

Problem-Based Learning Approach on the Knowledge and Skills in Pharmaceutical Care: Proposed Instructional Design

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ABSTRACT

The study established the difference between the Problem-Based Learning (PBL) Approach and Conventional Method of teaching among the first year Pharmaceutical students of Cebu Doctors' University. The result serve as basis for a proposed instructional design. The results for conventional method of teaching has the higher mean of 28.25 in knowledge, however in skills the PBL method has the higher mean of 80.09 compared to 72.89. In the post-test mean gain scores of students still higher mean in conventional method and in skills higher mean is with PBL method. There is significant difference in the post-test mean gain scores between the two groups as to knowledge in disease and drug therapy, and in communication skills. In general knowledge and skills of students differ between the two groups after teaching utilizing the two methods. In conclusion, there is significant difference in terms of knowledge of disease and drug therapy and communication skills between the conventional and PBL method of teaching, with a computed t-value of 2.40 and 3.72 respectively compared to the critical t-value of 1.67 the null hypothesis of no significant difference is thereby rejected. Conventional method of teaching is more effective as teaching methodology in imparting knowledge, and PBL approach is more effective in developing communication skills of the students.

Keywords: Problem-based learning approach, pharmaceutical care, communication skills, teaching methodology

INTRODUCTION

“A liberal education is at the heart of civil society, and at the heart of liberal education is the act of teaching” (Bartlett Giamatti).

Education to be meaningful should be in consonance with the times and with the present need of society. Students of this generation have shown their inherent desire for involvement in almost all phases of life. Thus, teachers should utilize group process as a teaching strategy or approach to have a good learning. The most disheartening aspect of education in colleges and universities today is the unpreparedness of students to do real college work. This deficiency has a strong debilitating effect on the attainment of academic excellence.

To improve the quality of college education, teachers should be updated and flexible in utilizing various methods and techniques of teaching. Knowledge of the subject matter alone is no longer sufficient to make an efficient instructor or professor, but the necessary training and skills do produce effective teaching and learning.

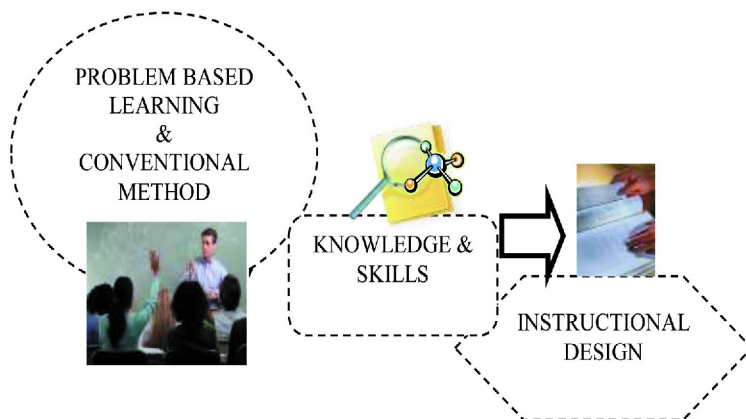
College instructors should realize that the principles and techniques of teaching are integral parts of professional preparation. Good learning is the result of democratic methods and procedures tailor made to the capacity of the students to understand and assimilate. This will stress individual worth and integrity of human persons on a plane of mutual respect, cooperation and fair play, freedom of inquiry and development of self-responsibility. This may also recognize freedom of each member to work with peers since intellectual growth of the students can be also achieved through group actions and cooperation.

It has been said that there is no best method of teaching for all teaching-learning situation. No one has proved one method to be superior to the other in every situation but the researcher believes that there is a method or technique that suits a specific type of lesson or subject matter in every classroom situation. One major subject in the Pharmacy curriculum is Pharmaceutical Care, in which, the researcher believes that can be best taught through problem-based learning(PBL) (Frazee, 1995).

In the pursuit of quality education, the researcher wants to implement another method of teaching in Pharmaceutical Care, which is proposed by the Philippine

Association of Colleges of Pharmacy (PACOP). With this reason, the researcher who is a faculty member of the College of Pharmacy, envisions that graduates in the College will be equipped not only with knowledge but with skills that can globally compete in the field of practice.

