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Effect of Cognitive Strategies Training on Nursing Students' Academic Achievement in School of Nursing and Midwifery of Iran University of Medical Sciences Based on Kirk-Patrick Model

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Abstract

Background & Objective: Nowadays, the academic achievement of students is one of the concerns of professors and authorities. Therefore, the training courses are expected to be designed so that students can achieve this goal as one of the indicators of educational system effectiveness. Hence, in this study, we try to use cognitive strategies training for nursing students' academic achievement and the impact of this training is examined by applying the Kirk-Patrick model.

Materials and Methods: This quasi-experimental study was performed on 60 nursing students (two groups of 30 students) of Iran University of Medical Sciences. In the experimental group, in addition to presenting the content of the lesson, 5 sessions of 20 minutes were presented and practiced in the form of the extracurricular cognitive strategies program. The data collection tool was pre-test and post-test (end-of-course test). Data were analyzed by SPSS software version 20.

Results: All 60 students participated in the study. There was no significant difference between the scores of students in the two groups before the cognitive strategies training (P = 0.1). There was a significant difference between the scores of the two groups after intervention and training (P = 0.001). Moreover, paired t-test results showed that the mean scores of post-test in each group increased compared to the pre-test but this increase was higher in the experimental group than the control group (P = 0.001).

Conclusion: Training the cognitive strategies will lead to students' academic achievement so that planning is recommended for training and promotion of these strategies.

Introduction

One of the most important stages of the educational system is an academic achievement (1). Thus, the level of academic achievement of students in each country is one of the main measures of the efficiency of its educational system (2). They usually measure academic achievement in a variety of ways, including the amount of achievement in each course individually, the progress achieved in the set of courses, the annual grade point average, and the grade point average of a training program (3).

Educational systems seek to identify the effective factors in students' academic achievement, growth and excellence of the intended goals, and providing strategies for achieving them (2). Identifying the factors that affect students' academic achievement provides an appropriate approach to the planning, development, and evolution of educational programs to provide the best possible outcomes for both the educational institution and students (3).

One of the factors affecting academic achievement is the effective use of learning strategies. Indeed, the ability of individuals to learn is different, and people learn differently in the same situations that can be due to the learning strategies and the perceived goals of the class (2). Learning strategies are measures that are used to facilitate, consolidate, deepen, and recall individual learning. In other words, learning strategies, methods, and practices that learners use during learning to achieve their

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intended educational goals (4). Cognitive strategies are approaches that focus directly on learning topics and increase the willingness to interpret, understand and acquire information. Cognitive processes enhance thinking and help to achieve cognitive goals such as understanding and memorizing, facilitating information coding, storing, and retrieving information (5). Cognitive strategies include five subgroups: attention strategies, short-term storage strategies, programming strategies, restructuring strategies, and surveillance strategies (6). According to Gagne and Briggs, cognitive strategies are intrinsic organized skills that influence the learner's intellectual process and include the process of understanding problems, learning, remembering and thinking (7).

Research has also shown that the use of cognitive strategies can influence academic achievement (8). In their studies, Tinajero et al. identified cognitive styles and learning strategies as influencing factors for Brazilian university students' academic achievement (9). Considering the above, it is clear that planning and training cognitive strategies is always important for the academic achievement of students. It is also necessary to use appropriate models to assess the effect of these types of training. One of the common patterns in this area is the Kirk-Patrick model, which includes different levels of assessment (10). This model addresses four questions in the curriculum and assesses each level to answer each of these questions:

1) Response: Did the learners show a favorable response to the course?

2) Learning: Has the course provided a significant improvement in learners' knowledge?

3) Behavior: Has the training course made a significant difference in learners' behavior?

4) Outcome: Has the training course been able to solve the existing issue and achieve the organizational goals? (11)

Given the wide range of content that nursing students need to learn from different courses of their education, it is expected that cognitive strategies play a significant role in improving learning and delivering better results in their academic achievement test. Many studies have been published in recent years regarding the training of cognitive and metacognitive learning strategies at home or abroad, but most of these studies are at the school level. In addition to the limited number of articles available in this field, there are limited investigating the effectiveness of these courses based on valid assessment models. Therefore, the present study was conducted to determine the effect of cognitive strategies training on nursing students' academic achievement based on Kirk-Patrick model.

Materials and Methods

In this quasi-experimental study with a pretest-posttest equivalent group design, the effect of cognitive strategies training on academic achievement of undergraduate nursing students in "Theory of Aging 2" was investigated. The Ethics Committee of the Iran University of Medical Sciences (Ethics Code: iR.iums.ric.1396.32284) licensed to conduct the study, and after coordinating with the relevant group, participants were provided with the necessary information and were assured that their information was only available to the researcher and published in the form of research results in general without any mention. If any of the participants want, they may also be excluded from the study before analyzing the data. Then, after obtaining written informed consent from the participants, the study was conducted. The participants were 60 nursing students who were enrolled in the study using census method. Students were randomly assigned into two groups of 30 experimental and control groups. The lecturer in both classes was the same and the content provided in both classes on the topics of the elderly were taught equally and in the same manner. However, in the experimental class, in addition to the lessons of aging, cognitive techniques and strategies (including memory functions, memorization strategies, a variety of study methods, and factors influencing memory retention and retention) were presented to the students in the extracurricular format. These cognitive techniques and strategies were taught from the first to the fifth session for 20 minutes at the end of the class.

