

Exploration of Teaching Mode of Software Project Management Based on Engineering Education Professional Certification

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Abstract. Software Project Management is a core professional course in software engineering major. Combined with engineering education professional certification, we deeply analyze some problems existing in the reform of software project management course teaching mode, and further put forward the teaching improvement strategies. A new teaching model of software project management course is explored based on the analysis of achievement of course teaching objectives, the establishment of all-channel teaching system, and the refinement of assessment and evaluation granularity. The further deepening of the teaching reform of this course can promote the achievement of the training goals of software engineering professionals, and at the same time guarantee the implementation effect of engineering education professional certification.

Keywords: Software Project Management; Engineering Education Professional Certification; Teaching Mode; Course Achievement Degree.

1. Introduction

Engineering education professional certification is an important part of current higher education in our country and occupies a pivotal position in higher education system [1]. The scale of engineering graduates from ordinary colleges and universities in my country has ranked first in the world. Industrial system is complete, independent and diverse. Engineering education professional certification helps a lot for these. The core of engineering education professional certification is to confirm that engineering graduates meet established quality standards recognized by industries, which is a qualification evaluation oriented to training goals and graduation export requirements [2-3]. Engineering education professional certification requires that professional curriculum system setting as well as allocation of teaching staff and school-running conditions are all focused on the achievement of student graduation ability. How to further promote transformation and development of teaching mode of software project management requires our more consideration and analysis. It will ultimately enhance student awareness of the curriculum, which will deeply enhance their abilities to solve practical problems [4].

2. Potential Problems of Course Teaching

2.1. Current Teaching Objectives can not Meet the Requirements of Engineering Education Professional Certification

Figure 1 has shown that due to engineering education professional certification is mainly based on the quality of graduates to measure attainment of educational goals. First of all, we need to analyze the relationship between courses and graduation requirements, and then formulate teaching objectives of this course to meet the requirements of engineering education professional certification. In this process, we should focus on practical skills and the abilities to solve complex problems [5].

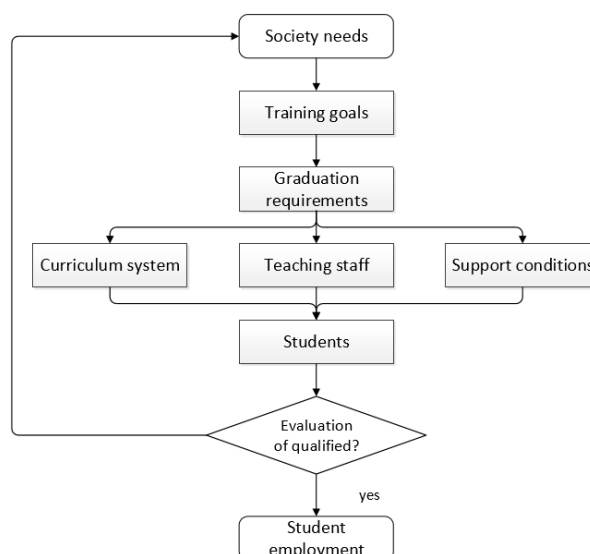


Figure 1. Subject relationship

2.2. Teaching and Training Ways are Single and Lack of All-channel Teaching System to Meet Requirements of Engineering Education Professional Eertification

We focus on teaching objective of this course, and reform traditional single teaching ways. Traditional single teaching way emphasizes knowledge inculcation as well as ignores ability training, and students lack initiative and innovation. In order to meet requirements of engineering education professional certification, we should take students as center, pay attention to cultivation of student abilities, and set up diversified teaching ways to make student abilities meet the requirements of engineering education professional certification [6]. It is shown in figure 2.

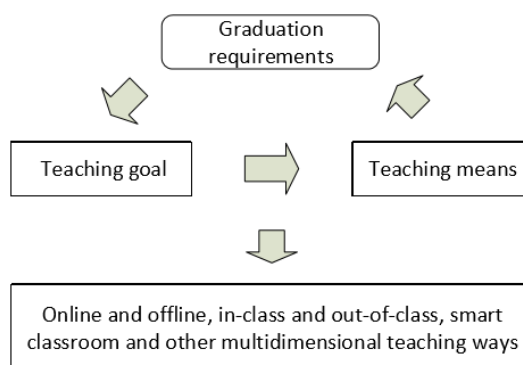


Figure 2. Schematic diagram of teaching system

2.3. Assessment granularity is extensive, course assessment and evaluation system needs to be improved to meet requirements of engineering education professional certification.

At present, main problems of course assessment and evaluation mechanism are that assessment and evaluation system has some limitations and evaluation granularity is too extensive, which is difficult to measure student practical engineering application abilities effectively, can not monitor and evaluate the process well, and can not meet social demands for engineering talents. In order to meet requirements of engineering education professional certification, it is necessary to establish a scientific, feasible and comprehensive assessment and evaluation system, which can refine granularity of assessment and evaluation, attach importance of training process, take the results as guidance, and mobilize student learning enthusiasm and internal motivation [7].