FRAMEWORK



The input of the study was the problem-based learning approach on the knowledge and skills in pharmaceutical care among the first year pharmacy students. The data were processed through experimental analysis and the output of the study was a proposed instructional design in the subject pharmaceutical care. According to Frazee and Rudnitski (1995), instruction is a personal craft, so teachers must be confident in choosing a variety of strategies to motivate and engage students in learning. They form a continuum from direct to indirect teaching. Direct instruction is teacher-centered and indirect instruction is student-centered. Student centered instruction believes that learning is a result of a student’s ability to understand and process information. The teacher facilitates indirect learning. Combination of direct and indirect instruction are possible, depending on the nature of the lesson, student needs, and teacher preference.

Palma (1992) defines method as a teaching-learning strategy. An effective strategy is expected to bring about the desired learning outcomes. The role of the teacher is to be responsible for creating a climate for thinking so that students feel free to think, are encourage to think, and are challenged to think. The democratic principle of respect for others has been violated from a different

viewpoint. Individuals do not always select the most direct, the least cost, or the most appropriate means to gain their ends.

Teachers of their multiple role as motivator, traditional teacher, facilitator and collaborator. Implications to science teaching view learning eby interacting, learning by watching and listening, learning by thinking and understanding, and learning by doing. Authentic learning tasks enable students to see the connections between classroom learning and the world beyond the classroom (Dorado, 2001).

According to Duch (2003), in some ways, PBL is self-evident that results from working with problems. Official descriptions generally describe it as an instructional strategy in which students confront contextualized, ill-structures problems and strive to find meaningful solution. Problem-based learning begins with the introduction of an ill-structures problem on which, all of the learning is being centered. The learners work independently with the given problem and engage in formulating solutions to the problem. Teachers assume the role of cognitive and metacognitive approach rather than knowledge-holder and disseminator.

Furthermore, James Rhem (2004) of the University of Delaware stated that by having greater ownership of the teaching and learning process, students learn how to learn and are much better able to deal with unfamiliar situations. The context of learning is more realistic and there is plenty of anecdotal evidence indicating that graduates from PBL courses are better prepared for the workforce than those from more traditional programmes. This kind of learning is much appropriate to the pharmaceutical care subject of pharmacy curriculum.

OBJECTIVES OF THE STUDY

This study aimed to determine the effectiveness of problem-based learning approach on the knowledge of disease and drug therapy. This also determined the skills in communication in the subject Pharmaceutical Care, among first year pharmacy students in Cebu Doctors' University, Mandaue City.

Specifically, the study aimed to: (1) determine the mean score in the pretest and posttest in knowledge of disease, and drug therapy and communication skills in the experimental group (Problem Based Learning) and control group (Conventional/Traditional Teaching); (2) determine the posttestmean gain score in knowledge and skills in communication in the two groups; (3) determine the significant difference in the pre and posttest meanscores of the students in the

experimental and control group in terms of Knowledge of disease and drug therapy, and Skills in communication; (4) determine the significant difference in the posttest mean gain of the students between the experimental and control groups in terms of knowledge and skills; and (5) proposed an instructional design in Pharmaceutical Care.

Hypothesis

1. There is no significant difference in the posttest of the students in the experimental and control group in terms of knowledge and skills.
2. There is no significant difference in the mean posttest gain of the students between the experimental and control groups in terms of knowledge and skills.

METHODS

Research Design

Random assignment of the students to the experimental and control group were not done, hence this study employed the quasi experimental method of research to determine the effectiveness of problem based learning approach on the knowledge and skill in pharmaceutical care of first year pharmacy students of Cebu Doctors' University.

Research Environment

The study was conducted in the College of Pharmacy, Cebu Doctors' University, Mandaue City. The College has classrooms which can accommodate to at least forty students, well ventilated with ceiling fans each. Classrooms are utilizing white boards and LCD. It has enough overhead projector to be used in the classroom and with one classroom designed for demonstration type of class.

Research Participants

First Year Pharmacy students enrolled in Pharmaceutical Care were the research participants of this study. One section was exposed to the problem-based learning approach with approximately forty (36) students enrolled, and the other section was introduced to Conventional/Traditional way of teaching, with thirty one (31) students enrolled.

The participants in each group represents approximately 10% of above average students; 30% average and about 60% are below average with high school general weighted average range between 75-79.

