

Research and Practice of Graduation Design Quality Assurance and Evaluation System

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Abstract. The theory and methods of both for quality management and standardized management, which have been implemented in modern enterprises successfully, is applied to the graduation design work in engineering colleges by combining the characteristics of engineering education and the principles of quality management and quality assurance. The teaching practices illustrate that the management of the graduation design become much scientific and effective. It also promotes a steady improvement in quality for graduation design work.

1. Introduction

Graduation design is an important part of universities education. It is an important reflection of the quality of talent training as well. In response to the fundamental changes such as: (1) the development of the economic system, (2) the new form of deepening graduation design reform, (3) ensuring and improving the quality of high education, *etc.*, both the management and teaching modes of graduation design work are required to research, reform and practice

The goal of research and practice is learning from the successful experience of modern enterprises in implementing the series of ISO9000 [1,2] related to quality management, quality assurance standards and the examples of its successful application in engineering education [3-5]. Then the management ideas and methods of providing by this series of standards were applied in the process of graduation design in engineering colleges. It mainly includes the following aspects: (1) attaching importance to engineering practice, integration, innovation; (2) strengthening the integration of theory with practice; (3) improving students' practical ability, comprehensive ability and innovation ability; (4) enhancing the cultivation of engineering practice ability of instructors and the accumulation both for scientific research and production practice experience; (5) overcoming the lacks of actual engineering knowledge, economic knowledge, and the engineering organization management knowledge in graduation design. At last, a graduation design quality management system is suggested to ensure the steady improvement of graduation design quality in higher engineering college. □

2. The Importance of Graduation Design Work in Engineering Colleges

Graduation design is an important part of the talent training plan in universities. It is an important reflection of the quality of talent training. Graduation design is not only a practical teaching link, but also an important training stage to achieve the study goals. It is an important process for deepening and sublimation of learning. It is also a comprehensive test of students' comprehensive quality and training effect. It still is a teaching process to carry out science education, to cultivate the scientific spirit of seeking truth, to strengthen engineering awareness, to carry out basic training in engineering, to improve scientific research ability and engineering practice. As well it is an important training stage for abilities and innovation. Totally, it is an important way to train students with excellent ideological qualities and professional knowledge. At the same time, the graduation design achievement has its social function of directly or indirectly

-serving for economic construction, production and scientific research.

3. Established the Quality Assurance System for Graduation Design

The quality of graduation design is one of the key items to evaluation the teaching quality of engineering colleges. They are the basis of graduation design to study the quality connotation of graduation design and to establish a quality assurance system for graduation design. Using the ideas of "Quality Management and Quality Assurance" series standards of modern enterprises under the new thinking of modern quality management, after the quality connotation and quality assurance of graduation design are studied, the quality policy, quality goals and quality elements of graduation design are proposed respectively.

3.1. Quality Policy

The graduation design must follow the laws of education and meet the training objectives and requirements of undergraduate education. It also need to combine the current development of the socialist market economy, to link scientific research, engineering technology practice, and to cultivate high-quality advanced engineering technology based on teaching practices and teaching management methods. At last, students can comprehensively improve their knowledge, abilities and qualities through the practical teaching link of graduation design. For engineering students, it is necessary to improve their comprehensive design ability, innovation ability and engineering practice ability. And also students' economic awareness ought to be developed.

3.2. Quality Goals

The quality objectives are suggested as following: students can comprehensively use their knowledge through graduation design to improve their ability during solving general engineering and technical problems. Students' basic skills in engineering drawing, design, calculation (including the use of computers) and reading skills in foreign languages ought to be to further developed. Students have a preliminary ability to engage in scientific research work or bear specialized skills through independent designing or researching on a certain technical issues. A correct design perspective, a theoretical and practical work style, and a serious work attitude ought to be trained for students during the period of graduation design.

The current reform of the training model and the widening specialties require special efforts to strengthen the comprehensive training of students' knowledge, abilities, and qualities in graduation design work. In particular, it is necessary to highlight the improvement of comprehensive design capabilities, innovation capabilities, and engineering practice capabilities. It is necessary to introduce the economic awareness.

3.3. Quality Elements

Applying management ideas and methods in the modern enterprises, based on educational laws, teaching practices, principles conducive to teaching quality management, and the basic requirements for teaching content of graduation design work, a graduation design quality assurance system is established according to the aforementioned quality policy and quality goals of graduation design work. It consists of eight organizational elements: thesis selection quality, teacher guidance quality, student learning quality, material security quality, engineering design quality, thesis writing quality, thesis defense quality, and organization management quality. □

4. Established a Quality Evaluation System for Graduation Design

By analyzing the current status of the graduation design of the college objectively, the purpose of the graduation design quality evaluation is to evaluate the level of the graduation design; then to find out the existing problems and to propose plans how to improve the graduation design teaching work efficiently by summarizing the results and experience; so that the purpose of quality control of graduation design can be reached. □

The guiding ideology of establishing a quality evaluation system is the combination of science and feasibility, the combination of qualitative and quantitative, the combination of basic indicators and improvement indicators. The evaluation indicator system should have a certain direction in order to fully motivate teachers, students and management staff. □

Based on quality elements of the graduation design, according to the principles of scientificity, operability, orientation and comparability, present graduation design quality evaluation system include eight evaluation items. They are thesis selection quality, teacher guidance quality, student learning quality, material security quality, engineering design quality, thesis writing quality, thesis defense quality, and organizational management quality. Furthermore, eight evaluation items are subdivided into twenty-seven evaluation items. Every item was assigned itself weight coefficients.

