



The effect of extra small group session during PBL implementation on student's achievement

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Abstract

Problem based learning (PBL) started to spread in health professions in Saudi Arabia at the beginning of this century. There are several challenges facing its implementation such as defects on interpersonal communications and self - directed learning. These challenges would affect students' performance in small group discussions and their achievement on exams. We believed that, introducing midweek sessions might improve students' performance. This intervention study included third year medical students (36 students) . The students were randomly divided into two groups, A and B (18 students each). An extra small group discussion was conducted with group A in the middle of the week (midweek session) between the brain storming and debriefing sessions in haematopoietic and immunology courses. At the end of the midweek session, the students were asked to summarize and record their accomplishments. The scores marks \pm SD at the end of each course examinations were evaluated. Moreover, a questionnaire was designed to explore the students' opinion about the midweek session. The data were analyzed and the studied groups were compared using analysis of variance (ANOVA) and chi square tests. The means of the scores in continuous assessment and the end of the course exams were significantly higher in group A compared to group B in both immunology and haematopoietic courses. Moreover, a survey showed that the students have a positive feedback about the implementation of the midweek session. The midweek session has a good impact on the students' performance and achievement in problem-based learning.

Keywords: Small group discussion, midweek session, problem-based learning, PBL.

INTRODUCTION

Problem-based learning (PBL), also known as case-based learning, is an increasingly integral part of education that reform around the world, especially in the medical, and in pre-professional and professional programs (Michel et al., 2002). While there is no universally-accepted definition of problem-based learning in the literature (Morgan, 1983), the essence of PBL can be summarized as the use of a "real world" problem or situation as a context for learning (Barrows, 1985; Boud, 1985; Domin, 1999; Duch, 1995; Morgan, 1983).

In PBL, the small-group discussions encourage student's development of critical thinking skills, a high professional competency, problem-solving abilities, knowledge

acquisition, the ability to work productively as a team member and make decisions in unfamiliar situations and the acquisition of skills that support self-directed life-long learning, self-evaluation, and adaptation to change (Albanese and Mitchell, 1993; Engel, 1991; Ryan and Quinn, 1994). In PBL, this is achieved by using situations or problems presented in class that resemble reality.

The skills necessary for successful teaming include: consensual decision making skills, dialogue and discussion skills, team maintenance skills, conflict management skills, and team leadership skills. Students who have these skills have a better opportunity to learn more than students who do not have these skills (De Grave et

Table 1: Comparison between group A and B according to age and GPA

	Group A (Mean \pmSD)	Group B (Mean \pmSD)	p value for t-test (at two tail)
Age (years)	20 \pm 1	20 \pm 1	0.9
GPA (out of 5)	3.55 \pm 0.4	3.53 \pm 0.5	0.5

al., 2001; Peterson, 1997a, b; Schmidt et al., 1989). Many medical schools including ours have adopted Problem Based Learning (PBL) to promote active learning. However, quantitative evidence of the effectiveness of PBL is still weak. Therefore, we have tailored the curriculum of our medical school to be in a hybrid form of the pure PBL system and the traditional system aiming at overcoming the major drawbacks of these two educational systems.

It is a fully integrated program offering a mixture of problem based on small group, learning with appropriate lecture and laboratory teaching with faculty from different departments that contributing to each course; the emphasis throughout is on self-directed learning with PBL being the organizing feature of each week. Our curriculum is composed of three phases; phase I (Pre-Medical), Phase II (Basic Medical Sciences), and Phase III (Clinical Sciences).

For the duration of Phase II, randomly assigned small groups of 8 or 9 students will consider a problem together. Tutorial groups will meet for approximately three hours twice a week for the duration of the course. During the first small group session (brain storming session), the student group will identify and prioritize a number of learning issues/objectives.

Students will be expected to spend four to six hours each week on independent study outside the small group to research and elaborate upon new information and concepts. As they return to their small group on second weekly session (review or debriefing session), they will bring this new knowledge and information to the group. With the assistance of a faculty tutor, important issues and learning objectives will be further identified and discussed. Each week, new information built into the original problem may be introduced by the tutor. Within each course, a PBL group will likely encounter five or six problems.

Why change was necessary

In our school, we accept students at high school entry level. This has forced us to deal with students who were relatively young and inexperienced and who were used to methods of instruction that were the teacher centered with no active involvement of the students with themselves in the teaching and learning process. It was reported that there are internal (e.g., motivation, knowledge, skills and capacity) and external (e.g. tools, expectations and rewards) barriers during implementation

of this approach (Azer, 2001) . Although, we have introduced more than one course at our school to enhance professional and personal development, it was noted that our students felt that, they were lost and that it took them a long time to get used to our spiral, student centered approach of teaching and learning.

