

# Process Oriented Guided Inquiry Learning in Nursing Education

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## ABSTRACT

Employers want graduates who have the confidence and ability to make appropriate patient care decisions. This study was done to determine whether Process Oriented Guided Inquiry Learning (POGIL), would have an effect on the diploma in nursing students' academic achievement and confidence in learning. A convenience sample of students (n=73) were randomly assigned to two groups. A quasi-experimental study was conducted using pre-test/post-test together with a beginning/end of semester confidence in learning surveys. To determine the perception of the students towards the new instructional method, a semi-structured interview was done amongst nine students from the experimental group. Significant difference was found between the two groups towards confidence in learning, but not in the post-test scores. Three main categories and nine themes emerged from the interviews which supported the quantitative findings that POGIL as an instructional method has the potential to make a significant contribution to nursing education.

**Keywords:** POGIL, achievement level, confidence in learning.

## INTRODUCTION

Demand for nurses with diploma is high, but employers in Malaysia are very selective and want graduates who are committed and able to blend immediately into the working environment. They want nurses who have the confidence to communicate well in writing and orally, source for evidence-based information and think critically to solve and manage any nursing problems that may arise.

Majority of the millennials who join the programme are passive learners. When they are in the final semester, they are expected to have at least gained some ability to use the knowledge they had

learned in past semesters and during their clinical practicum to the coursework they are currently learning. In the clinical areas, if there is any deviation from norm, the students are also found to have difficulty applying the concepts learned in classroom. They have to be constantly supervised.

Current instructional methods are teacher-centred with emphasis on imparting discipline content. To replace these methods, innovative methods are being introduced to engage students not only in their own learning, but develop key skills that would enhance their employability and enable them to adapt to any new situations. One such active instructional method that is gaining much popularity in the field of science and meeting the needs of new workplace challenges is Process Oriented Guided Inquiry Learning (POGIL).

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## LITERATURE REVIEW

Grounded in educational research, POGIL was originally developed in the 1990s by educators who wanted to replace didactic teaching methods<sup>1</sup>. Based on constructivism, the focus of POGIL is on the student

and the process of learning. The students learn the required discipline content and the important skills which are relevant for their professional role and lifelong learning<sup>1</sup>. The allocated teaching time is used for discussions and guided inquiry activities with minimal or no lecture<sup>2</sup>. The lecturer acts as a facilitator rather than imparting information as content expert. Students are grouped into cooperative learning teams made up of four members, with each member having a specific role such as manager, presenter, recorder and strategy analyst. These roles are rotated for each class to enable the students to learn the associated key skills. The learning activities are designed around a three-phase learning cycle derived from Piaget's mental functioning model and Vygotsky's theory of learning<sup>3</sup>. Each class starts with a briefing of the learning outcomes to be achieved. Worksheets are then distributed with models specific to the course such as case scenarios and critical thinking questions<sup>2</sup>. In the exploration phase, students learn to examine and explore the given model. The given questions stimulate their curiosity and create the needed cognitive dissonance for critical thinking<sup>4</sup>. In the concept invention phase, the students learn to discover new concepts and relate to what they already know<sup>1</sup>. Finally, in the concept application phase, they learn to apply their conceptual understanding to new learning situations and in the process learn how to apply the concept learned to similar experiences they may encounter in the actual work setting. At the end of each class, learning teams are randomly selected to present their answers to the questions through their presenter. The whole class had to come to a consensus and agree on the right answer to each of the questions. Every team is given the opportunity to answer a question. The lecturer only intervenes to give a diagnostic assessment of the responses agreed upon and to use the information to provide a mini summary before ending the class<sup>2</sup>.

