

# ***Fundamental Nursing: Process-Oriented Guided-Inquiry Learning (POGIL) Research***

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## **Abstract**

Measuring the effect of a Process-Oriented Guided-Inquiry Learning (POGIL) implementation in a fundamental baccalaureate-nursing course is one way to determine its effectiveness. To date, the use of POGIL from a research perspective in fundamental nursing has not been documented in the literature. The purpose of the study was to measure the effects of participation in the POGIL process in Fundamental Nursing classes on the final grades and ATi (Assessment Technologies Institute, LLC) grades (national exam) of groups of students who participated in group scenario work compared to students who did not participate in group scenario work in class. A comparative quantitative design measured the relationship of grades in two fundamental nursing classes taught by the same professor. The results demonstrated a short-term implementation of a POGIL program could increase grade performance significantly on a standardized exam. Final exam data revealed no significance in grade performance between groups. Utilizing the POGIL method may be beneficial in nursing courses.

## **Introduction**

Process-Oriented Guided-Inquiry Learning (POGIL) is a student-centered pedagogy that supports group activities. Students interact and are given the opportunity to construct knowledge. Learning is a shared responsibility of faculty and students. Educators developed POGIL in 1994 as a student centered general chemistry strategy. This pedagogical method encourages cooperative and collaborative classroom learning. Comparing the results of standardized exams has demonstrated improvement in grades in the POGIL classes' versus the traditional lecture approach (Hanson & Moog, 2010). POGIL allows students to think about their learning, their performance and how to improve and develop problem-solving skills. Students work in teams with group guided learning exercises to encourage active learning (Bransford, Brown, & Cocking, 2000).

The POGIL method uses activities to teach content and encourage analytical critical thinking and teamwork. POGIL activities are implemented in groups of four students. The instructor is a facilitator moving between the groups and listening to the student discussion and intervening when necessary with guiding questions. The roles include four different ones for each student in the group: Manager keeps everyone on task. Recorder keeps records of the names, roles and discussions of the group. Presenter or team leader presents an oral report to the class. Reflector observes and comments on group behavior and dynamics in learning process (Moog, 2012).

The ability for nursing students to work effectively in a team through the POGIL process may help to prepare future nurses for a work environment that requires multidisciplinary teamwork. Health care future improvements will need to promote teamwork and excellent communication skills (Frankel, Leonard, & Denham, 2006). Safe patient care is an essential factor identified by the Joint Commission (TJC) (2014) through teamwork in the work environment. Providing students the opportunity to work as teams and communicate in a basic nursing course may better prepare them for transitioning to the work environment. It is imperative to continue to develop and test alternative methods in education that will lead to improved learning and will lead to improved test scores as well, there is a need to explore the POGIL approach in nursing education as a valuable tool for both. The author adopted the POGIL in a fundamental's class and used a control group section in the same semester to evaluate the effect on course grades and a standardized test.

## **Purpose/ Research Question**

The purpose of this study was to examine the relationship of *POGIL: Process-oriented guided inquiry learning*, utilizing group scenario exercises in the class on grade performance. The research question was: Will participation in the POGIL process in a fundamental nursing class

affect the final grades and ATI nursing education grades (national exam) of groups of students who participated in group scenario work (POGIL) compared to students who did not participate in group scenario work in class?

## Literature Review

In nursing, due to the complex nature of its curricula, innovative pedagogy should be explored to present this complex material. Published reports on the POGIL method of delivering science courses have documented success of students. A study of 200 undergraduate students investigated whether POGIL use affected grades, retention, self-efficacy, attitude and learning environment in a first semester chemistry course. Grades had some positive results in the POGIL group versus the control group. Retention rates varied, however emotional satisfaction and attitude toward chemistry was lower in the control population. Overall the POGIL approach had minimal impact on the results. No difference was revealed in self-efficacy between groups. The most positive result was the attitude toward learning environments of the POGIL students (Case, Pakhira & Stains, 2013).

Undergraduate biomechanics courses traditionally were taught by lab and lecture method. Students reported that lectures were not engaging and learning was not enhanced. POGIL (N=64) and traditional instruction methods (N=52) were compared. Quiz, tests and course grades were reported to be higher in the POGIL group (Simonson & Shadle, 2013). Many studies have documented the POGIL method in general chemistry. One author compared the final exam scores on a national standardized exam of organic chemistry with a participant and control group to evaluate the effectiveness of POGIL pedagogy. Analysis indicated that 72% of the POGIL students scored higher than the control group (Hein, 2012). The department of chemistry in Northwestern State University is utilizing POGIL. One author reported students helped struggling peers in their group, and grades have improved with fewer failures, fewer D's as well as fewer withdrawals in the course. However, all students did not embrace the student centered learning (Jackson, 2009).

A study was conducted to determine if implementing POGIL in aviation classes would be an effective teaching strategy. Two classes were taught by the same professor one using the POGIL method and the other employing the traditional approach. Pre and post-test were given in each group. The POGIL approach made a significant difference ( $p < 0.05$ ). The author concluded that POGIL was adaptable to an aviation course (Varek, 2011).

In summary, following a review of the literature POGIL has been documented as an effective approach in a variety of disciplines. Much of the research is centered on chemistry and other science courses. Studies have not included nursing courses utilizing the POGIL method. Al-

though it is a useful strategy POGIL has not been effectively documented in a fundamental nursing course. Therefore the aim of this study was to evaluate would POGIL group scenario exercises improve test scores in a fundamental nursing course.

## Method

The study used a comparative quantitative design. Two sections of undergraduate students in a fundamentals didactic nursing course were given the opportunity to volunteer to participate in the research. One class participated in six group scenario exercises and the control non-participant group was given the scenarios on an individual basis. Purposive sampling was used. The theoretical framework for this research study was Piaget's theory of constructivism (Piaget, 2012). Permission to conduct the research was obtained from the Institutional Review Board of the author's university with exempt status.