Research Instrument

A prepared examination based on the module was used, determining knowledge of disease and drug therapy with a total of fifty (50) items. And a pre-tested rubric was used based on the criteria set to determine the skills in communication. A record sheet was also used to reflect the scores of the students in the pretest and posttest for data analysis and documentation.

Research Procedures

1. Random Assignment of the Sections

Enrollment in the College of Pharmacy is first come first serve basis, thus one class is heterogenous type, a mixture of above average, average, and below average students. The researcher utilized one section with almost the same number of students for Problem-Based Learning and one section for conventional/traditional method of teaching.

2. Administration of the Pretest

The two sections were given the prepared examination prior to introducing the new subject matter through the PBL method and conventional way of teaching. The examination was fifty (50) items which covers the knowledge of disease and drug therapy. The class was given one hour to answer the test questions which was arranged one seat apart. The result of which was tallied and computed.

3. Team Formation

Five to six members composed one group with one leader chosen by the professor/instructor, the leader then selected his/her members to complete the team. The instructor explained the objectives to all. He gave the group a brief lecture on what are supposed to be included in the final report and during panel discussion session. Each group was given a case to be analyzed, with one week time allotment for research. They were given a scenario/situation designed to place them in a familiar work context to give the learner the scaffolding to extend his reality. At this stage the learners grouped together to describe the problem,

which allows them the freedom to identify key elements in the given problem and to use these part of their problem identification process.

4. Problem Inquiry

Here, the learner used prior knowledge to come up with possibilities to the given problem. The class was given one hour group discussion that allow the learner for free collaborative exchange of knowledge among the group members. After this session, the team was given one week break from the classroom setting for research work in preparation for reporting and buzz session.

5. Learning Issues

During the one week break, the learner selected, organized, and categorized the many ideas. They worked independently as they engaged in finding information on the learning issues delegated to them. They engaged in searching for various resources including interviewing people with experience in the given problem. Learners came together once again and tabulated the information they had gathered through their search with open sharing of new information they had picked up in their readings. The group then proceeded to engage in formulating the solution to the problem, through the information they have gathered. Then they did the final group presentation in the classroom which was subjected to panel discussion and interrogation by the instructor.

6. Reporting/Presentation of the Case

Each team presented their consolidated report to the class. They are given 15 minutes and another 15 minutes for questions and answer. The instructor as the facilitator guided them with the objectives. The learners reflected regarding the process of learning, as well as their reflections of the sharing and learning they have gathered in the process used to learn. Evaluation of team reports was based on the completeness of the paper and the presentation based on the prepared rubric.

Conventional Method of teaching

In this method, the researcher conducted a lecture-discussion covering the same subject matter as of the Problem-Based Learning group. This was done three hours a week for one month. After discussion, the students were encouraged to ask questions regarding the topic discussed.

Administration of the Posttest

The whole class was given the same set of examination as in the pretest, items were rearrange and were given again to the group with one hour time allotment to answer the fifty (50) items multiple choice test questions, with seating arrangement of one seat apart. Results were tallied and computed to get the mean scores of the whole class.

RESULTS AND DISCUSSION

Table 1 presents the pre and posttest mean score of the students. Table 1 is the posttest result after introducing the two method of teaching conventional way and the PBL method as to student's knowledge and skills.

Table 1

Pre and Posttest Mean Score of students in the two groups

Group	Knowledge (\bar{X})		Skills (\bar{X})	
	Pretest	Posttest	Pretest	Posttest
Conventional Method	15.91	28.25	62.28	72.89
Problem-Based Approach	15.08	24.34	64.60	80.09

Table 1 reflects the pre and posttest mean scores of students in the two groups as to knowledge of disease and drug therapy, and communication skills. It is evident that both groups increased in the posttest scores as to knowledge and skills. However, it shows that the posttest mean increase under knowledge is credited to conventional method while in the communication skills it is in the PBL method which is 80.09 over 72.89. This means that first year students are still dependent on teachers discussion in the classroom setting.

Kyra Sheahan (2013) said classroom environments promote and stimulate a dynamic collaborative learning. This translates into a type of learning in which the pairing or grouping of students is required to complete a task or to come to a specific outcome. Collaborative learning enhances students' critical thinking skills. Teaching in a classroom gives students the opportunity to engage in live discussions in which they are forced to use their critical thinking skills to formulate opinions or arguments. When students are placed in a live classroom, they experience social interactions with peers and establish rapport with teachers.

