Abstract—To deal with the present situation of high student-teacher ratio and wide discrepancy amongst college first-year students in the college information technology experiment course in China, we have constructed a student-teacher role-switch model (RSM) in our teaching. Enlightened by Carl Rogers’ non-directive teaching theory, the RSM aims at shifting the priority of learning from the teacher to students, doubled with group discussion, to guarantee teaching quality. The statistics gathered from the online questionnaire show that the RSM did cope with the present problems and improve teaching effectiveness remarkably.

Keywords- Experimental Teaching, Teaching Model, Computer Teaching

I. INTRODUCTION

Colleges in China offer Information Technology (IT) course catering to the application and related research required by other disciplines so as to promote students’ IT knowledge and operating skills [1]. However problems are still commonly found in its follow-up hands-on experiment class as follows:

A. Insufficient Teacher’s Guide

College IT course is aimed at first-year students of all majors. Take our college for example. The teacher has to confront a combined class consisting of two average classes, a total of no less than eighty students, so it is difficult, if not impossible, to give sufficient guide to each of them. In most cases, the teacher only manage to help several students with their problems in practice before the class comes to its end, the rest short of the teacher’s personal guide, which severely undermines the learning progress.

B. Wide Discrepancy amongst Students

As the computer/IT courses spread in pre-college education, a considerable population of first-year students has been through a preliminary computer education [2]. But we still see a wide discrepancy amongst them due to regional imbalance regarding education resources and teacher capacity, even worse with the absence of a standard computer proficiency test before their entry to college [3].

It is a problem worth exploring how the teacher could, when facing such an overly crowded class, modulate the experiment progress to benefit every student and enable them to pass the standard proficiency test in the meanwhile.

II. THE STUDENT-CENTERED APPROACH TO TEACHING AND LEARNING

Student-centered learning is a personally significant kind of learning that integrates new elements, knowledge, or insights to the current repertoire of the learner’s own resources such that he or she moves to an advanced constellation of meaning and resourcefulness [4].

Student-centered learning can be characterized by the following goals [5]:

- A participatory mode in all aspects of learning and decision making, furthering and experiencing self-responsibility for learning, and for assessing gains.
- A climate of trust in which curiosity and the natural desire to learn can be nourished and enhanced.
- Helping students to achieve results they appreciate and consider worthwhile and inwardly meaningful, such as building their self-esteem and confidence.
- Uncovering the excitement in self-initiated discovery, which leads students to become lifelong learners, fosters originality, and brings out the creative potential of the individual.
- Increasing a person’s capabilities to experience and explore his or her own processes, thus raising the awareness of meaningful ways of inquiry, in other words, learning how to learn. This generic meta-capability enhances the person’s disposition to successful problem solving in new and unforeseen
The student-centered approach to teaching and learning is one of the derived theories of Carl Rogers’ theory of therapy, personality and interpersonal relationships [6]. Consequent research in the student-centered approach proved that students achieve superior results along with personal growth in terms of higher self-confidence, creativity, openness to experience, self-respect, and respect toward others and their environment, and so on, if they learn in an atmosphere or climate in which the facilitator (instructor, teacher, etc.) holds three core attitudinal conditions and if they perceive them, at least to some degree. The core conditions are: genuineness; acceptance (acknowledgment); and empathic understanding [7].

III. Constructing Role-Switch Model in Computer Practice Class

We take advantage of the “student-centered” teaching concept that we construct a student-teacher role-switch model (RSM), which offers a new approach to the problems and difficulties in college IT course. As in a task-driven manner, the RSM places students at the center of teaching activity, while the teacher acts as “progress supervisor” behind the curtain and “solution provider” when the situation calls, which is of great significance to solving the inherent problems in the “teacher-centered” teaching model. In order to optimize organizational structure, we have also introduced group discussion [8] and contemporary management concepts [9] into the RSM to build a pyramid framework as shown in Figure 1. The RSM also moves along with an award mechanism to monitor and assess the learning progress and outcomes of every student.

A. Constructing the Framework of Group Learning

First the class is divided into groups, each with ten students, hence a computer experiment class reduced to eight groups.

Then a group leader and a representative are selected from the group members on their own. The former manages the group work and learning progress while the latter is responsible for summary and coordination, assisting the leader to ensure the successful completion of assigned tasks, tracking success and failure in each task, and presenting on behalf of his group in the following lecturing class.

B. Task-driven Group Learning

This phase is pictured as the core of the class, where the teacher is playing as “progress supervisor” in backstage.

