

# The effectiveness of Guided Discovery Learning on the learning and satisfaction of nursing students

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## Original Article

### Abstract

**Introduction:** Revision of the traditional teaching methods as well as employment of modern and active learning method through educational systems is tangible. Application of such methods are quite common in different scientific areas. Therefore, performing modern educational approaches such as self-directed and long-life learning such as Guided Discovery Learning (GDL) is a step toward the student-centered strategy. This study was carried out to compare the effectiveness of two teaching methods including lecture and GDL on the learning and satisfaction of nursing students.

**Methods:** This semi-experimental study was conducted on all nursing students (BSc. degree) at Shiraz school of nursing and midwifery (n=38). They selected "the principles and skills of nursing concepts course" for the first time. Based on demographic information, students were divided into two homogenous groups. Five 2-hour sessions of "the principles and skills of nursing concepts course" were organized with lecture method for the control group. Five 2-hour sessions of "the principles and skills of nursing concepts course" were organized with GDL method using a study guide for the case group. The satisfaction was assessed using a valid and reliable Likert scale questionnaire. Data was analyzed by t-test, paired t test, Chi-square and Man-Whitney statistical tests using SPSS 15.

**Results:** Although there was no significant difference between two groups learning scores, the mean score of the case group was significantly higher than control group in analysis, synthesis and evaluation cognitive levels ( $P < 0.001$ ). The total satisfaction mean score and satisfaction in areas of "interest" and "encouragement to participation in learning" of the case group was significantly higher than control group ( $P < 0.001$ ).

**Conclusion:** The higher level of learning in higher cognitive level and the preference of the students to GDL compared to lecture indicates their attention to active more modern learning methods. Student-centered learning methods by reinforcing the sense of group participation among the students motivate them to further study and enhance learning in higher levels of cognition.

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## Introduction:

Development of effective teaching and learning methods is one of the inexhaustible missions of nursing instructors toward encouraging the development of educational-care systems. Providing quality healthcare with the aim of maintaining and improving the health of the people in community will be possible when nursing graduates are able to update their knowledge and expertise according to ever-increasing development of medical knowledge, steadily increase of the complexities in clinical settings, the rapidly changing needs of community and technological growth (1,2). When encountered with new circumstances in the clinical settings, the graduates have to make critical decisions in order to provide systematic healthcare and also to solve the problems of the health seekers. Therefore, it is necessary to improve such skills as problem-solving, decision making, critical thinking, creative thinking and interpersonal relationship as educational needs of nursing (3). Evidence shows that applying student-centered approaches are more effective than teacher-centered ones for improving the above-mentioned skills (4,5).

On the other hand, the necessity for the revision of traditional teaching methods and employing modern, active, student-centered approaches is felt by educational institutions. The application of such approaches has become common for teaching sciences including medical science. Furthermore, optimal adult learning occurs when it is self-directed and lifelong. One of the student-centered teaching methods is based on Guided Discovery Learning (GDL). One of the features used for the design of GDL and preparation of its study guide is its problem-based characteristic. In another word, this method like Problem-Based Learning (PBL) tries to form learning around a problem.

McDonald reported GSL as a suitable strategy for the improvement of interpersonal partnership, team working, transfer of knowledge, arriving at a consensus, application of interactive processes and creating collaborative atmosphere among students, constant communication, active listening skills, social communication and empathy (8). Comparing lecture and GDL Yadav found that there was a significant difference between the GDL-based-trained group and lecture-based-trained group regarding achievement of learning objectives (9).

However, Heywood concluded that although GDL method and discovery techniques did not significantly increase the test results of students compared with expository methods, they created a better learning setting in which the students showed more motivation and incentive for learning (10).

In spite of conflicting results between the two afore-mentioned learning methods reported in different studies from various cultures and educational backgrounds, further studies in this field is necessary. The present study was carried out to compare the effectiveness of teaching by GDL method with lecture method on the level of learning and satisfaction of nursing students.

## Methods:

In this semi-experimental study – non-equivalent group pretest posttest design (NEGD)-the research population included entire nursing students at Fatemeh (P.B.U.H) School of Nursing and Midwifery Shiraz-Iran enrolled in the first semester of educational year 2011-2012. Inclusion criteria were: 1) selecting "Nursing Fundamental Concepts" course for the first time, and 2) tendency to participate.

