

## Application and Effect Analysis of Task Driven Teaching Mode in the Course Teaching of Automation Specialty

BAI Duanyuan<sup>[a],\*</sup>; ZOU JI<sup>[b]</sup>; ZHANG Chao<sup>[b]</sup>

<sup>[a]</sup>Changchun University of Science and Technology, Changchun, China.

<sup>[b]</sup>Changchun University, Changchun, China.

\*Corresponding author.

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### Abstract

This paper discusses the application of task driven teaching mode in the teaching of automation major courses. Select the main course of automatic specialty, establish the task specific content, establish the tasks, set up teaching assistant platform. Establish the task driven teaching mode and applied it to teaching practice, then explore the application effect.

**Key words:** Task driven teaching mode; Automation major courses; Application effect

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### INTRODUCTION

At present, the initiative of the students learning has become a significant problem in the international higher education. Therefore, in order to improve the students' learning autonomy, the task driven teaching mode is increasingly recognized and promoted by domestic and foreign colleges and universities. But there are still some problems, such as "Understanding of the" task driven "teaching mode is insufficient; the task is too large; the relationship between teachers and students in the task driven teaching mode is too vague.

The concept of automation is very early, but it was not until the establishment of the control theory in 1940s.

Lyapunov stability theory, PID control law concept, feedback amplifier, Nyquist and Bode chart in early twentieth Century. In the middle of twentieth Century, the "control theory" of the Wiener professor of MIT (MIT) marked the formation of control theory. In some developed countries, the university does not set up a separate automation professional, it is integrated in other disciplines. For example, the world's leading MIT, the Engineering Institute of the establishment of Aerospace Engineering, electrical engineering, computer science and engineering, biomedical engineering and other 12 professional. We can not find the shadow of automation, but the principle of automatic control is a compulsory course for computer science and other professional. For similar to some of the domestic professional courses, the United States and the United States is to divide the task type teaching unit, they pay more attention to the students use the computer to solve practical problems and the ability to complete the task. Jane Willis more influential, he outlined the a teaching model, task driven teaching includes three stages: pre task activities, task planning report in the planning stages, analysis and practice stage. Due to the short research time, the research on the application of task driven teaching mode in the course of information technology is not perfect, there is still a long way to go.

At present, there are mainly the teaching mode of the course of automation specialty at home and abroad: network environment, research study, independent exploration, interactive collaborative learning, subject teaching, stratified teaching, based on problem based learning, etc.. Among them, "task driven" is a kind of teaching mode which has received much attention in recent years. Domestic scholars put forward their own task driving teaching process: the Research Institute of modern education technology, Beijing Normal University, Professor Kekang He proposed "teaching goal analysis—Situation Creation—Information Resource Design—

self study design—the design of cooperative learning environment design—the order of study effect evaluation and design; Fengping Ai of the Chengdu Institute of Education Science and the mode of “task driven, teacher and student discussion, task completion, effect evaluation, summary”.

Task driven teaching mode is the latest outcome of developments of 20th century

college education in the West since the 80's and it also is the latest developments. Pattern recognition is the scientific discipline whose goal is the classification of objects into a number of categories or classes. Pattern Recognition has a long history, but before the 1960s it was mostly the output of theoretical research in the area of statistics. This paper select the Automatic Control Theory, Power Drive Automatic Control System, Pattern Recognition Introduction, Automation Technology and Applications, such automation professional courses. After visiting the industry peers and experts, determine the main research contents of the course. Carry out the studies according the train of thinking shown in Figure 1.

## 1. EXAMPLE OF TASK DRIVEN TEACHING MODE FOR AUTOMATION SPECIALTY

According to the classification of task driven method, we can classify the students' personality characteristics, cognitive structure and knowledge structure according to the theory of achievement motivation:

(a) According to the theory of achievement motivation, the task drivers can be divided into three kinds:

i) Cognitive drive. Cognitive drive is the study of the cognitive drive as the core driving force.

ii) Self enhancement drive. Self enhancement is driven by self enhancement of the internal drive as the core of the driving force of learning.

iii) Affiliative drive. Affiliative drive is a kind of need to win the approval of others (e.g., parents, teachers, role models), and it is a kind of extrinsic motivation. Students get their academic achievements, not to take it as a means to win, but to win praise and recognition from others. Students get their academic achievements, not to take it as a means to win, but to win praise and recognition from others.

