

Studying and Implementing about the Grading Teaching*

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Abstract—The grading teaching is studied and implemented in the professional basic courses. The grading method and teaching method are different according to different aims. Based on the purpose of decreasing the failed rate and developing students' ability, some aspects about the grading teaching are investigated, which include the grading idea and principle, the aim and teaching method for different grade classes, the examination method and evaluation. The grading teaching is implemented in the course of "Fundamentals of Circuit Analysis", and the result is compared and analyzed.

Keywords—Grading Teaching; Teaching Method; Examination and Evaluation

I. INTRODUCTION

Along with the generalization of the higher education, the undergraduate education is no longer to cultivate leading talents in science and technology, it should make targeted teaching so as to cultivate talents in different levels based on students' characteristics and their own condition[1]. For the students with strong ability, it should exploit their potential to discover and cultivate the innovative talents; for the students with general ability, the main target is to let them master the basic knowledge and do some ability development; for the students with poor ability, the key point is to let them learn the basic knowledge so as to achieve better score as far as possible and finish their university studies. The professional basic courses are the most important courses, therefore, carrying out the grading teaching research for the important professional basic course is not only necessary but also very meaningful.

"Fundamentals of Circuit Analysis" and "Signals and Systems" are very important professional basic course of the electrical information subject. They occupy very important position in the whole cultivation process, and the mastery for these two courses will directly influence the following courses learning. Through years' teaching experience, we found that the students' score is varies greatly in the same class. Therefore, in order to cultivate innovative talents, enable them to develop their potential and receive the education suitable to their own development, meanwhile taking into account the students with poor ability, it is necessary to carry out the grading teaching research. In this paper, the grading teaching is introduced with the "Fundamentals of Circuit Analysis" as

an example.

II. THE BASIC GRADING METHOD AND THE MANAGEMENT MECHANISM

First of all, in order to carry out grading teaching we must determine how grading, which has great influence on the grading teaching effect and the students' psychology. So we need to determine reasonable grading method and management mechanism[2][3].

A. The Basic Grading Method

According to the past teaching experience and the students' states, usually the students with strong ability or poor ability are less and the students with general ability is more. Therefore, the class is divided into three levels, named A, B and C respectively. That is we disrupt the natural boundaries of the class and rearranged the classes of the whole subject.

Now how to arrange A, B, C class? According to all the leading courses' scores, or according to the leading courses' scores which are closely related to this course? Whether the students' wish is taken into account? All these questions must be considered. According to the people-oriented sense, the basic principle is: the student's own wish is the first factor, and the leading courses' score is the second factor. That is, if the number of students declared a level exceeds the predetermined number, then considering the scores. However, the work is too much if we consider all the leading courses' score, and the key is that some courses are not necessarily related to the course offered. So it is sensible to consider only the leading courses' score which are closely related to the course offered.

B. The Management Mechanism of the Grading Class

Now one course basically is finished in one term, therefore, the management problem is not involved if we only consider one course. However, if we consider the whole professional fundamental courses, it needs to be considered. That is, class A, B and C is fixed or changed. In order to encourage students' learning enthusiasm and form a good learning atmosphere, the grading class should be changed.

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However, the students' psychology should also be considered, especially for those students who originally in the high level. They should not be degraded because of lacking few scores. Therefore, a transition threshold should be determined, that is, the student who originally in the high level class can stay in the high level class if his total score of the leading courses is not less than the transition threshold. The transition threshold could be determined as 5 scores in average, which it mean that if one student's average score is not less 5 scores than that of the total average he can stay in the high level class. This mechanism can encourage students racing to the top and keeping morale.

III. THE TEACHING OBJECTIVE AND TEACHING METHOD FOR DIFFERENT GRADING CLASS

According to the guidelines of the grading teaching to determine the teaching objective, the teaching methods and means for different grading class.

A. *The Objective for Different Grading Class*

According to the idea of training different level talents, the objective can be divided into three levels which are cultivating talents with scientific innovative ability, basic ability and basic knowledge respectively.

Class A is the high level class and is trained in accordance with the scientific innovative ability. Its objective is focusing on the cultivation of abstract thinking ability, analysis computation ability, preliminary linking theory with practice ability, self-learning ability, independent thinking ability and innovation consciousness on the basis of mastering the basic knowledge.

Class B is the general level class and is trained in accordance with the basic ability. Its objective is focusing on the cultivation of abstract thinking ability, analysis computation ability and the preliminary linking theory with practice ability on the basis of mastering the basic knowledge.

Class C is the low level class and is trained in accordance with the basic knowledge. Its objective is strengthening the basic training, letting the students learn the basic method on the basis of the basic knowledge.

B. *The Teaching Content, Methods and Means for Different Grading Class*

According to the grading teaching goal, we need to adopt different teaching methods and means. However, no matter what kind of students, the basic course content must be guaranteed, just the emphasis is different.

