practical teaching, the first step is to help, the second is to observe and the third is practice by students themselves. The first step adopts four-stage teaching method, the second step adopts modern four-stage teaching method and the third step uses the project teaching method. In other words, three stages are divided according to the stages in which tasks are undertaken by carriers, and different teaching methods are adopted at different stages.

The design of teaching mode is based on four-stage teaching method, the design and development of student performance management system serves the carrier throughout the teaching process, designing the learning situation to reproduce the work environment of the enterprise. The tasks are divided according to the development flow of the project, the task chain is designed and divided according to the specific situation to constantly make innovations in imitation.

4 Application of Small-step Fast-forward Teaching Method in the Course of Computer Assembly and Maintenance

(1) Task selection: “Assembly of computer host”.

(2) Task description: Assembly of computer host is an important part of the practical link of Assembly and Maintenance of Computer, aiming to enable students to get familiar with the basic hardware of the computer and its assembly process, and be able to master the troubleshooting methods of common computer failures. The task of this course is to disassemble all the components of the host computer and complete the assembly of the hardware of the host computer so that the computer can start correctly. Under the premise that the students have a certain self-binding force, the task of "computer host assembly" can be basically completed in two classes. But for many students almost without self-discipline in recent years, it's impossible to complete such a large task throughout the course, and they may disassemble and assemble in a symbolic way and then go to play and sleep.

(3) Task guidance and split-up:

From this session, I will take about 10 minutes to guide the course. The basic idea is, based on repurchasing the hardware such as mainboard, CPU, memory and hard disk, to put forward the task, that's, how to assemble the hardware together so that the computer can work normally.

Task name: Assembly of computer host

Sub-task 1: Disassembly of the host (10 minutes); **Sub-task 2:** Assembly and test of host model (15 minutes); **Sub-task 3:** Assembly of Main hardware of host computer (15 minutes); **Sub-task 4:** Assembly of power line, data line and signal line (10 minutes); **Sub-task 5:** Test and rectification of host computer (15 minutes)

(4) Task implementation

Step one: It takes 10 minutes to learn new and guide the task of this lesson.

Step two: Give the student about 10 minutes time to completely disassemble the prepared computer host and in this process the timing method can be used for the urging and the supervision. This process is used to complete Sub-task 1.

Step three: After the students complete the disassembly, I took out some basic hardware: motherboard, CPU, memory, and power supply, and bring the students together. Starting from asking questions: what's computer host? Is it computer case? Motherboard? Then, I show a real computer host for my students. I take out several prepared computer hardware, quickly assemble together (without using the computer case), form the most basic model of the computer, let the students plug in the power

supply, and quickly click the starting switch on the mainboard with a screwdriver, the computer model will run normally (it takes about 10 minutes for this step).

Step four: Give the student about 15 minutes to personally experience the assembly of the computer host model, and carry out the test. This process is used to complete Sub-task 2.

Step five: After the completion of the basic model of the computer, it takes about 5 minutes for communication and interaction, so that students say their feelings, when the computer runs only with one gentle click by a screwdriver without main switch and computer case. Then students will ask if the host can be used? Of course, yes, but it's not convenient to use. Then the third Sub-task shall be introduced. It takes 10 minutes to assemble the hardware of the host to the computer case, and give the considerations of the assembly process.

Step six: When the main hardware assembly is completed, the students will be upset for the complicated lines inside the computer case, and then the teacher takes about 10 minutes to classify and explain the lines inside the computer case. The lines in the computer case can be divided into three kinds: power line, data line and jumper. The teacher explains the uses of the three lines one by one, especially explains and demonstrates the assembly methods and matters regarding the three lines. Then the fourth Sub-task is introduced, that's, assembly of power line, data line and signal line. It takes about 15 minutes.

Step seven: After most students have finished the fourth Sub-task, the fifth Sub-task shall be introduced: whether you assemble it correctly or not, and whether the computer can run, so the fifth Sub-task "host test and rectification" is introduced. This Sub-task takes 15 minutes.