(b) Considering the characteristics of students' personality, cognitive structure and knowledge structure, the task is divided into: closed task and open task.

Closed type tasks and and type of task represents the typical features of the

task type, in between the two, there are still different closed type or degree of openness can refer to the two typical characteristics to recognize them, and can not be too absolute. Because the two tasks have different characteristics, the function of the two different. “Task” design should be to closed task to pave the way, improve the students' basic skills, and put task-based upgrade, improve students' comprehensive use of chemistry knowledge to solve practical problems, many aspects improve students chemical knowledge, to cultivate students' scientific literacy.

In the establishment of a project to automate the course of the implementation of the program, a specific teaching scheme design, can consider the following task driven model:

(a) In the course of Automatic Control theory and other basic courses, we can use the closed type project driven inquiry teaching mode.

(b) Motion Control System, Pattern Recognition (professional course), we can use of closed and open project driven inquiry teaching mode.

(c) In automation technology and application (general knowledge courses), we can use open project driven inquiry teaching mode.

### 1.1 Setting Up the Task

Take motion control system corse teaching for example, is shown in Figure 2, set up Longmen planer control as a task situation. Setting task content as:

Task 1, If Speed regulation index,  $D=20$ ,  $s=5\%$ , could open-loope achieve both the speed regulation index? If achieve the index, solving the speed drop value.

Task 2, Longmen planer is often in reversable operation state, how to achieve the ideal start?

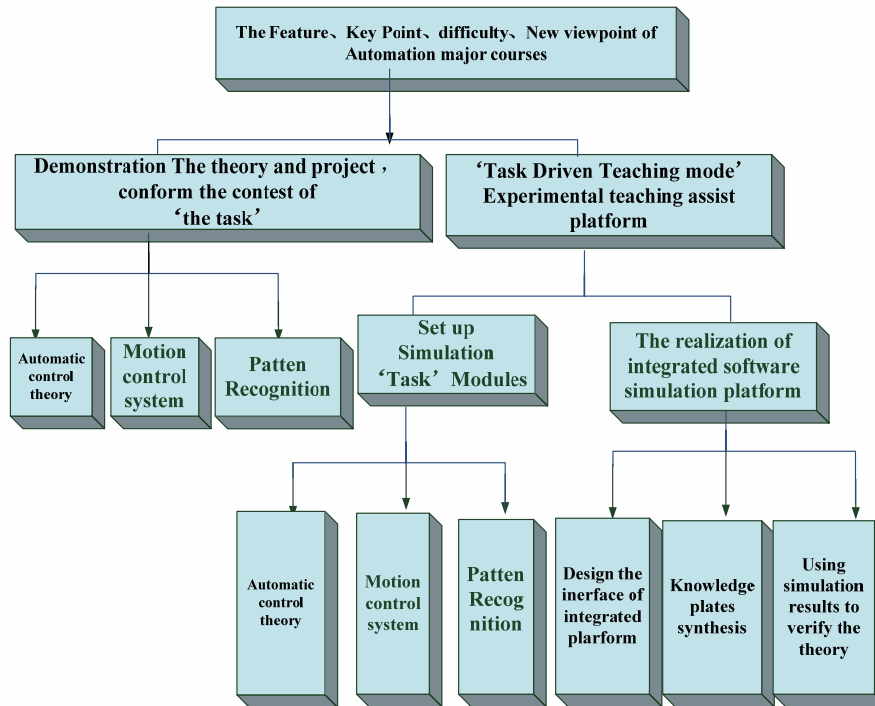
Task 3, Consolidate strengthening exercises, when