3. Teaching Model Reform Strategies

3.1. We sort out course graduation requirements and formulate scientific teaching objectives around graduation requirements.

The corresponding relationship between graduation requirement index points and course objectives is shown in Table 1.

Based on graduation requirements supported by courses above, teaching objectives of this course are as follows:

Course Objective 1: Training students to master basic theory of software project management, familiar with methods, processes and tools of software project management, so as to cultivate student strongly social responsibility and mission. (Corresponding index point 08-1)

Course Objective 2: Cultivating student basic abilities to manage software development projects in software development organization, especially in project approval stage, bidding documents of party A, project proposal of party B and so on. It can exercise student language expression abilities in all-round way. (Corresponding index point 10-1)

Course Objective 3: Training students to apply theory of software project management to practice of software projects, improve student abilities to analyze and solve problems, so as to cultivate student abilities to apply project management knowledge to solve practical problems in discipline environments, and improve student learning abilities by their own. (Corresponding index point 11-2,12-1)

Table 1. Correspondence between graduation requirement index points and course objectives

Graduation requirements	Index points	Course Objectives
08 Professional norms	08-1 Humanistic quality and social responsibility	Course Objective 1
10 Communication abilities	10-1 Writing and language expression	Course Objective 2
11 Project management	11-2 Application of project management knowledge in a multidisciplinary environment	Course Objective 3
12 Lifelong learning	12-1 Learn awareness and ability	

3.2. Diversified teaching ways, establish a full channel teaching system.

The In teaching process, in addition to traditional teaching ways, we diversified some other teaching methods as follow:

- (1) Online classroom;
- (2) Smart teaching platform publishes courseware, micro videos, stories and other resources;
- (3) Flip classroom;
- (4) Take student as main body, take practical problems as orientation, carry out discussion;
- (5) Integrate ideological and political elements to realize synergistic effect;
- (6) Construct triune practice training method of experiment, curriculum design and second classroom.

3.3. Refine granularity of assessment and evaluation, design formative evaluation, and improve curriculum assessment and evaluation system.

Aiming at problems that evaluation granularity is too extensive and can not effectively measure student practical engineering application abilities, the evaluation index of teaching link is further refined. The assessment method of this course is mainly divided into four parts: homework, experiment, stage test and final test. The specific assessment scheme is shown in Table 2.

Table 2. Software project management course assessment scheme

Inspection ways		Evaluation content and scores	Course Objectives
Ordinary examination	Home work	Check the progress of work completion and knowledge (10 points)	Course Objective 1
	Stage of testing	Check the completion of the test (30 points)	Course Objective 3
	Experiment	Experiment 1 Project bidding and tendering (10 points)	Course Objective 2
		Experiment 2 Project requirement analysis (10 points)	Course Objective 2
		Experiment 3 Project cost planning analysis (10 points)	Course Objective 2
		Experiment 4 Project schedule plan analysis (10 points)	Course Objective 2
		Experiment 5 Project configuration management arrangements (10 points)	Course Objective 2
		Experiment 6 Project summary report (10 points)	Course Objective 2
	Final exam	Single choice (1-5), Fill in the blanks (1), True or false (1-5), Short-answer questions (1) (22 points)	Course Objective 1
		Short-answer questions (2-5) (24 points)	Course Objective 2
		Single choice (6-10), Fill in the blanks (2-4), True or false (6-10) (24 points)	Course Objective 3
		Calculation analysis question (1-2) (30 points)	

Total Course score = ordinary score*30% + final examination score*70%.

Considering the lack of timely specific student feedback in traditional courses, formative evaluation is designed. According to graduation requirements, teaching objectives of this course are sorted out and formative evaluation is designed. The effect of formative evaluation supports the achievement of teaching objectives, as well as the effect of teaching objectives supports the achievement of graduation requirements. Formative evaluation mainly includes two party, such as assessment and feedback. It can promote synergistic effect and strengthen cultivation of student engineering abilities.

4. Conclusion

Software project management is the core specialized course of software engineering, which is characterized by strong and abstract theory. Under background of new engineering, we need to think more about reform plans of software project management curriculum based on engineering education professional certification. We need to actively face the problems existing in ordinary course teaching ways, explain course teaching system, aiming to student-centered and results-oriented, and decompose results-oriented engineering education index points into course teaching objectives. In reform of teaching model, we need to design teaching ways, teaching links and assessment mechanism around teaching objectives, continuously improve construction of software project management, strengthen teaching quality of software project management courses to enhance student international competitiveness. In the future, we will keep pace with time, improve our course teaching quality, deeply integrate information technology and teaching ways.

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