Prior to the class start demographic variables including age, sex, high school diploma average, and dormitory residency were extracted from educational record of the participating students. To avoid multiple group threat which might influence internal validity on one hand and having equivalent groups on the other, the class was divided into two match groups based on the above mentioned variables. To better match the groups and also for upcoming comparisons needed between the groups pretest was given to the students. Before starting the program, the selected group for GDL was briefed on the method instead of receiving lesson plans.

Both the case and control groups were separately taught the topics for "Nursing Fundamental Concepts" using GDL (Case group) and lecture (Control group) methods by the instructors of the course. Both group shared the same topic including vital signs, oxygen therapy, infection prevention and control and types of wounds. In the first session of the case group, there was a briefing on GDL, introduction of the course, goals, teaching methodology and evaluation. In this

group, before any other sessions, the students were provided with related study guides. Therefore, the students were informed of the required student activity along with short explanations noted in the guide as well as related resources. Hence, students were supposed to be ready for the following session. Study guides were prepared for the topics to be taught in the class and were handed out. The study guides mostly focused on content, learning management and somewhat on the activities by the students.

Considering the objectives of the topic materials for each session, the instructor started the class by providing a scenario or a problem at the beginning. Next, the students started to discuss about the scenario or the problem. Then questions and hypotheses were discussed and the instructor as a learning facilitator prevented the diversion of the debates and guided the learners to self-directed learning. The instructor attempted to engage all the students in the debates about the hypotheses and discussions. It aimed to develop and improve interpersonal communication between the students. At the end of the class, a whiteboard was used to conclude the subjects discussed over; and ultimately, to attain the suitable answer, or in other words, the objectives of the session.

In the control group, after handing out the lesson plans, the topics were taught by lecture method using video projector (PPT), whiteboard and overhead.

At first, topics were lectured for the control group. At the end of the course, they were evaluated (posttest). Later on, the course was presented for the case group and then they were evaluated (posttest). In the next step, study guides were collected then the learning level of the students in both groups was similarly assessed by multiple choice questions (MCQ) with content and cognitive level. The test was validated by the faculty members of the school (expert group). The reliability of the test was determined by parallel-Forms. Since there was the same instructor for teaching both methods, and there was the possibility of bias in evaluation, the posttest was given in written form and by MCQ in order to avoid the opinions of the corrector on the results.

The tool for assessing the satisfaction of students was a questionnaire composed of 23 questions in 4

domains: 1) creating interest and encouraging participation in learning (10 items), 2) respecting principles and regulations of teaching and learning (6 items), 3) skills and proficiency of the instructor for teaching (4 items), and 4) Test and evaluation (3 items). Responses to each item included a 5-point Likert scale ranging from very dissatisfied (1-score) to very satisfied (5-score). To study the validation of the questionnaire and to determine its reliability, content validation and re-test method were used respectively. To prepare the questionnaire, the researchers used well-known scientific resources in the field of teaching methodologies and education as well as consulting the experts.

Satisfaction assessment questionnaires were filled out by the students of both groups after posttest. The acceptable satisfaction score of this study was  $\geq 60$ . Dissatisfaction is applied to scores less than 60.

The collected data was analyzed using statistical tests including independent t-test and paired t-test. The level of significance was considered 0.05.

Data was analyzed by t-test, paired t test, Chi-square and Man-Whitney statistical tests using SPSS 15.

## Results:

There were 16 male (42.1%) and 22 female (57.9%) students. The mean age was  $19.26 \pm 1.14$  years old and the average score of the students for the "Fundamental of Nursing Concepts" was  $17.56 \pm 1.86$  at the end of semester.

The mean score of the students for their learning level by lecture was  $12.8 \pm 1.62$  (from 20 score) while it was  $14.68 \pm 2.008$  by GDL. Although the average score in case group was more than the control group, there was not a significant different statistically. However, the average score of the students in the two groups for cognitive levels proved to be statistically different ( $P < 0.001$ ). In other words, the students in the case group scored higher in levels of analysis, synthesis and evaluation.

The mean score for total satisfaction by lecture method was  $65.05 \pm 13.56$  (from 100 scores) and for the GDL method was  $79.52 \pm 11.54$ . There was a statistically significant difference between the groups ( $P < 0.001$ ).