(a) Load suddenly reduce,

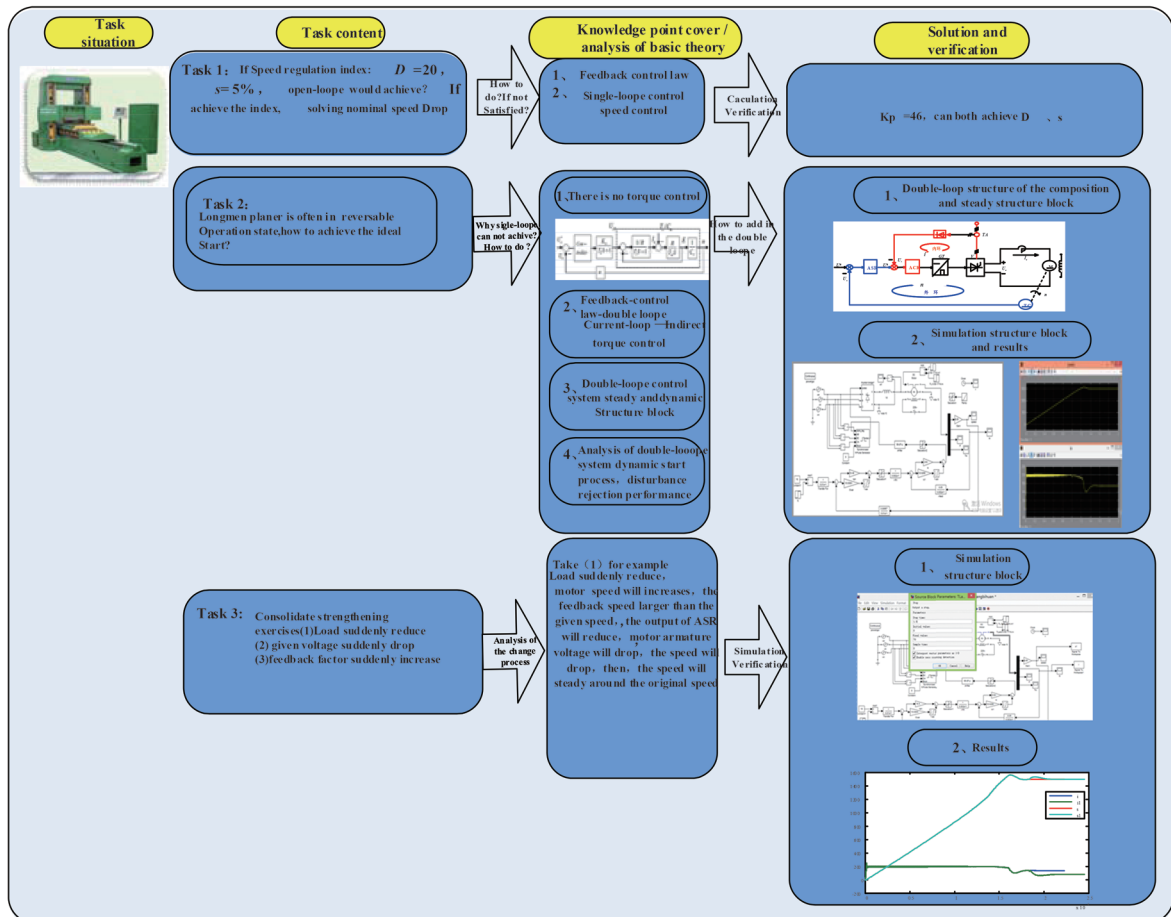
(b) Given voltage suddenly drop,

(c) Feedback factor suddenly increase.

Analysis the changing process and set up the simulation block, get simulation result.



**Figure 1**  
**Implementation Plan of Task Driven Teaching Mode for Automation Specialty**



**Figure 2**  
**Example of Task Driven Teaching Mode in Motion Control System Course Teaching Practice**

## 1.2 How to Interspersed Knowledge With a Task

In this example, Task 1 cover the knowledge point of feedback control law and Single-loope control speed control.

Task 2 guide students to think about why single-loope cannot achieve both the speed regulation index? The answer is there is no Torque control. Further, how to achieve torque control? The answer is add in another closed-loop to control current, indirect to control torque. Then, encourage students to reflect further on the composition and the structure of the double-loop control system. Next, analysis of double-loope system dynamic start process, disturbance rejection performance.

Task 3 help students accomplish some strengthening exercises.

Introduction of teaching aids software platform into the whole process of task-driven teaching model, complete theory for analysis and results of verification.