In the first phase, the teacher assigns the computer practice task to the group leaders via electronic documents along with reference materials and related knowledge points essential to the completion of the task.

In the second phase, the group leader organizes his group members to discuss and work on the received task and materials. This phase serves as a vital link in the process of knowledge acquisition where students play a key role in self-learning. The depth and width of task-driven learning largely depend on the progress of the group learning. Here the new learning model has shown great advantages:

1) In group learning, its members enjoy more freedom of communications, facilitated with sufficient analyses and abundant materials which lays a more solid foundation and opens a broader horizon into the discipline.

2) The teacher asks group members to answer questions whose answers are counted in the group scoring, which can encourage high-achieving students help those underachieving ones.

3) The underachieving students can be mentally stimulated to put more efforts so as not to drag the progress of the whole group.

4) It offers a good opportunity for high-achieving students to improve their teamwork spirit in this mutual-help model. In addition they are more motivated to advance their knowledge into the discipline so that the completion of the task can be perfected.

5) Group members volunteer to devote extracurricular time to learning and further expansion based on the assigned task.

In the third phase, the groups’ completed task will be demonstrated in the following lecturing class to examine their learning progress. This step requires the whole class together with the teacher to score each group’s task in a fair and open manner. The scoring is undertaken in two aspects:

1) The group representative exhibits the group work and shares with the class problems as well as achievements that emerge in the process of the task.

2) The teacher selects group members and tests their understanding of the knowledge points to ensure the group progress as a whole.

The lecturing class preceded by the practice class goes as shown in Figure 2. As the group representative exhibits the group work, he earns scores by presenting achievements and problems as well. Then other groups also score if helping solve the problems or raising problems of their own. Consequently the lecturing class goes in this ask-and-answer model, dealing with all the problems that emerge in actual group work, which greatly enhances class participation and learning enthusiasm.

As to problems unsolvable by all the groups, the teacher will provide the answers and bring the class to a close.
In the RSM, the teachers and students keep changing their roles in different phases in order to perfect the teaching results together.

IV. RESULTS AND EVALUATION

To assess the teaching results of the student-teacher RSM, we have done a questionnaire in the two experiment classes, handed out via electronic documents by the group leaders to his members who should submit the answer sheet online anonymously.

The assessment is carried out in two rounds. The first round is done at the start of the college information technology experiment course and the second near its close. The first round of questionnaire focuses on factors that contribute to students’ taking the course, such as interest, ability, teaching style etc; the second emphasizes the influences of those factors on students’ participation in this new teaching model.

The two rounds of questionnaires are both done with the two parallel classes of advertising major in the School of Humanities who choose College Information Technology as elective course. The questionnaires are distributed to a total of 80 students, 73 copies having been retrieved. The statistics of the retrieved questionnaire is shown in Figure 3 with the score of each factor given on a scale of zero to ten.

An analysis of the statistics shows:

1) In early stage students value “promoting operating skills” as the most important, scored 9.4 with 10 as the full mark. After being taught in the RSM, students start to take “sufficient freedom of contemplation and exploration” as the focus of course learning, scored 9.5.

2) A longitudinal comparison shows the most increasingly scored factor is “pleasure of peer cooperation”. Task-driven group learning and group work scoring enable students to seek pleasure and sense of achievement in teamwork. The experiment RSM renders students how to cooperate and how to enjoy it, which lays a solid foundation for their future learning as a social being[10].

3) However, the score on “promoting operating skills” decreases as the RSM advances, which is accounted for by the fact that students in the RSM mainly focus on know-how of acquiring professional knowledge rather than the knowledge itself. Students exhibit a stronger capacity of obtaining and updating knowledge, which is more important because the knowledge that students have learned in the first year of college is likely to be out of date upon graduation. Accordingly, in contrast to “how to operate”, “how to learn” [11] seems more promising.

At the close of this experimental teaching model, we take the traditional way of examination, among which 93.67% students reach the course requirement with fair success, 13.92% scoring above 90 points with 100 as the full mark. It proves that the RSM is of great value to broaden students’ horizons as well as complete the teaching curriculum.
In our collecting the questionnaire of the second stage, we find that a small percentage of students still take the course as “too quick-paced beyond our acceptance”, which calls for a more detailed fine-tuning of the teamwork within the group. There is still room to improve or optimize the student-teacher role-switch model by engaging each student in the whole IT experiment course in a more effective manner.

ACKNOWLEDGMENT

Project supported by the Natural Science Foundation of Ningbo City, China (Grant No 2009A610006).

REFERENCES


