PDMF Process Management of Undergraduate Graduation Design (Thesis) for Excellent Engineers Education Training Plan

Xin YANG*, Sheng-you XU, Yu-gang SU and Yue SUN

Chongqing University, Chongqing, China

*Corresponding author

Abstract. The quality of undergraduate graduation design (thesis) directly influences the quality of undergraduate talents developing and the teaching level for excellent engineers education training plan (EEETP). This paper introduces the practice and some experience of PDMF graduate design (thesis) process management for the automatic majors in EEETP, and has been applied to the graduation design guidance of the Automation College of Chongqing University, and achieved good implementation results.

1. Introduction

As the most basic talent development system of information technology, undergraduate graduation design (thesis) is of great significance to ensure the training quality of college talents in EEETP. And appropriate graduation design guidance plays an important role in the undergraduate career after graduation [1, 2]. Undergraduate graduation design (thesis) can be a summary of undergraduate knowledge on the one hand, and on the other hand, it can laying the foundations to enter the industry or continue to study.

Automation majors mainly teach the basic knowledge of automatic control theory and basic methods of control system design, develop students 'ability to solve practical engineering problems. As the last link of undergraduate talents training, undergraduate graduation design (thesis) directly reflects the quality of undergraduate talents training in EEETP and the teaching level of the university [2, 3, 4].

Therefore, this paper proposes to improve the quality of automation undergraduate graduation design (thesis) for EEETP by establishing PDMF process management model [5, 6]. The structure of the undergraduate graduation design (thesis) process management for EEETP based on PDMF feedback is shown in the Figure 1[6].
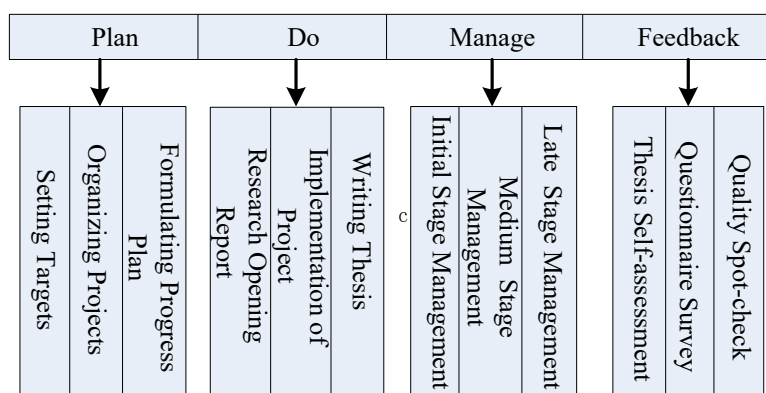
Figure 1. The Structural Framework for Process Management Based on PDMF

The characteristics of this management model are that quality management and improved feedback are seen as a cycle in the order of Plan, Do, Manage, and Feedback. In this management model, the design (thesis) target planning, design (thesis) implementation, design (thesis) process management

and design (thesis) evaluation feedback are carried out under the conditions that fully meet the requirements of undergraduate quality training.

2. Planning Target of Undergraduate Graduation Design (Thesis)

This stage is mainly formulate the goals of undergraduate graduation design(thesis), and determine the measures and schedule to achieve these goals based on the needs of students and talent markets. The planning stage consists of three steps: setting targets, organizing projects, and formulating progress plans.

2.1 Setting Targets

The problem of selecting the projects of undergraduate graduation design (thesis) is actually a problem of training what type of talents for EEETP. At present, the location of undergraduate graduate design (thesis) is not clear. Most of projects pay attention to academic and other theoretical topics, and despise industry applied topics [2,7]. This kind of orientation is not conducive to the training diversified talents in Chinese colleges and universities. According to the future flow of automation professionals and EEETP requirements, there are two main goals for the development of automation talents:

(1) Research Talents Training

The goal is to cultivate research and academic talents with broad basic knowledge, high comprehensive quality and good self-learning ability. Such students do not work directly after graduation, but receive higher education.

(2) Engineering Applied Talents Training

The goal is to train engineering practical talents in industrial automation, chemical automation, thermal automation, logistics automation and so on. After graduation, such students will enter the company to work in automation engineering projects.

2.2 Organizing Projects

According to the target setting of talents training in EEETP, there are three sources for selecting the projects of graduation design (thesis).

(1) Academic Research Projects

These projects are mainly about the research of control theory and the basic problems involved in automatic control theory, the stability of control system, the dynamic and steady performance of control system, the analogy problems of typical problems in automatic control theory, predictive control, functional control, neural network algorithm and so on. Through these topics can lay a research foundation for students to enter the postgraduate stage.

(2) Project Application Projects

These projects are mainly applied to engineering and come from the production line. It not only improves students' interest in learning, but also cultivates students 'ability to solve practical problems.

(3) Invention and Creation Projects

These projects are mainly based on innovative practical projects, and come from innovation projects and inventions in actual production and life. Through their own efforts, students aim to create technology as their goal, carry out serious scientific and technological inventions, and have achieved results.