Step eight: It takes 5 minutes to summarize the tasks of this lesson. It is clear to everyone that through the efforts of two classes, most students have completed the task of "computer hardware assembly," and put forward the existing problems and measures for improvement.

(5) A summary of the tasks

The implementation of the assembly task of the computer host belongs to the core problem of Assembly and Maintenance of Computer. If the traditional task-driven teaching method is adopted to organize the implementation of the classroom, there will be many problems. The implementation of the small-step fast-forward teaching method can not only improve the students' interest, but also enable students to accomplish the established tasks in a relaxed and happy atmosphere, which can make the students full of gains and stimulate the students' interest.

5 Implementation of the Small-step Fast-forward Teaching Method in Linux System Management

(1) Task selection

“Dynamic expansion and reduction of disk using LVM technology”.

(2) Task description

Linux System Management is a basic course for the major of mobile interconnection, focusing on how to assemble, use, configure and manage Linux operating system by using commands. Dynamic expansion and reduction of disk using LVM technology” is the task of disk advanced management in Linux System Management.

(3) Task guidance and split-up

Traditional disk management problem: When the partition size is not enough to expand the size, the space can only be expanded by increasing the disk and creating a new partition. However, the newly added disk is an independent file system, and the original file system has not been extended effectively. In order to achieve the purpose of file system expansion, it’s the only way to export the file system in the small disk to the file system in the new disk.

Now students have basically used cloud disks, which are more than 2 TB mostly, but it is impossible for any cloud service manufacturer to buy many hard disks, then divide a large hard disk into two TB space, and label as someone's hard disk, but to use a dynamic management technology to achieve

In addition, ask the students to think about a problem. No matter how big the hard disks of these cloud manufacturers is, sooner or later, they will be full some time. Then ask: "Have you ever met the notice of turning off the computer for changing the hardware in using Baidu, 360 and other cloud services?" Of course not. Because these cloud service manufacturers are using a dynamic management technology for disk management.

Therefore, it is the task of this class to achieve dynamic expansion and reduction of disks without affecting the normal use of disks, no offline, and no data loss.

Task name: Dynamic expansion and reduction of disk using LVM technology

Sub-task 1: Create a dynamic managed disk LVM; **Sub-task 2:** Dynamic expansion of disk; **Sub-task 3:** Dynamic reduction of disk; **Sub-task 4:** Expansion and reduction of disks using graphical interface.

(4) Task implementation

a. Knowledge explanation

LVM logical volume management can encapsulate the underlying physical disk abstractly and express it to the upper system in the form of logical volume. The size of the logical volume can be dynamically adjusted without losing the existing data. The newly added disk will not change the logical volume of the upper layer.

LVM technology manages disks through PV, PV, VG, and LV. The physical disk is formatted into PV, the space is divided into PE; different PVs join the same VG, PE of different PVs all joined the PE pool of VG; LV is created based on PE, with the size of integer times of PE, and PE of LV may come from different physical disks; LV can be directly formatted to use LV; expansion of LV is actually to reduce or increase the number of PE’s LVs, without the data lost in the process.

b. Task realization

Sub-task 1: Create a dynamic managed disk LVM

Step 1: Building a logical volume pvcreate /dev/sdc /dev/sdd vgcreate yidong /dev/sdc /dev/sdd

Step 3: Building LVM based on volume group `Lvcreate -n jisuanji -L 10G yidong`

Step 4: Building a file system and formatting LV `mkfs.ext4 /dev/yidong/jisuanji`

Step 5: Mount use `mount /dev/yidong/jisuanji /guazai`

Sub-task 2: Disk dynamic expansion

Step 1: View free space `vgdisplay`

Step 2: Add 10G to the logical volume `lvextend -L +10G /dev/yidong/jisuanji`

Step 3: View the expanded LV size `lvdisplay`

Step 4: Update file system `resize2fs /dev/yidong/jisuanji`

Step 5: View the updated file system `df -h`

Sub-task 3: Disk dynamic reduction

Step 1: View free space `vgdisplay`

Step 2: Un-mounted the mounted logical volume `Umount /dev/whb/mylv`

Step 3: Reduce the file system (fsck -f) `resize2fs /dev/whb/mylv 1G`

Step 4: Reduce the size of LV `lvextend -L -1G /dev/whb/mylv`

Step 5: View the reduced LV `lvdisplay`

Step 6: Mount `mount /dev/whb/mylv /mnt/`

Due to space, the implementation of other tasks will not be repeated.