It was evident to us that when students have too much freedom, they may fail to come into contact with what to be learned. The lessons learned and research indicates that PBL should adopt guided discovery learning rather than pure discovery learning. Guided discovery is generally more effective than pure discovery in promoting learning and transfer to new problems (de Jong, and van Joolingen, 1998; Spencer and Jordan, 1999). We assumed that the introduction of Small Group Midweek Discussion would facilitate the students teaming skills and cause them to value self -directed learning thereby improving their achievements. It is basically a mid week meeting, where a single faculty meets with all the groups to go over the material and objectives that were covered up to that point. The idea was to stimulate students to be on top of things, to be more organized, and to overcome procrastination. The outcome of a preliminary assessment suggests that students benefited appreciably from this program with an increased students' interactivity in the educational process.

MATERIALS AND METHODS

The study involved 36 male third year medical students at our medical school attending the haematopoietic and immunology courses consecutively over a period of 10 weeks (5 weeks each). The study was approved by the ethical committee and the students consented to participate in it. The students were randomly divided into two groups A and B (18 students each). The students in both groups were close to each other in age, gender (all males), GPA (Table 1) and demographic characteristics

Group A was randomly subdivided into two subgroups (9 students each) where the number of students in each group mimics the number of students attending the regular PBL sessions (brain storming and debriefing sessions). Midweek sessions were introduced to the two subgroups of group A between the brain storming and the debriefing sessions. The duration of which was similar to the duration of regular brain storming and debriefing sessions (3 hours) and were conducted during the self -directed learning time. No Midweek sessions were conducted with group B. In preparation for the Midweek sessions; students in the two subgroups were asked to prepare and work on the learning objectives that had been discussed during the brain storming sessions and to summarize and record their accomplishments in this regard so that it can be recorded and noted by the faculty member supervising the Midweek sessions.

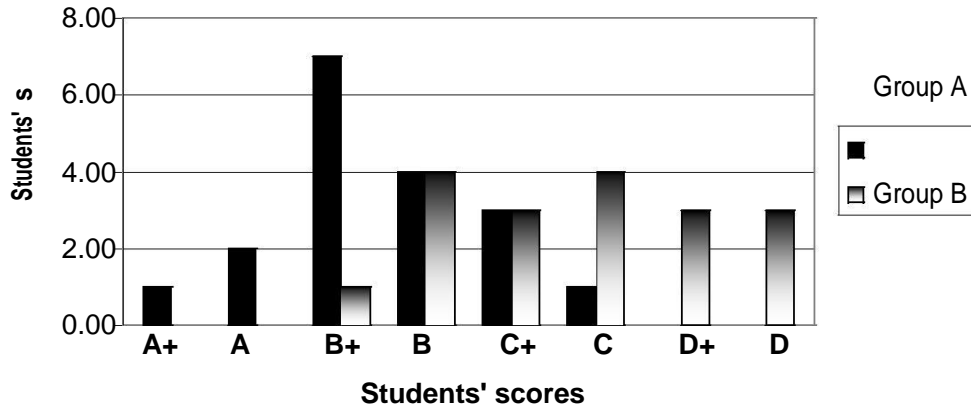


Figure 1: The overall student's scores in haematopoietic unit.

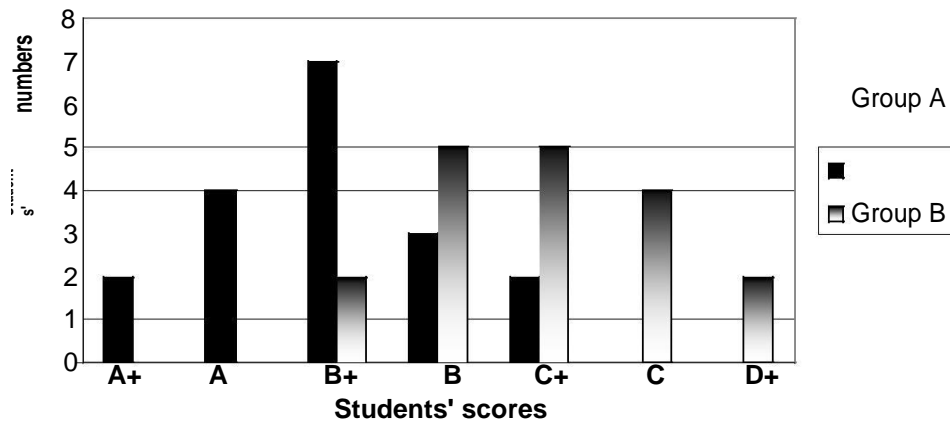


Figure 2: The overall student's scores in immunology unit

The measured outcomes

1. Students in phase II are assessed by a combination of summative and formative methods of assessment; small group tutor-student evaluations, portfolios, field visit reports, student seminar evaluation, lab reports, quizzes, and clinical skills (collectively called continuous assessment in our curriculum), as well as other formats of written exams (mid course and end of course exams).

