

Using the feedback teaching method to improve the quality of class teaching

Fumeng Gao & Pingyang Wu

Fuyang Teachers' College
Fuyang, Anhui, People's Republic of China

ABSTRACT: The feedback teaching method (FTM) is a new philosophy for practice teaching. It is a highly-efficient teaching method in which strengthening basic theoretical knowledge is emphasised, students' initiative and creative cooperative capability is valued more in teaching, and where teachers and students communicate better and more often. The study presented in this article focussed on the learning status of engineering students, investigated through the applied feedback teaching method to specific teaching. Quantitative and qualitative experimental research testified to the efficiency of FTM, based on changes of engineering students' learning interests and scholarly performance, and provided useful information that could be used for course teaching reform in engineering majors.

INTRODUCTION

With economic globalisation and the development of reforms and the opening up of international markets, engineering is becoming more recognised, highly preferred and is receiving attention as an important teaching field in universities and colleges. However, the overall trend in engineering teaching has not yet been optimised. Because students do not pay attention to the course itself, but focus on high scores, most of them only study to pass the examinations and they lack an appreciation of practical application; hence, the effects of teaching and learning are not satisfying [1]. Therefore, universities, colleges and related research institutes should conduct relevant research to investigate and remedy the situation.

Lee and Qiu applied the stereo teaching method to professional courses in engineering. They realised three dimensions of course resources: layering of teaching content; diversity of methods; and interactivity of process and, then, conducted an initial test on the practice layer of teaching [1]. Zhang analysed several aspects of practice teaching in engineering: concept, characteristics, theoretical foundation and implementation, summarised experiences and existing problems, proposed practice teaching mode, which could be reformed through hardware support, cooperation, and management and evaluation systems [2].

Ding examined the application of scientific and technical methods to engineering teaching in universities and colleges, and introduced four aspects of the theory of scientific and technical methods: observation method, experimental method, scientific logical thinking method and mathematical method [3].

From the research results mentioned above, one can see that most of the research carried out independently was focused on a single aspect within whole teaching mechanism rather than on comprehensive and integrated ones. Moreover, most of the researchers involved focused on theoretical explanations and were limited in consideration of experimental and practical analysis.

The feedback teaching method (FTM) refers to providing timely feedback during learning in order to capture the status of learning and teaching effectively. It changes the asymmetrical information status of traditional teaching [4]. The advantages of FTM are promoting the development of teachers and students, and improving the teaching method. A methodical application of FTM can realise the effective use of important information about teachers and students.

Based on the research status of the feedback teaching method, Yuan applied this method to biology teaching in a rural middle school and found that it could improve the learning efficiency [5]. Many other researchers have focused on its application in physical education teaching, but seldom in engineering teaching [6]. In the research presented in this article, FTM was used in experimental research and class teaching data analysis of engineering students, and the results

were verified as effective through comparison and analysis of the feedback teaching method against the traditional teaching method.

BRIEF INTRODUCTION OF FEEDBACK TEACHING METHOD

Basic theory of feedback teaching: according to automation theory, feedback may be positive or negative. Positive feedback exists when a student receives high scores or good evaluation results during learning, hence, he or she will be more enthusiastic about learning. Negative feedback is when a student obtains low scores or unsatisfactory assessment in learning, so his or her motivation may decrease. Many students lose their confidence in learning mainly because they do not improve their deficiencies after getting the very first feedback. Feedback should be timely in order to influence the learning result. According to psychology research, feedback must be timely, so that it can play a positive role of maximising learning feedback [7].

What FTM emphasises is timely feedback and adjustment of information. In FTM, there are forward, real-time and delayed forms of feedback. In forward feedback, before teaching, according to former teaching feedback, the teaching designer analyses the background, the knowledge level, the current skills and psychological element of students, and sets the goals and strategies for teaching design. In delayed feedback, students provide feedback after learning and absorbing, so that experienced teachers offer *cold treatment* to problems, which is extremely difficult for students to understand. This kind of feedback is good for students to think and for problems to be solved [7].

Characteristics of feedback teaching: FTM is considered to be the best method with which teaching advantages can be found [7]. Education is an activity in which teachers and students interact. No matter what kind of key strategy it is based on or what kind of critical measure is taken, after a period, by comparing actual and expected results, problems in teaching and learning can be found and second-round learning can be organised in order to compensate for weaknesses. The characteristics of FTM in teaching are that learning results go back to students and teachers; teaching and learning can be adjusted; second-round learning can be organised to compensate for weaknesses; most students can grasp what they are taught; and teaching evaluation can be integrated. In other words, FTM can realise the overall functions of the subject, the results of teaching will be improved and will help students to develop more actively.