For Class A, the emphases and difficulties be introduced detailed in the process of teaching, part of contents can be briefly described or let the students self-study. Usually, we set aside about 10~20% class hours for the expansion teaching, such as linking theory with practice, seminars, course paper or curriculum design, and et al. The main teaching method is lecture, watching curriculum video, simulation experiment demonstration, simulation homework, comprehensive exercises and extracurricular questions.

For Class B, the curriculum content is introduced in accordance with the conventional methods, while leaving about 5% class hours for exercise, discussion, and introducing the combination of theory and practice.

For Class C, in addition to introducing the curriculum content in accordance with the conventional methods, the emphases and difficulties are explained detailed, especially to consolidate and strengthen hr important knowledge points through more exercises. The teaching method is focus on explaining the basic knowledge, which can be done by lecturing and watching curriculum video. At the same time more exercises will be taken in the class.

IV. THE ASSESSMENT MEASURES AND EFFECT EVALUATION OF DIFFERENT GRADING CLASS

A. *The Assessment Measures*

How to assess different level students and how to evaluate the teaching effect are closely related to the grading teaching purposes. In fact, the main objective of grading teaching is to make the students with poor learning ability grasp the basic knowledge of the course, and graduate normally. At the same time, let the students with strong learning ability learn something beyond the basics. Therefore, based on the idea the test sheet is same for all students.

In the case that in order to encourage or stimulate the students' learning enthusiasm, or the teaching reform of Class A is greater, we can consider other assessment methods. For example, the test sheet is same, but the proportion of regular homework, midterm exams, final exams is different; or in the same test sheet, the scores of different problems is not same for different level students; or there are some options in the test sheet, the students can make their own choice.

B. *The Effect Evaluation*

Evaluating whether a reform is successful needs a set of criterions. Specifically, there are two aspects, one is to check whether it is approved in the implementation, the other is to check whether it achieved the expected effect. Whether it is approved can be gotten through questionnaire. But the effect is more complex, the score is part of it, and the others may be appeared many years later, such as the innovation ability. So, in the short term, we can evaluate through the result of questionnaire and the examination results.

V. THE IMPLEMENTATION

This project is implemented in "Fundamentals of Circuit Analysis" course in School of Electronic Engineering. The students are divided into four classes, one is Class A, one is Class C, and the other two classes are Class B, namely Class B1 and Class B2. Firstly, we explain the purpose and teaching mode of grading teaching to the students, and then let the students register according to their own will, finally we determine the four classes according to the registration and the scores of "Advanced Mathematics" course. In the end, there are 94 students in Class A and 58 students in Class C, the rest are in Class B1 and B2. Due to some students changed major or stayed down, there are 89 students in Class A and 59

students in Class C at the end of the term, and there isn't change in class B1 and B2.

In the teaching process, Class A and C adopt the mode of letting students watch the teaching video in advance. The main teaching methods of Class A include: lecturing; watching the course video in advance, leading students to review the video content, and then do some exercises; problem discussion; simulation demonstration and exercise; chapter summary. The main teaching methods of Class C include: lecturing; watching the course video in advance(the content of the video include the basic knowledge and examples), and then combing the knowledge; doing exercises and tests; peer discussion, and so on.

The main teaching methods of Class B include: lecturing and exercises.

The final scores of "Fundamentals of Circuit Analysis" are shown in Table I.

TABLE I. THE FINAL SCORES OF "FUNDAMENTALS OF CIRCUIT ANALYSIS TABLE STYLES

Score Class (person)	90-100 (person/ %)	80-89 (person/ %)	70-79 (person/ %)	60-69 (person/ %)	<60 (person/ %)
A (89)	8/9	33/37.1	26/29.2	12/13.5	10/11.2
B (187)	6/3.2	20/10.7	54/28.9	78/41.7	29/15.5
C (59)	0/0	4/6.8	12/20.3	16/27.1	27/45.7

We can see from Table I: 1) Although Class A added some extra content, the overall performance is still significantly better than Class B. 2)There are failing students, but this has little to do with the measures implemented, because some of

these students did not complete homework, and did not actively participate in the discussion. 3) Although the failure rate of Class C remains high, but we must consider the fact that there are 78% and 95% of these students whose math midsemester score is below than 40 and 60 respectively. Now in this course, there are 45.7% of these students is below 60 scores. So it can be seen that the grading teaching has good effects in improving the students' scores whose leading courses' score is not so good.

VI. CONCLUSIONS

Grading teaching is a traditional topic, but how to implement it better and play its role need to be seriously studied. The measure we adopt is focus on the good students and poor students. The basic method, means and implementation of the grading teaching are discussed. We hope to provide some reference for higher education

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