Successful implementation and effectiveness of POGIL in achievement levels and overall satisfaction of the students towards the method have been reported in many courses such as chemistry<sup>5, 6, 7</sup>, engineering<sup>8</sup>, aviation<sup>9</sup>, foreign language<sup>10</sup>, medicinal pharmacy<sup>11</sup>, anatomy and physiology<sup>12</sup>, biochemistry<sup>2</sup> and business marketing<sup>13</sup>. While academic achievement is important, students need to have a personal feeling of having succeeded in mastering a

learning task through their own abilities and efforts<sup>14</sup>. Confidence in learning is important and reported to have increased with POGIL<sup>2,7,15</sup>. Despite the benefits, students used to traditional teaching methods and the authoritative figure of the lecturer in the classroom were found not appreciative of POGIL<sup>8</sup>. Contributing factors were cited as unclear explanation given of the classroom format, expectations from the lecturers, inadequate feedback to the students and not listening actively to students' complaints<sup>8</sup>. This study was done to determine whether POGIL, a constructivist-based instructional strategy, introduced into a traditional teacher-centred environment would have an effect on the diploma in nursing students' achievement and confidence in learning. In addition, the study investigated the perception of students towards this instructional method.

## MATERIALS & METHODS

Mixed-methods sequential design was used to explore the following research questions:

1. Is there a difference between the post-test scores of nursing students in the POGIL group when compared to nursing students in the lecture group?
2. Is there a difference in the post-test scores between two genders of nursing students in the POGIL group when compared to nursing students in the lecture group?
3. Is there a difference in the post-test scores between the different nationalities of nursing students in the POGIL group when compared to nursing students in the lecture group?
4. Is there a difference in the end of semester confidence in learning scores of nursing students in the POGIL group when compared to nursing students in the lecture group?
5. What is the perception of nursing students towards POGIL as an instructional method?

In the quantitative phase convenience sampling was used. Final year students (n=73) registered for the course Communicable Diseases in January 2012 semester were selected. The class was divided into control (lecture method) (37 students) and experimental (POGIL) (36 students) groups. The course content, syllabus, homework and

examinations were similar. In the qualitative phase, purposive sampling of nine students, three with the highest scores, three with average scores and three with lowest scores from the experimental group were selected based on the final school examination results for the course Communicable Diseases and interviewed using a semi-structured format.

Two instruments were administered before and after the intervention: 1) Pre and post-test made up of 30 multiple choice items on Communicable Diseases and 2) A three-part confidence in learning survey questionnaire adopted and revised to suit the current course with permission from the authors<sup>16</sup>. The contents of the before and after intervention instruments were similar in all aspects except for tense changes in the end of semester confidence in learning survey format. The selected questions for pre and post-test were from the test bank and had undergone item analysis. Two senior lecturers checked the questions for content and face validity. Similarly, the confidence in learning survey was validated and piloted twice for test-retest reliability (Cronbach's alpha .912 and .891). The semi-structured interview format with five open-ended questions was also piloted among a similar group of students in July 2011 semester to determine the clarity of the questions, authenticity of the methods used and accuracy of findings<sup>17</sup>.

Ethical approval was granted by the university where the study was done. At all times confidentiality and anonymity of the students was maintained. Using SPSSv20, descriptive and inferential statistics were used to analyse quantitative data. Qualitative data was analysed using selective coding methods for themes and categories<sup>18</sup>.

## FINDINGS

Majority of the students were female (89%). Students were mainly from Malaysia (65.8%). Rest were from Botswana (28.8%) and Nigeria (5.5%). The mean age of the students was 22.3 years. The grade point average (GPA) of the students at the end of the previous semester ranged from 2.48 to 3.65 years with a mean of 2.87.

The main effect on post-test scores after controlling pre-test scores was not significant statistically between

the two groups, ( $F [1, 70] = .11, p = .740, \text{partial } \eta^2 = .002$ ). Only 0.2% of the student gains were related to POGIL as an instructional method when compared to the findings of other POGIL specific studies<sup>6,9</sup>. Similar to Barthlow<sup>6</sup>, the effect of group and gender in post-test scores was also not significant ( $F [1, 68] = .007, p = .934$ ). In addition, the effect of group and nationality was not significant ( $F [2, 61] = .057, p = .945$ ).