ANALYSIS OF THE EFFECT OF THE FEEDBACK TEACHING METHOD IN CLASS

Experiment's goal: in this study, feedback skills were applied to specific teaching activities through integrating feedback teaching theory with engineering teaching in English at a Chinese university. With experimental research, traditional teaching ideas and old teaching methods were replaced; the *teaching class* was turned into a *learning class* and students' development was changed from *learn to know* to *know how to learn*; students' capacity to learn positively, grasping English writing skills, using words skillfully, knowing grammar well and speaking fluent English were developed; students' interests in English writing were raised and the quality of English teaching was improved greatly.

Experiment's subjects: the 2013 cohort of students in the engineering major of a Chinese university which took part in an English Writing course were divided into two groups in each of which there were 150 students (80 boys and 70 girls). Three hundred students in total were selected as the subjects of the FTM experiment. One group was an experimental group, while the other was a control group. FTM was conducted in English writing teaching with the experimental group and the traditional teaching method was used with the control group. In addition, in order to ensure the validity and scientific reliability of experimental results, the differences in English writing foundation levels of the two groups were not great and were within the range of allowable error.

Research Method

Time, teaching hours and arrangement of experiment: experimental teaching in the first semester was conducted between February and June 2014. Class teaching of 150 minutes was conducted twice a week for both the FTM and traditional teaching mode groups.

Experiment's method and variables: a comparative experiment method was used. In integrated quantitative and qualitative research, the authors examined the teaching experiment before and after, and feedback teaching strategy (FTS) was applied without interrupting normal teaching. FTS is an independent variable, while students' scores and interests are dependent variables.

Conduct of Experiment

Feedback before class: teachers paid particular attention to difficult points and errors that appeared in students' learning, collected and managed them, analysed the reasons, and explained them during the next teaching session. It was good for strengthening the effect of class learning and was called feedback before class.

This kind of feedback has two functions: on the one hand, it can strengthen students' attention to English writing skills and knowledge, improving their weaknesses and triggering their best status in class learning. On the other hand, it helps teachers

to know students' learning situations, including learning and knowledge absorbing status. Questionnaire surveys and interviews were used to obtain learning information about the English Writing class, and the foundation was built for FTM.

Course feedback: class teaching feedback was gathered in order to capture the teaching effect in time to adjust teaching content and to continue future class teaching effectively. Feedback teaching ideas can be gathered through body language, action, questioning, class assignments and discussion.

Feedback of practical operation: feedback was used to strengthen operational capability of students in practical learning, transfer knowledge into skills, develop ability to *read more, write more, translate more and speak more*, encourage students to communicate with each other, arrange for them to translate Chinese and English articles, assign them to exercise writing skills and to participate in class teaching.

Inspection feedback: timely inspection of students' class learning effect; once problems were found, they were solved effectively in order to improve class efficiency.

EXPERIMENTAL RESULTS

After finishing half of the school year course, students' final examination, daily homework and interests in the English class were scored and evaluated, and data collected and managed.

Comparison of examination score differences between the experimental and control groups: the final examination score is an important index to assess the efficiency of teaching methods and a direct way to examine students' learning status. Inspection of daily homework is a good way to find out about students' overall learning status. Scores of the final examination and daily homework of those in the experimental group and the control group are shown in Table 1 and Table 2.

Table 1: Comparison of final examination scores of English writing between the experimental group and the control group.

	Number	Before test	After test
		$\bar{x} \pm s$	$\bar{x} \pm s$
Experimental group	150	70.23 \pm 8.79	75.67 \pm 7.21
Control group	150	70.01 \pm 8.45	70.43 \pm 7.98
<i>t</i> -test		0.73	3.01
		$p > 0.05$	$p < 0.01$

Table 2: Comparison of daily homework score of English writing between the experimental group and the control group.

