

Brief Communication

The Effect of Task-based Teaching via Drawing the Concept Map of Metabolic Pathways as Homework on the Academic Achievement of Pharmaceutical Students in Biochemistry Course

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Abstract

Task-based learning is a teaching method that focuses on meaningful learning through completely student-centered homework assignment. The present study investigated the effects of task-based teaching through drawing the concept map as homework on the academic achievement and easier and more effective learning of metabolic pathways of biochemistry course in pharmaceutical students. Having examined the homework assignments done by the experimental group and having given the exam, the scores of both groups were analyzed by independent t-test using SPSS 16 software. The female students in control and experimental groups consisted of 46.67% and 51.11%, respectively. The mean score of experimental group (11.76 ± 2.45) was significantly higher ($p < 0.001$) than that of the control group (8.78 ± 2.79). Task-based teaching via drawing the concept map of metabolic pathways in biochemistry course as homework promotes the academic achievement of pharmaceutical student.

Keywords: Teaching method, Concept map, Biochemistry, Pharmacology

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Introduction

Learner-centered teaching methods facilitate learning. Task-based teaching method encourages the learner to do the task and learner plays a key role in the learning process (1).

This method emphasizes meaningful learning through doing completely learner-centered tasks and task is considered as the basic unit of the syllabus design, curriculum development and teaching in the classroom (2). In this method the learners would have the opportunity for analysis, problem solving, innovation, and critical and creative thinking (3). Since task and how to do it are considered the most important part of task-based teaching method, both choosing a proper task and how to do it have been highlighted in designing the syllabus so that the concern of “what the

learners will learn” is replaced by “how the learners will learn” (4).

Encouraging students to succeed in coordinating the learning materials is a serious challenge ahead of teaching in the higher education (5).

To perform a task through concept map, students should listen more attentively in the classroom to better comprehend the materials which, in turn, assists the learners in more effective note-taking and consequently enhances meaningful learning (4). Concept map as an appropriate approach to facilitating critical thinking is applicable in teaching, learning and assessment (6, 7).

When drawing the concept map to learn the new materials, students should focus on the previously

learned materials and relate each concept to another one by connecting words (8). The aim of the present study was to examine the impact of task-based teaching through drawing concept map of metabolic pathways as homework on learning and academic achievement of pharmaceutical students in biochemistry course.

Methods

To perform the common teaching method, a class comprising of 45 pharmaceutical students at Kermanshah University of Medical Sciences, Faculty of Pharmacology in the second semester in 2009-2010, who, as usual, were studying metabolic pathways in biochemistry course, were selected as control group. Pharmacology students (n=46) in the second semester in 2010-2011 were chosen as experimental group.

After teaching carbohydrates metabolism via lecture method using slides as well as introducing task-based method through drawing concept map and presenting examples of drawing the concept map and its applications, important points about making a concept map as homework assignments were presented to students. In addition to studying the materials taught in the classroom, the students were required to refer to more reliable sources of biochemistry and draw the concept map of carbohydrates metabolic pathways as homework assignment. 1.3 out of the score of 20 was allocated to the learner-made graphical and drawing materials and the rest of the score was allocated to the written exam, based on the principles of standard assessment. Also, scoring of drawing the concept map was carried out according to specific criteria. Then, the scores of the control and experimental groups were computed out of 20. The instructor for both groups was the same for two consequent years and the primary and regular assessments for each group indicated that both groups were homogenous. Finally, the mean of the scores for both groups was analyzed by independent t-test using SPSS 16 software. $P < 0.05$ was considered significant.

Results

The characteristics of the experimental and control groups including sex, scores' distribution and results are presented in Graph 1 and Table 1. The mean of the scores for the experimental group (11.76 ± 2.45) was significantly higher ($p < 0.001$) than that of the control group (8.78 ± 2.79).

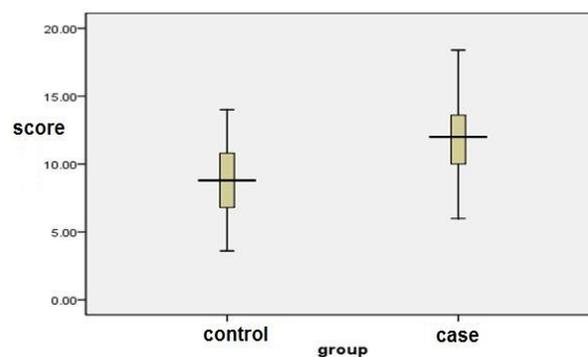


Figure 1: Comparison of the mean of scores for experimental and control groups

Table 1: Percentage of males and females and scores for experimental and control groups

sex	Control group	Excremental group	P value
Male/Female	53.33% / 46.67%	48.89% / 51.11%	0.15
Score	8.78 ± 2.79	11.76 ± 2.45	< 0.001

Discussion

The findings of this study indicated that task-based teaching method through drawing the concept map significantly enhances the theoretical learning in experimental group in biochemistry course. In this study there was an emphasis on task via drawing concept map in which the materials should be mastered in order to draw appropriate concept map. The concept map should be drawn by the learner to have more efficiency. The results of this study, which indicated concept map promotes learning, are in line with the findings of Amy et al. (9) and Chularut et al. (10).

In their study on the effect of concept map, Rahmani et al. concluded that this method is appropriate when deep and higher level learning of the materials is required (11). Ghanbari et al. reported that concept map teaching method could significantly enhance the scores of the experimental group (12) which is compatible with the findings of the present study. The present study emphasizes that in learning the difficult and complicated materials such as metabolic pathways in biochemistry course, organizing the materials by students using concept map will have a better impact on the learning because by drawing the concept map association between the materials will increase and consequently the learning will be more effective. In their study, Rahimi et al. reported that task-based

teaching has positive effect on academic achievement (13) that is in line with the results of this study. Further, the findings of, Sabzavi (14), Zarei (15), and Zand Moghadam (16) are in line with the results of the present study. Generally, doing the task by the learners encourages them to participate in the learning process and ignites their creativity.

Overall, it can be concluded that task-based teaching method using concept map of metabolic pathways and every piece of material that needs meaningful learning, as homework enhances academic achievement and results in more meaningful learning.

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