5.1 A summary of the tasks

The explanation of LVM logical volume technology is a complicated problem in Linux System Management. The implementation of "task-driven teaching method" has great problems for current students. The authors adopted task-driven small-step fast-forward teaching method in recent years' teaching practice, dividing the big task of dynamic expansion and reduction of disk using LVM technology into four small tasks, so that students can easily complete each small task on average 20 minutes, and finally complete the big task, the dynamic expansion and reduction of the disk through the completion of small tasks.

6 Conclusions

In the context of the rapid decline in the quality of students, the traditional "task driven teaching method" cannot be fully in line with the present teaching. The task-driven small-step fast-forward teaching method is improved based on the traditional task driven teaching method, further subdividing the big task into a number of sub-tasks, and the students accomplish the big task indirectly in the process of completing the sub-tasks one by one. This method can be well adapted to the current situation of the students, and it is a good choice. In recent years, the authors have been exploring and practicing this teaching method, and has given the practical steps through the two tasks of the two courses. The task-driven small-step fast-forward teaching method further applies the leading idea of integrating teaching and learning into the practical teaching, and through practical classroom implementation, the reform of the curriculum has made certain achievements with good teaching effect.

7 References

- [1] Sun, Z.Y, Shu Y.X. (2017). Analysis of Blended Learning Scheme Based on Cloud Computing Assisted Instructions. *International Journal of Emerging Technologies in Learning*, 11, 52-56.
- [2] Chuenyeh, R., Chen, Y.C., Kuo, S.H., Chung, P. (2011). The Effect of Problem-based Learning on Enhancing Students’ Workforce Competence. *World Transaction on Engineering and Technology Education*, 9(4), 380-385.
- [3] Zhang, E.W., Zhang W.M., Jin, C.X. (2018). SPOC-based Flipped Classroom of College English: Construction of an Effective Learning Model. *International Journal of Emerging Technologies in Learning*, 14, 37-47. <https://doi.org/10.3991/ijet.v13i01.7513>
- [4] Tu, X.H. (2012). Research on the goal and connotation of higher vocational education at the undergraduate level. *Vocational and technical education in China*, 27,15-20.
- [5] Ma, J.F. (2015). Vocational education responsibility and action strategy for new vocational farmers. *Research on the development of Education*, 1, 73-79
- [6] Wu, F. (2016). The performance analysis and improvement path of enterprise training in Vocational Colleges and universities. *Education Research*, 70-76.
- [7] Wang, S.R. (2013). In Adhering to the Scientific View of College English Teaching Reform, *Foreign Language World*, 27(6), 9-13.
- [8] Shu, D.F. (2014). Problems and Several Research Projects in English Classroom Teaching, *Foreign Language Teaching and Research*, 46(3), 446-455.

8 Authors

Haibin Wang is an associate professor at the Xingtai Polytechnic College. He was born in Xing tai city, Hebei province of china in 1982; Research direction: The application of virtual reality technology, Software design and development, Research on the teaching method based on task driven.

Hua Sun is a lecturer in Xingtai radio and Television University. she was born in Xing tai city, Hebei province of china in 1982. Research direction: Software design and development.

Juanjuan Gao is an assistantship in the Department of information engineering at the Xingtai Polytechnic College. she was born in Zhang Jiakou city, Hebei province of china in 1990. Research direction: Website design and construction.

Xia Liu is a lecturer in the school of mathematics and information technology at the XingTai University. she was born in Xing tai city, Hebei province of china in 1982; Research direction: The security of network.

Haili Liang is an associate professor in the school of mathematics and information technology at the Xingtai University. she was born in Xing tai city, Hebei province of china in 1982; Research direction: Software Engineering.

Article submitted 20 February 2018. Final acceptance 25 March 2018. Final version published as submitted by the authors.