	Number	Before test	After test
		$\bar{x} \pm s$	$\bar{x} \pm s$
Experimental group	150	61.24 \pm 5.76	70.67 \pm 5.43
Control group	150	60.34 \pm 4.95	61.03 \pm 5.91
<i>t</i> -test		0.69	2.16
		$p > 0.05$	$p < 0.01$

Information in Table 1 and Table 2 shows the results, and the *t*-test conducted with the experimental group and the control group. At $p > 0.05$, it meant that before the experiment, there was no obvious difference in the English writing skills between the two groups. After the experiment, at $p < 0.01$, it meant that after the feedback teaching method was conducted, there was an obvious difference in English writing skills between the experimental and the control groups. The successful learning effect of students in the experimental group was comparatively obvious after FTM was conducted. It showed that this teaching method can improve the quality of class teaching and reflected on the advantage of feedback teaching.

Comparison between the experimental group and the control group in learning interest and the attitude to English writing: in order to fully verify the effect of the feedback teaching method in the English writing class, questionnaire interviews and surveys were conducted before and after the experiment.

Table 3: Comparison of learning interest and attitude to English writing between the experimental and control groups.

	Number	Before <i>t</i> -test	After test 1 (one month later)	After test 2 (after experiment)
		$\bar{x} \pm s$	$\bar{x} \pm s$	$\bar{x} \pm s$
Experimental group	150	51.33 \pm 2.54	53.68 \pm 2.49	61.37 \pm 8.40
Control group	150	51.26 \pm 2.75	52.93 \pm 3.01	55.89 \pm 5.97
<i>t</i> -test		0.012	0.026	4.18
		$p > 0.05$	$p > 0.05$	$p < 0.01$

Since the time the two tests were held was not the same, students' interest in English writing class was different. From data shown in Table 3, one can see that at $p > 0.05$ in the *before t*-test indicated that the result difference between the experimental group and the control group was not great; after FTM had been introduced for one month, $p > 0.05$ was still the *t*-test probability, and the students' interests of English writing between the experimental group and the control group was still not great, but from the average score one can see that the students' interests of English writing between the experimental group and the control group was improved to a certain extent. When the feedback teaching class was over, it showed that after FTM was conducted for a while, there was a big difference between the two groups, and the students' interests of English writing was considerably improved ($p < 0.01$).

ANALYSIS OF THE FEEDBACK TEACHING METHOD'S IMPACT ON TEACHING EFFICIENCY

Impact of conducting feedback teaching method on students' English score: conducting FTM was good for improving the English score of engineering students for several reasons. Firstly, it developed students' proactivity in learning and turned passive learning into active learning. Secondly, FTM can help students and teachers through timely action, highlight key points and improve weaknesses. Thirdly, FTM can increase interaction between teachers and students; students can feel that they are being cared for and that help is provided by their teachers. Finally, the learnt theory can be applied to practical operations effectively, students' abilities in translating and reading can be practised, and their overall ability can be improved.

Impact of conducting feedback teaching method on students' interests in English learning: conducting FTM strengthens students' interests in English learning. Interest is the best teacher. In FTM, firstly, students demonstrate good consciousness of the goal, which can inspire their learning enthusiasm, increase their interest in giving learning information feedback and raise the desire to know more. Secondly, in positive feedback, students can feel contented to explore the knowledge and because every student gets the chance to express him or herself, the participation rate can increase.

Impact of feedback teaching method on teaching method: FTM creates a new mode for modern teaching and avoids various disadvantages in traditional teaching. In teaching, teachers are no longer conveying the knowledge they need to summarise, analyse and change teaching. Therefore, in teaching, firstly, teachers need to build advanced teaching thoughts, to change teaching ideas, to consider their students not only as students but also as friends, to learn and to develop their knowledge together, to respect students' new thoughts and to teach students differently according to their personalities. Secondly, teachers need to improve the quality of teaching, to prepare contents and methods before class, to optimise the language, posture and other details in class, and to conclude and rethink after class. Thirdly, teachers need to pay attention to information communication, adapting and adjusting their abilities. Finally, teachers need to strengthen information feedback from class teaching and to build an atmosphere of learning independently and cooperatively.

CONCLUSIONS

The experiment proved that the feedback teaching method can effectively improve the learning effect of engineering students and inspire their learning interests. With FTM, the limitation of the traditional teaching mode with students was overcome. Students were inspired to learn positively, and learned communication, cooperation and action. Their thoughts were paid attention to, and a relaxing environment was provided to students who could fully develop in order to meet the social demands of university and college students.

ACKNOWLEDGMENTS

This work was supported by a Project of Funded by Anhui Provincial Level Quality Project *English Education Practicum and Training Center* (2011/item 252).

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