Confidence in learning of both groups at the beginning of semester was not significant ( $p > .05$ ). However, the computed t-value of independent t-statistic (equal variance assumed) showed a significant difference between the groups in the end of semester confidence in learning ( $p < .05$ ). The experimental group had a higher mean score compared to the control group<sup>2, 7, 15, 19</sup>. De Gale and Boisselle<sup>19</sup> had similar findings in a study done on students of an upper six class of a secondary school. However, their students in the POGIL class were academically good students compared to the nursing students who were academically average. Qualitative findings further strengthened these findings and showed the nursing students had benefited in terms of confidence gained.

Three main categories emerged from the interview. In the category, learning and teaching environment, four themes emerged: non-threatening environment, peer support, learning by doing and limited time. The students perceived their experience learning in a group and the use of worksheets did not hinder their learning. Despite the initial doubts, the psychologically safe environment and the support of peers were appreciated. The students perceived learning by doing and the intellectual discourse with their peers had benefitted them in many ways. However, the students stated of being stressful due to limited time in class to complete worksheets and prepare for each class. Some of the quotes are:

- *"It was fun, learning this way. I just express what I think is right. Not all the time we can be right. We never really had a problem as a group....so I like that."* (PG8);

- *"At first I thought, no way...I am going to get used to this kind of learning. What no lecturer. Later it sort of made sense. By working on it (worksheets) and you hear other people's opinion why they think that way about something you never thought of...made me check it out."* (PG8).

- *“So frus...stress...if manager or recorder and had to submit what is done next day in time (PG9).”*

The second category was personal factors with two themes: motivation to learn and self-confidence. From the responses, the students were found to be conscious of their own limitations and aware that doing the worksheets alone was insufficient. They knew it was important to read on their own. The students determination and effort put into learning was extrinsic and goal oriented, namely to do well in the course and ultimately get a good cumulative grade point. The constant feedback which is an in-built mechanism of POGIL classes was perceived by the students to have enabled them to self-assess and take the necessary steps to improve further. Such extremely motivated behaviours appear to have increased their self-confidence not only in examinations, but in the clinical area when giving care to patients<sup>20</sup>. Some examples of the student quotes were:

- *“I like to procrastinate, I never read before class. With POGIL you have to do it (PG6)”;*

- *“I think the POGIL classes helped me to be more sensible about the way to look at things in the ward. I was much more confident when reading patient case notes with hepatitis B. I sort of knew what to look for (PG4).”*

The third category was key transferable skills with three themes: teamwork, communication, critical thinking and clinical reasoning. The students perceived the skills they had learned in the POGIL class were important and difficult to learn in a lecture class where there is no active involvement and participation. Examples of some of the student quotes were:

- *“I know when I am absent from class, it can affect the group. We all have a responsibility and it is not fair if one of us do not show up” (PG6);*

- *“As a presenter, I learned to express my group’s ideas in front of the class” (PG3)*

- *“Without the right information we cannot think and reason out. Like we get to know not all the answers may be suitable for the particular case” (PG1).*

## CONCLUSION

It has been a challenge to introduce POGIL in a

teacher-centred environment. There were limitations which could not be avoided. True randomisation was not possible, but attempts were made to segregate gender and nationality before assigning the students to groups. All possible effort was taken to ensure both groups were kept as similar as possible to avoid extraneous variables. The small sample may have also contributed to statistical significance.

Nevertheless, the findings were encouraging and indicate that POGIL has the potential to contribute to nursing education in producing “work ready” graduates. One of the positive findings was the increase in the confidence in learning and how students perceived they had benefitted in many ways especially in learning important process skills when compared to lecture classes. Their only concern was the limited time for preparation and in completing the activities. Through self-assessment, they did realise the importance of prior reading and coming prepared for discussions. If POGIL had been introduced at beginning of the programme, it would probably have made a significant difference. A track and trend of achievement scores through the three years and further research will help to establish the effectiveness of POGIL especially in relation to retention of knowledge and level of growth in process skills.

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