5. Organization, Implementation and Quality Monitoring

The teaching quality of graduation design is an important index to evaluate the effectiveness of school teaching work. And it is also an important source of information for feedback on teaching quality information. It is of great significance to improve the teaching quality monitoring system, optimize the process of talent training, and improve the quality of talent training. The system of quality assurance and evaluation is very important to ensure the quality of the graduation design.

In present teaching practice, a set of effective practices were explored as following. First, the organization and leadership of graduation design work is strengthening. A three-level teaching management system, which is constituted by college, department and teaching office, is the main body of graduation design teaching. A clear division of tasks has been established. Then, the graduation design work process is standardized. The management of graduation design implements the combination of target management and process management. Regarding process management, the various processes of graduation design work were standardized including to clarifying the purpose and implementing it on schedule.

During the implementation of graduation design management, graduation design works in every engineering college was formulated regulations as a policy and regulatory document for management according to the teaching characteristics. Each department, under the guidance of the general principle of the university and colleges, formulated themselves management rules combined with the characteristics of each major. □

6. Practical Effects

Based on the transformation of educational manner and educational concepts, the macro management of graduation design work is strengthened after the rational thinking on deepening the reform of graduation design work and improving the quality of graduation design. The present "Graduation Design Quality Assurance and Evaluation System" was implemented and satisfied results were achieved in teaching practice. □

6.1. Establishing and Improvement Related Documents for Graduation Design Work

The university has issued rules and regulations for teaching management of graduation design work. And proposed a system guarantee for graduation design work, so that graduation design work can be followed by rules and regulations. □

6.2. Giving the Full Play for the Role of Departments and Teaching Offices

The management of graduation design includes both objective management and process management. The two-level organizations of the department and teaching office play an important role in the process management of graduation design. The college clarified the responsibilities of the departments and teaching sections in the regulations on graduation design work. The university focuses on macro-control, while the college, departments and teaching sections enhanced and strengthened the organization, management, and inspection of graduation designs based on professional characteristics. Also they suggest the details of graduation design work.

6.3. Strengthen the Quality Assurance and Evaluation of Graduation Design Work

The present "Graduation Design Quality Assurance and Evaluation System" was implemented in teaching practice.

First, the graduation design topic selection time was arranged early in advance to alleviate the problem of distracted students caused by employment and graduate entrance examination. Now, the topic selection work is carried out in the seventh semester. Students enter the stage of graduation design preparation in advance. Combine the learning and practical teaching links of professional courses and social practice activities, they can timely select, change or replace of topics under the guidance of teachers, in order to give full play to the leading role of teachers in teaching and reflect the subjective status of students in teaching. The practice results show that the advancement of topic selection time and the implementation of the instructor responsibility system are conducive to giving full play to students' creative talents. On the other hand, students have sufficient time to consult and research the literatures, enter the role in advance and establish a solid foundation for the graduation design in the eighth semester.

Second, the mid-term inspection of graduation design work was enhanced. The members of teaching expert group, the head of the teaching faculty, and the relevant staff of the Academic Affairs Office will go to various departments and majors to review the teaching documents related to the graduation design, understand the topic selection of the thesis, and guide the staffing management, find problems in equipment and funding guarantees. Its purpose is to identify problems and solve problems in time.

Third, the writing format of graduation designs was standardized. In addition, college or departments also organizes exhibition of excellent graduation design, which shows outstanding graduation designs from previous years for students, instructors, and related teaching and administrative staff to study. After the graduation design work is completed, the teaching expert group will check and review of the graduation design randomly in order to hold the current quality of the graduation design and to find any deficiencies and the areas that need to be modified. At the end of each year's graduation design work, we carry out activities to submit and compile outstanding graduation designs at the college level.

Last, at the end of the graduation design work, the teaching expert group will grade the graduation design work of the year in accordance with the present "Graduation Design Quality Assurance and Evaluation System" to clarify the status and find out the shortages in order to rectify construction and improve continuously.

The macro-monitoring of graduation design work has promoted the steady improvement of the quality of graduation design. The grade distribution of graduation design results is more reasonable. The number of titles related to engineering design problems and practical problems were kept in a satisfied amount.□

Conclusions

Learning from the ideas and successful experiences of modern enterprise quality management, in accordance with purpose, role and characteristics of graduation design in higher engineering colleges, present study suggested a quality assurance and evaluation system of graduation design.

During teaching practice, the theories and methods of total quality management and standardized management were established. The standardized and institutionalized graduation design teaching management mode promotes the steady improvement of graduation design quality.

The present study provides a set of complete and systematic standards for graduation design work. It gives the suggestions that how to do, how to evaluate, how to record, and so on. It can promote the teaching quality and teaching management effectively.

References

[1] Julin Osborne: Quality and Reliability Engineering International, Vol. 10 (1994)_No.3

- [2] C. Mackie, British Telecom technology journal, Vol.15(1997) No.3, p130-139
- [3] Ab Wahid, Roslina, TQM Journal, Vol.31(2019), No.4, p563-577
- [4] L.X.Yin, L. Xin , Y. Jing and G.W. Gao: Advanced Materials Research, Vol.211-212(2011), p.6
- [5] X.Z. Shao, International Conference on Internet Technology and Applications, ITAP 2010
- [6] Xie Qian, Energy Education Science and Technology Part A: Energy Science and Research, Vol.32(2014), No.6, p 8817-8822