Classroom teaching environments help students figure out how to resolve conflicts, work in teams, get along with those from different cultural backgrounds and give presentations in front of peers. Such experiences are valuable in shaping students' communication and listening skills, as well as growing and maturing emotionally.

Table 2 presents the mean posttest gain score of the two groups on knowledge of disease and drug therapy, and communication skills

Problem-based learning orients students towards meaning – making over fact-collecting. Students learn via contextualized problem sets and situations. Because of the dynamics of group work and independent investigation, they achieve higher levels in forming skills and more social skills as well.

Table 2

Mean posttest gain Score on knowledge and skills in the two groups

Group	Knowledge (X̄)	Skills (X̄)
Conventional Method	12.38	10.47
Problem-Based Approach	8.97	15.49

Table 2 reveals the mean posttest gain score in knowledge and communication skills in the two groups of which higher gain in conventional method of 12.38 as to knowledge but in skills PBL has the higher gain of 15.49.

The PBL group of students were more exposed to group works and discussion, during which they have more time in interacting with each other, hence more chances of exchanging words that will develop their confidence in communicating. Once there is teaching, this follows learning.

According to Gow and Kember (1993) teaching is not indivisible from learning. Good teachers are those who know what is meant by learning, because only then they will know what they expect from the learners to achieve. If the teachers goal is to prepare the students to pass an exam, then this will affect the way they teach. Furthermore, Gow and Kember said that learning can be subsumed under any of the following points: a quantitative increase in knowledge; memorization; the acquisition of facts and procedures which can be retained and/or used in practice; the abstraction of meaning; an interpretative process aimed at the understanding of reality and some form of personal change.

Table 3 presents the significant difference of the pre and posttest mean score of the students in two groups as to knowledge of disease and drug therapy and the skills in communication

Pharmaceutical care is the responsible provision of drug therapy for a purpose of achieving outcomes that improve patients quality of life through knowledge of disease, elimination or reduction of symptoms and prevention.

Table 3

Significant Difference of the pre and posttest mean scores between the two groups as to knowledge of disease and drug therapy

Evaluation	Mean	SD	Computed t	Critical t	Decision H ₀	Interpretation
Pretest	15.91 15.08	0.39 0.38	0.95	1.67	Accept	Not significant
Posttest	28.25 24.34	1.76 1.40	2.19		Reject	Significant

Table 3 reflects the significant difference of the pre and posttest mean scores of the two groups, as to student's knowledge on disease and drug therapy. In the pretest mean, the computed t-value is 0.95 lesser than the critical t-value of 1.67, thus the null hypothesis of no significant difference is accepted. Meaning, the knowledge of the students in the conventional and problem based learning approach before the lesson was being introduced is in the same level, which is also evident in the computed mean of 15.91 and 15.08 respectively. However, in the posttest mean the computed t-value is greater than the critical t-value of 1.67, where null hypothesis of no significant difference is rejected. This simply means that the knowledge of students after teaching, utilizing the two methods has difference. As shown by the obtained mean value, the conventional method of teaching has 28.25 higher than the mean value of PBL group which is 24.34. Since the null hypothesis is rejected this means knowledge of students reflected in the posttest had a different increase between two groups. Conventional method is better compared to the PBL method.

The researcher believes that there is no best method above all method of teaching and that no teaching method can beat a teacher discussing in front of

the learners. Young minds need all inputs of their teachers and that mostly are dependent to what is being shared and imparted by their teachers.

The result supports the statement of progressivism theory of learning that describes learning as a process that is active, purposeful, meaningful and creative. Learning is not merely a case of individual set of neurons and their connections cooperating when one learns but rather a coordinated and unified pattern of response that occurs in the learner.

Furthermore, Aquino (2000) said that knowing is a part of learning and that true learning has occurred only when the behavior of the individual has been changed.

Table 4 presents the significant difference of the pre and posttest mean scores between the two groups as to communication skills

PBL approach has flourished mainly in medical and professional schools. This method of teaching is self-evident that results from working with existing problems, as this is generally describe as an instructional strategy in which students find meaningful solutions to an structured problems or situations.