2.3 Formulating Progress Plan

According to the requirements of personnel training in EEETP and relevant regulations of the university, within a limited time period, the progress plan for students to complete undergraduate graduation design (thesis) is formulated. This progress plan includes the deadline for completion of each phase, as well as the critical node for inspection time.

2.4 Doing Projects of Undergraduate Graduation Design (Thesis)

At this stage, according to students own interests and future development plans, they choose their own research project, and enter the implementation stage of the design (thesis). The implementation process for this phase is shown in the Figure 2.
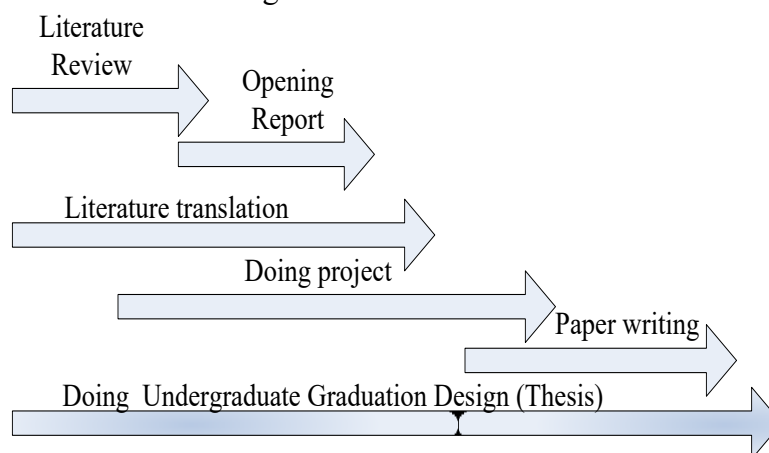
Figure 2. The Process Diagram for Doing Undergraduate Graduation Design (Thesis)

3. Process Management of Undergraduate Graduation Design (Thesis)

Process management is the management of the process and is an important part of the management to achieve the targets. The undergraduate graduation design (thesis) process management is mainly to conduct quality control at each node of the undergraduate graduation design, establish the undergraduate graduation design (paper) process performance measurement method and process control method [7,8]. Through each details in the process, to improve the overall quality management of undergraduate design (thesis) for EEETP, and achieve continuous improvement and innovation.

3.1 Initial Stage Management

After the students carry out the design project selection, according to the requirements of the project description, it is necessary to seek a method to achieve the design (paper) through reading a large number of related literatures and understanding of domestic and international trends. At this stage, the student must complete the literature review, the opening report and the foreign Literature translation.

The process management at this stage is mainly to ensure that students correctly understand the project description, supervise students to complete a sufficient amount of literature review, and improve students 'design and implementation plans. It is mainly managed through periodic inspection of design document, student-teacher interviews record, and open report quality evaluation document

3.2 Medium Stage Management

The middle stage is mainly the program implementation stage for students to carry out graduation design (thesis). The mid-term inspection mainly focuses on the management and inspection of "the progress of the project, the innovation points of the project, the difficulties existing in the process of the project, and the solutions". It is mainly managed by regular design progress report, student-teacher exchange record, and supervision checking record.

3.3 Late Stage Management

The late stage mainly checks whether the students' thesis is standardized, whether the documents are complete, whether the graduation design (thesis) defense preparation is adequate, etc. It is mainly managed through the standardization of graduation design (thesis) documents, the cross-review of graduation design (thesis), and the defense of graduation design (thesis).

4. Evaluation Feedback of Undergraduate Graduation Design (Thesis)

Evaluation feedback is mainly to solve the problems in the implementation and management of undergraduate graduation design (thesis) for EEETP, and to sum up experience and lessons. The automation college mainly collects feedback information to improve the management process through the following measures [9].

(1) Formulating "Self-evaluation Form for Undergraduate Graduation Design (thesis)". In this form, students and teachers through conducted self-evaluations on the projects selection, schedule, content, and format of undergraduate graduation design (thesis) to sum up their experience.

(2) Formulating "Undergraduate Graduation Design (thesis) questionnaire survey". Through this survey, authority can collect students' opinions on topics, teacher guidance, student harvest and other issues.

(3) Organize expert supervision team to spot check the graduation design (thesis) and conduct a comprehensive quality evaluation of the undergraduate graduation design (thesis).

Through the above methods, combing and summarizing the problems found in the inspection, summing up the experience in the implementation, and exchanging feedback on different situations, promoting the experience, so to put the next year's undergraduate graduation design(thesis) process management for EEETP into a virtuous circle.

5. Summary

In recent years, the College of Automation of Chongqing University has vigorously promoted and implemented the PDMF process management system for EEETP in order to ensure the quality of students' training and improve their professional quality. Through two years of implementation, remarkable results have been achieved, students' learning attitude has been rectified, the quality of graduation design (thesis) has been improved, and students' professional quality of automation has been strengthened.

Acknowledgement

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