**Table 1. Comparison of learning score and the satisfaction of students in case and control group**

Groups	Mean Score and Standard Deviation of learning criteria	Mean Score and Standard Deviation of higher levels of cognition (problem solving)	Mean Score and Standard Deviation of satisfaction criteria
Lecture (Control)	12.80±1.62	5.05±1.30	65.05±13.56
GDL (Case)	14.68±2.008	8.21±1.18	79.52±11.54
P-Value	0.004	0.001	0.001

Comparison of the groups from different domains showed that: 1) in the domain of creating interest and encouraging participation in learning, the mean score of GDL (35.021) was significantly higher than the lecture method with mean score of 24.68 ( $P < 0.001$ ), 2) in the domain of respecting principles and regulations of teaching and learning, the GDL method with mean score of  $18.31 \pm 4.79$  higher than the lecture method, 3) in the domain of skills and proficiency of the instructor for teaching, the GDL method ( $16.42 \pm 2.29$ ) obtained higher mean score than lecture method ( $14.36 \pm 4.03$ ), and finally 4) in the domain of test and evaluation the mean score of GDL and lecture methods were  $7.73 \pm 2.35$  and  $7.68 \pm 2.78$ , respectively.

### Conclusion:

The findings of the study showed that the total score of GDL was more than the lecture method, although it was not statistically significant. However, statistically significant difference was observed in higher levels of cognition in GDL group compared to lecture group. Our findings are matched with the results of a study by Newsome and Tillman. They reported that there was no significant difference between GDL and lecture groups regarding knowledge of memorizing level while the score of GDL group for problem solving was significantly higher than the lecture group. They concluded that both the methods are similar memorizing knowledge, but were different for teaching problem solving skills (11).

Moreover, Summerlee and Murray found out that the mean score for performance in the method based on GDL was significantly higher than the lecture-based method. They also reported that GDL was not only effective for learning at knowledge level but also for performance improvement and participation improvement of students in learning (12). Meany and Vicky conducted a research on GDL-based learning in organic chemistry found that it was more effective for the improvement of

power of perception, the ability for problem solving, and memorizing topics by students.

In the present study, the comparison of students' satisfaction showed that satisfaction obtained by GDL method was significantly higher than the lecture-based method. Furthermore, satisfaction of students in different domain showed that in the domain of creating interest and encouraging participation in learning, the mean score of GDL was significantly higher than the lecture method ( $P < 0.001$ ). Alfieri et al in a meta-analysis research aimed to study the effectiveness of GDL-based teaching on GDL reported that students were more satisfied with GDL (14). The findings were consistent with the results of McDonald study in 2011. In his study, 42% of the students believed that progress in discovery learning from one stage to another does not need previous knowledge. Moreover, 52% of the students believed that information sharing was effective on learning. Sixty-three percent of the students declared that constant communication and active listening skills in discovery learning were quite effective for creating a learning atmosphere. He pointed out that discovery learning improved interpersonal partnership, team working, transfer of knowledge, arriving at a consensus, application of interactive processes and creating collaborative atmosphere among students, improvement of constant communication (8). It could be said that participation and interaction are among the most important factors for the progress in learning. This is consistent with the present study. Moreover, Heywood in an attempt to compare GDL and expository methods for applied psychology indicated that although the students taught based on GDL got lower mean score than their peers on the expository method, they experienced a better and more effective educational environment affecting their creativity and motivation. Moreover, more privileged students benefited more from GDL while the less privileged ones benefited more from the expository method (10).

Although no significant difference was observed between the groups regarding knowledge learning in the present study, there was a significant difference regarding the questions assessing higher levels of cognition and the abilities for solving problems. This may be an emphasis on skills such as problem solving and decision-making as educational needs in active learning and student-centered teaching methods.

Moreover, higher satisfaction score reported for GDL method in our study may imply that it is necessary to reconsider the traditional teaching methods and substituting them by modern student-centered methods.

There were some limitations in the present study. One of the most important limitation was lack of students' personal skills including critical thinking, participation and decision-making in the GDL group. Another limitation was the small sample size of the study and just focus on nursing students. This limits the generalization of the results. On the other hand, the students in both groups were at the same school and an interaction between them was inevitable. For the future studies, it is suggested to study groups with more samples and in a longer period.

Using active learning approaches like GDL compared to the traditional methods is more effective for the improvement of problem-solving, decision-making, critical thinking, creative thinking and interpersonal skills. It leads to a higher students' satisfaction, accelerating learning process, constant learning and critical learning.

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