Table 4

Significant Difference of the pre and posttest mean scores between the two groups as to communication skills

Evaluation	Mean	SD	Computed t	Critical t	Decision H ₀	Interpretation
Pretest	62.28	3.06	0.97	1.67	Accept	Not significant
	64.60	2.68				
Posttest	72.89	2.99	5.98		Reject	Significant
	80.09	2.48				

Table 4 shows the significant difference of the pre and posttest mean scores of the two groups, as to students skills in communication. In the pretest mean, the computed t-value of 0.97 is lesser than the critical t-value of 1.67 reason to accept the null hypothesis, which means that there is no significant difference of the student’s skills in communication before teaching which also entail that the two groups are in the same level. However, after teaching, the posttest mean score significantly differ, which means that one method of teaching has a significant

increase in the posttest score after the intervention. As shown in the table the PBL method has a higher mean of 80.09 over the conventional method of 72.89. Hence, PBL method of teaching can develop good communication skills compared to the conventional method.

The result supports the later statement of Jeffry Pan that says, when people listen to and learn from each other, they communicate more efficiently and honestly. Group discussion exercise play an important role in developing the communication skills. People get to know each others' views and thoughts through such exercises. More importantly, discussing on a particular topic compels the participants to listen to each other carefully. A person can speak freely and without getting tensed when you just have to speak to a single person at a time, or in a small group of people.

Table 5 presents the significant difference in the mean posttest gain of knowledge and skill between the conventional method and problem-based approach.

The context of learning in PBL is more realistic; students learn how to learn and are much better able to deal with unfamiliar situations. A lot of evidence indicate that graduates from PBL courses are better prepared for the workforce than those from more traditional programmes.

Table 5

Significant Difference in the mean posttest gain of knowledge and skills between the two groups

Category	Mean	SD	Computed t	Critical t	Decision H_0	Interpretation
Knowledge	12.38	0.94	2.40	1.67	Reject	Significant
	8.97	1.08				
Skill	10.47	0.96	3.72	1.67	Reject	Significant
	15.49	0.86				

Table 5 shows the significant difference in the mean posttest gain of knowledge and skills between the two groups. Based on knowledge, the mean posttest gain is 12.98 for conventional and 8.97 in the PBL method, where conventional method evidently has the higher gain. However, the computed t-value of 2.40 is higher than the critical t-value of 1.67, reason to reject the null

hypothesis of no significant difference. This simply means that the posttest gain scores of students as to their knowledge on disease and drug therapy significantly differ. Thus, conventional method of teaching is better than the PBL method in this subject. This means that first year students are not ready to adopt a new method of teaching because they are used to the traditional way of teaching during their high school years.

Piaget's theory of maturity supports this result, which states that learners cannot undertake certain tasks until they are psychologically mature enough to do so. He proposed that children's thinking does not develop entirely smoothly: instead, there are certain points at which it "takes off" and moves into completely new areas and capabilities.

As to the posttest gain scores in skills, it is in the other way around. PBL method has a greater mean of 15.49 over the mean in the conventional method of 10.47. Hence, the computed t-value of 3.72 is again higher than the critical t-value of 1.67 which means that there is significant difference of their posttest gain scores. This further proves that the PBL method of teaching is much better than the conventional method when it comes to developing good communication skills among learners.

CONCLUSIONS

In conclusion, there is a significant difference in terms of knowledge of disease and drug therapy and communication skills between the conventional and PBL method of teaching, with a computed t-value of 2.40 and 3.72 respectively, and a critical t-value of 1.67. Therefore the null hypothesis is rejected.

Conventional method of teaching is effective as teaching methodology in imparting knowledge of disease and drug therapy. Problem based learning approach is effective in developing communication skills of the students.

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ACKNOWLEDGMENTS

The researchers expresses their sincerest appreciation to the following who helped them throughout the entire work of experimentation, preparation and completion of this study; God Almighty, the Supreme Being for the bountiful blessings and for making good things to happen; the researcher's parents and husband not only for the financial, moral and spiritual support but also for the unending guidance and inspiration they contributed to this work and in all undertakings they aspired for; the University statistician, who patiently helped the researcher in data processing and analysis and for the inputs and valuable suggestions; and the entire faculty and staff of the College of Pharmacy, Cebu Doctors' University, who helped the researchers in the formulation of test questions and in pre-testing the rubric for validity; to the pharmacy students who willingly participate in the implementation of the study; and to those who helped the researcher in one way or another.