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## 2. THE TEACHING EFFECT

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### 2.1 Automation Professional Courses “Task-Driven” Teaching Mode Based Teaching Aids Platform Helps to Stimulate Student Interest in Learning

In this thesis we put the “task-driven” teaching method implemented in automation specialty main courses, such as Automatic Control Theory, Electric Drive Control Systems, Pattern Recognition Introductory courses. Different from the previous passive acceptance of the teacher, Students can actively participate in the whole teaching process in class and after class. Students and teachers are more frequent interaction. The students also have a deeper problem, and the cycle of tracing a knowledge point is obviously prolonged.

### 2.2 “Task-Driven” Teaching Mode Helps to Improve Student Achievement

We classify the students who participate in the same curriculum, in the same class, according to the number of interaction with teacher in the class, after class. The students who interact with teacher more than 5 times, we defined as “active participants”; The students who ineract with teacher below 5 times and higher than 2 times we defined as “ inefficient participants”,. the students who interact with teacher under “2 times” , we think they are “invalid participants”. Through the comparison of interactive content we found quite a number of “effective participants” of students interactive content knowledge gradually deepened, gradually widening the scope of knowledge, eventually results in course assessment is relatively higher; and the “invalid participants” course assessment of the results were generally low. This shows that the “task driven” teaching mode has a positive

effect on the improvement of students’ performance in automation specialty class teaching. On the other hand, the students who take the initiative to study are generally good, but also from the number of participating in this teaching mode is also verified this teaching mode is more popular with the excellent students. In addition, tracking the graduation design results of the 2015 graduates, the “active participants” in the graduates get better results.

### 2.3 “Task-Driven “ Teaching Mode Helps to Develop Students’ Abilities

Take Motion Control System, for example, this curriculum is more comprehensive, more difficult, less classroom interaction, in the past, when students are learning to listen, rarely involved. The “task-driven” teaching mode, can integrate more dispersed knowledge in a teaching task that requires students make integrated use of key knowledge points to complete the task, thus effectively mobilize the participation of students consciousness. To complete the task but also cultivate students’ comprehensive ability. This process also extends to homework assignments outside the classroom, professional experiment, course design and other aspects of the graduation design. With teaching aids platform can very well be “Task-driven “ teaching mode extended after class, the feedback of teaching practice is good.

### 2.4 “Task-Driven “Teaching Mode Helps Smooth Convergence of Undergraduate Training and Postgraduate Training Phase

In the actual teaching course, we found that, the students who are willing to continue their studies in the domestic and international studies can be more active to accept the task and actively cooperate with the teacher to complete the teaching process of longer periods. Even the automation professional courses has ended, these students still maintain a good interaction with the teachers, continue and increase the Effect of “Task-driven” teaching mode. At the same time, the ability of students has gradually been improved, and lay a good foundation for the future study, in the undergraduate stage, it can be expected to complete the transition of undergraduate training to graduate students. Taking the graduate students study in the Department of automation of Changchun University of Science and Technology in 2015 as an example, this batch of graduates from the beginning of Junior, experience the complete cycle of the project “task driven” teaching mode. Their received schools are Tsinghua University, Zhejiang University, Harbin Institute of Technology and other domestic first-class university. And some students successfully get foreign graduate school qualifications. The results of this batch of graduates were significantly better than in previous years.

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## CONCLUSION

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This article is intended to integrate the core content of the course of automation, the task as the main line of, the teacher as the dominant, the students as the main body, the creation of the task of the course of automation professional; To establish the target task, the task of differentiation, and the task of establishing stage; Analysis task, try to solve the possible solution, the output of the process of the implementation of the task driven method. Taking concrete knowledge content as an example, this paper expounds the process of implementing the task driving method in the automation specialized course teaching. Analyzing the relationship among the students' performance in the classroom, the completion of homework and the relationship between the results, the graduation and the entrance rate, the effectiveness of the method in the teaching of the course of automation specialty is verified.

Task-driven, need to complete a number of tasks associated with the discipline to learn and develop skills. Task teaching method is very suitable for the specialized course teaching process of Automation Major Courses. Facts have proved that the task driven teaching method can get better teaching effect.

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