The result of the small group tutor-student evaluations, mid and end of course exams, as well as the overall scores for the two study groups were analyzed statistically for the two courses.

2. A questionnaire was designed to evaluate the students' perceptions towards the midweek session. The questionnaire was tested for face validity. It focused on the perceptions of students' performance, self confidence and teaming.

The scores of the exams (scores marks' means \pm SD) and questionnaires data were recorded in MS EXCEL spreadsheet. An analysis of variance (ANOVA) and chi square tests were used for the data analysis. The tests were considered significant when the p value $<$ 0.05.

RESULTS

The overall scores in the two courses showed that most

of the students in group A achieved higher (C+ or more) scores than those in group B (p value = 0.003 and 0.007 respectively at one degree of freedom) (Figures 1 and 2). Similarly, the mean scores of the written part of the end of course examinations for the two courses showed that the scores of students in group A were significantly higher (p value = 0.000005) than those in group B (Table 2). However, there were no significant differences in the OSPE results (p value = 0.8) between the two studied groups.

Moreover, the mean scores of the mid course examinations for the two courses showed that the scores of students in group A were significantly higher (p value = 0.00022) than those in group B (Table 2). Furthermore, scores of group A in the small group tutor-student evaluations were significantly higher than those in group B (p value = 0.023) (Table 2).

Finally, we explored via a questionnaire group A students' perceptions of the midweek sessions (Table 3). All the surveyed students agreed that the midweek sessions improved their utilization of the educational resources. It was noted that the midweek session improved the

Table 2: student's achievements in the haematopoietic and Immunology courses

Assessment		Immunology course		Haematopoietic course		P- value
		Group A	Group B	Group A	Group B	
End of the course	Written	85.7±7	77.2±6	87.2±6	75.2±8	0.000005
	OSPE	80±10	81±11	84±12	86±13	0.8
	Mid-course	80±10	65±12	81±10	67±10	0.00022
	Small group tutor-student evaluations	95±9	86±4	96±5	89±8	0.023

Table 3: The results of the survey on the students' opinion on the midweek session

	Agree	%	Disagree	
Midweek sessions made me study earlier in the week than before	16	88.9	2	11.1
The midweek sessions improved my knowledge	15	83.3	3	16.7
The midweek sessions improved my deep thinking	17	84.4	1	5.6
The midweek sessions made me to better utilize the educational resources	18	100	0	0
Due to Midweek sessions I became more confident towards the exam	15	83.3	3	16.7
The midweek sessions improved my interactions with my colleagues (as a source of knowledge)	14	77.8	4	22.2
The midweek sessions reduced the stress of review (debriefing) sessions	15	83.3	3	16.7
The midweek sessions improved the overall performance of my PBL group	16	88.9	2	11.1
The midweek sessions made me more aware of the importance of team work	16	88.9	2	11.1
The midweek session improved my interpersonal communication skills	16	88.9	2	11.1

performance, interpersonal communications and teaming skills for most of the students of the surveyed group A (Table 3).

DISCUSSION

The aim of this study was to evaluate the effectiveness of the introduction of Small Group Midweek Discussion session between the brain storming and the debriefing PBL sessions in the PBL implementation on the students' overall achievement.

To the best of our knowledge this is the first regional published data addressing this issue. The overall student's scores showed that the performance of those students who attended the midweek sessions were significantly higher than those who did not. This suggests that students benefited appreciably from this program with an increased students' interactivity in the educational process. According to students' responses to the questionnaire the students attributed this overall improvement in their achievements to the improvement in interpersonal communications and teaming; this however

has been described previously by Peterson (13-14) who suggested that these activities in general might improve discussion and teaming skills and consequently improve individual and group performances.

Students began studying immediately after the brain storming sessions, which might have been due to increased sense of responsibility and motivation to achieve some objectives before attending the midweek session. Additionally, it was evident that midweek sessions have motivated students to better utilize available educational resources that have been often ignored either due to lack of interest or due to lack of guidance.

The study has many limitations. It is limited in its scope and it included only a limited number of students attending only two courses. Before we could suggest the generalization of the study finding, more studies are needed to support the effect of the extra small group midweek session on the students' achievements.

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