

Short- and Long-Term Influences of Flipped Classroom Teaching in Physiology Course on Medical Students' Learning Effectiveness

Ming Ji, Ziqiang Luo*, Dandan Feng, Yang Xiang, Jianping Xu

1. Department of Physiology , School of Basic Medical Science, Central South University, China

The flipped classroom (FC) teaching has been increasingly employed in medical education. Many studies have shown this “student-centered” pedagogical model improves students' overall achievement in the course, with students showing more motivation and better self-directed learning skills when compared to the traditional classroom teaching. However, most of the previous studies have been evaluating the short-term effects of FC teaching conducted upon completion of the course. The retention of the promotion and the long-term effects on learning of students' subsequent courses deserve further attention and evaluation. By adopting and running FC teaching in the whole course of physiology, this study aimed to determine the short-term impact of FC teaching on students' learning of physiology course and also the long-term influences in students' learning of follow-up medical curriculums within 18 months after the completion of physiology course. 119 sophomore students majoring in clinical medicine from Central South University were recruited and they were assigned randomly into two groups: the control group (n =61) who received the traditional lecture (TL) teaching, and the experimental group (n =58), who received the FC teaching. In this study, students' final exam scores were used to assess their learning effectiveness and an independent samples t-test was conducted to compare scores between the two groups. Our study showed that FC teaching significantly improved the learning outcome of physiology in the experimental group compared with the control group ($P = 0.0001$) without obvious impact on the learning of other subjects conducted in the same period of time. Moreover, our results also demonstrated the long-term benefit of FC teaching, with students from the experimental group scoring higher in pathophysiology ($P = 0.006$), pathology ($P = 0.029$), pharmacology ($P = 0.0089$), diagnostics ($P = 0.01$) and internal medicine ($P = 0.0004$) than those from the control group. The study results indicate that FC is a promising approach to increase students' learning effectiveness in physiology course, and the long-term effects of FC facilitate the learning of the follow-up medical courses. Furthermore, this study also demonstrates that although the time investment on physiology is increased by FC teaching, it does not weaken students' learning of other courses conducted in the same period of time.

Keywords: Flipping Classroom Teaching, Physiology, Learning Effects, Medical Students