In order to match the groups, in the first session for both groups, multiple-choice test with 25 questions were used to assess students' awareness of cognitive strategies (repetition or review, simple or expanded content development strategies, complex content development strategies and organizing, memory functions, and reading and studying practices). To prevent students from guessing, it was emphasized that the wrong answer yields two negative scores.

The first and second steps of Kirk-Patrick model were used to assess the effectiveness of the program. For this purpose, in the first step of Kirk-Patrick, the students' satisfaction with the program was assessed.

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To assess the students' satisfaction with the program, a questionnaire including eight items on the teaching style, the appropriateness of the content presented, and its applicability based on a 5-point Likert scale was used (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree). In the second step of Kirk-Patrick, the lecturer took a multiple-choice test of aging 2 (in the form of post-test) at the end of the semester for both groups (experimental and control) to examine the changes in the learners' knowledge. Then the academic achievement scores of both groups were compared.

Descriptive statistics (such as mean and standard deviation) and inferential statistics (paired t-test and independent t-test) were used for data analysis.

Results

A total of 60 nursing students in two experimental and control groups of 30 participated in this study. The age range of the study participants was 19-24 years. Their mean age was 20 ± 0.95 years. There were 39 females and 21 males. At the first level (response), students' average satisfaction with the overall utility of the program was 4.32 ± 1 (Table 1).

Table 1: Students' satisfaction from overall utility of the program (Level 1 Patrick Patrick)

Items	Average (out of 5)	Standard deviation
teaching style	4.13	1.95
the appropriateness of the content presented	4.30	0.56
content applicability	4.53	2.37

The results of the Kolmogorov-Smirnov test showed that the distribution of data was normal. Independent t-test was used to compare the mean scores of the experimental group with the control group before and after training. The paired t-test was used to examine the differences in the means of each group before and after training.

Independent t-test results showed that there was no significant difference between the scores of the two groups before the training (P = 0.1). There was a significant difference between the scores of the two groups after the intervention and training (P = 0.001) and the scores of the experimental group were improved (Table 2).

Table 2: Comparison of the difference between the experimental and control groups before and after training

	group	Average	Standard deviation	t	p-value
Before training	experimental group	3.4	1.90	0.00	1
	control groups	3.4	1.67		
after training	experimental group	17.25	1.24	5.28	0.001
	control groups	15.20	1.75		

Paired t-test results also showed that the mean score of post-test increases in both groups but this increase was higher for the experimental group (P = 0.001) (Table 3).

Table 3: Paired t-test for examining pre-test and post-test differences

	stage	Average	Standard deviation	t	p-value
experimental group	Pre-test	3.40	1.90	-34/77	0.001
	Post-test	17.25	1.24		
control group	Pre-test	3.40	1.67	-23.40	0.001
	Post-test	15.20	1.72		

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Discussion

The purpose of this study was to determine the effect of cognitive strategies training on nursing students' academic achievement and to investigate the effect of Kirk-Patrick's model. Based on the results of the present study, training the cognitive strategies was effective in nursing students' academic achievement and getting higher scores at the end of the course. The experimental group showed a higher increase in scores than the control group.

A review of existing studies on the effect of training the cognitive strategies on academic achievement showed that they did not use a specific assessment model such as the Kirk-Patrick model. However, the published results were similar to the current study. For example, in the study conducted by Babakhani, training cognitive and meta-cognitive strategies significantly improved the performance of the experimental group in both sexes (12). A study by Sa'edzadeh et al. at Birjand University of Medical Sciences showed that there was a significant relationship between cognitive strategies and students' academic achievement (13).

However, the findings of the study of Suyitno in Indonesia suggest that cognitive strategies have positive or negative effects depending on the type of strategy (7). Kim et al. showed that cognitive strategies were highly effective and cognitive learning strategies were highly effective for middle and poor students (16). A study by Tinajero et al in Brazil showed that learning strategies play a significant role in academic achievement (9).

Given that cognitive strategies are intrinsic organizing skills and affect the learner's intellectual process including learning, memorizing, and thinking (14), successful problem solving also depends on the interaction and influence of cognition and metacognition and its effects (12). Therefore, it is expected that by training these strategies to learners to manage their learning process, we will see their academic progress.

In addition, enhancing cognitive strategies only directly affects the students' academic achievement, but also indirectly, improvesother skills. For example, Karami et al. showed that cognitive and metacognitive skills training affects creativity, achievement motivation, and academic self-efficacy (17). The study of Houshmandan Moghadam Fard and Shams had also shown that creativity has a significant relationship with academic achievement (18).

Yarmohammadian et al. stated that cognitive strategies training has the greatest effect on reading and memory performance (19). Maleki also stated that training cognitive and metacognitive strategies has a significant effect on the learning and retention of lessons (20). All of the above indicate the direct and indirect effect of cognitive strategies on academic achievement. However, one of the limitations of the current study was that the study was only for one course and it is suggested that this method be used for other courses. It is also suggested for the future studies to examine the effect of training cognitive and metacognitive strategies on enhancing students' learning in the clinical setting and comparing it with a theory class.

Conclusion

Based on the results of the current study, it can be concluded that training cognitive and metacognitive learning strategies lead to the academic achievement of students. Therefore, it is recommended to include courses in academic education planning for training and promotion of cognitive and metacognitive strategies.

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