Two fundamentals' class sections were conducted during their first semester of the third year of a nursing program with the same professor. Group one (experimental) was offered the opportunity to participate in POGIL exercises during class time. The professor assigned 4-5 students to each group in the participation class. After lecture the participants completed in 45 minutes intervals six group case scenario exercises. A team leader of each group presented the information to the class. The professor throughout the exercise encouraged critical thinking and communication skills. Roles of reflector, recorder, presenter and manager were chosen by the students and rotated each group exercise. The participant group initially consisted of 27. Two students dropped the course in week 1 and were not included in the data. Therefore 25 students were analyzed in the data.

Group two (control) of another Fundamentals class of nursing students was given the opportunity to complete the same 6 case scenario exercises individually on-line after class. This group had the opportunity to individually submit the work to their professor. Roles of reflector, recorder, presenter and manager were not utilized as individual students completed the work. Four students in the non-participant group declined to participate and were not included in the data. Therefore 25 students in the control (non-participant) group were analyzed in the data. The scenarios for both groups were the same non-credit assignment.

Data collection included demographics from participants and non-participants such as age, gender, and grade point averages of students prior to the POGIL study in order to determine group equality. The instructor/researcher recorded attendance, and final course grades and ATI grades on both groups (experimental and control) at the conclusion of the study. The course grades were defined as the student's final grade and included two exams (20% each), two quizzes (10%), final exam (30%), concept map (10%), and a standardized ATI test (10%).

## Results

Demographic variables were analyzed descriptively to determine the comparison of the two groups (POGIL and Non-POGIL) in the course using SPSS version 21. The participant experimental group age range of students was 19 - 40 years with a mean age of 23.4 years old. Included in the data were three males and 22 female subjects. Non-participant control group in the study age range of student's was 19-26 years with mean age was 20.6 years. Included in the data were two males and 23 female subjects.

The mean 3.6 GPAs of participant and non-participant groups mean 3.5 GPAs prior to the study were compared for consistency and no significant differences were found. The mean final grade (B) of the participant POGIL group was higher than the mean (B-) of the non-participant group (See Table 1).

Table 1. Final Grade Fundamental Course				
Groups	N	Minimum	Maximum	Mean
Final grade Participants	25	76.9%	93.1%	83.8%
Final grade Non-participants	25	76.7%	90.9%	82.3%
Valid N total	50			

Table 2. ATi Fundamental Nursing National Exam				
Groups	N	Minimum	Maximum	Mean
ATi grade Participants	25	60%	100%	79.2%
ATi grade Non-participants	25	60%	85%	74%
Valid N total	50			

The participant POGIL group mean (C+) national standardized test scores were higher than the (C) non-participant group (See Table 2). The 2-tailed t-test ATi standardized test equality of means revealed a significance of  $p = 0.032$  with  $\alpha = 0.05$ . Distribution of the ATi was measured with a Mann-Whitney non-parametric test. The analysis was 0.28, which the data revealed reject the null hypothesis, which demonstrates significance at 0.05. There is a difference between ATi groups across the categories of treatment. The numerical final grade for the course between participant and non-participant groups was not significant 2-tailed t- test=.199.

## Limitations of Study

This study compared two groups, however the participants were not randomly assigned to the two groups compared. A small sample of 50 participated in the study. Participating students evaluated did not participate in the same number of scenarios; some participated in five and some in six. The non-participant group had access to the same scenarios to complete individually. Only two students returned three scenarios of the six required case studies given to students online to the professor for evaluation despite reminder emails. The study was conducted at one site with one professor and one course in one semester.

## Discussion

Consistent with the literature cited, the results of this study revealed a difference between those who participated in the POGIL group and those who did not. The quantitative study with aviation students had very similar results and method as this nursing study. One professor taught two sections of the same course and compared participant and control groups. Higher test scores were documented (Varek, 2011).

Similar results to this nursing study revealed higher course grades (means) at the end of the course for the POGIL group, and these results did demonstrate a significant difference in means, such as those noted in the studies by a positive impact occurred on standardized national exam on POGIL students in organic chemistry (Hein, 2012). Improved test scores were revealed in the participant groups than the non-participant group (Case, Pakhira & Stains, 2013; Simonson & Shadle, 2013 & Jackson, 2009).

The present study adds to the knowledge of the effectiveness of the POGIL method in a different discipline. The nursing study would be enhanced if more classes and instructors could be added to the research over a longer period of time. However given the constraints of the one semester study results were positive improvement in the standardized test grades of participant subjects.

Findings from this study indicate that continued research to define the value of the POGIL approach in nursing education would be beneficial. Future studies should include a larger randomized sample in multiple

sites with additional professors utilizing POGIL pedagogy. Besides end of course grades, future research may compare withdrawal satisfaction for nursing students between the POGIL participants and non-participant groups.

## Conclusions

POGIL is a pedagogy that has demonstrated success in chemistry and other sciences courses. Exploring this method in future nursing courses may be beneficial to students. The students that participated in the group scenario exercises of POGIL achieved higher final course grades and national test scores in fundamental nursing. This methodology also enhances the use of teamwork, which may help prepare students to meet an essential competency for professional nursing.

Exploring POGIL as a teaching strategy is in alignment with goals to promote evidence-based teaching. A priority in nursing education is to enhance the development of analytical critical thinking and teamwork, which is encouraged through use of POGIL methodology. Pedagogy, such as POGIL in nursing education has been shown to improve grades. Further research is necessary to determine if this pedagogy is applicable to other nursing courses and the long-term effect of POGIL adaptation in future courses.

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