
Learning across boundaries

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Abstract

This study aims to compare the learning process and achievement of the third year students who have undergone the old style curriculum and the fourth year students had undergone the Student Centered Learning approach for the past year. These two different groups were mixed for tutorial discussions. The tutorial sessions were provided with one scenario - the subject of Oral Medicine III: the compromised-patient. We focused on comparing the results of both groups on the process of learning and the block test.

The eight mixed tutorial groups comprised of 16-20 students (half from the old style curriculum and half from the student-centered approach group) each. They were assessed by two tutors on the learning process: the time schedule, activity during discussion and relevance of questions asked. Furthermore, the study compared the results of the block test on 5 multiple choice questions (MCQs) on the compromised-patient among 100 MCQs at the final examination. There was no significant difference between the two groups for the process of learning and the result of the block test. This study challenges the belief that new concepts or knowledge require prior knowledge; is known as learning across boundaries.

Keywords: prior knowledge, PBL, Oral Medicine

Introduction

Problem Based Learning (PBL) has been widely used in many medical institutions. It can indicate who the motivated students are and therefore better achievement is accomplished. Through careful selection of problems the process awareness has constructed the smallest unit of learning (Snellen-Ballendong & Dolmans, 2000). Students are facilitated to learn certain subjects when directed by teachers. The Faculty of Dentistry, Gadjah Mada University, has not applied the Problem Based Learning (PBL) method to its students but the faculty has implemented part of the Student-Centered Learning (SCL) strategy (Harsono, 2003).

The Oral Medicine Department has been given opportunities to develop the SCL in Oral Medicine subjects.

Researchers were curious and challenged to discover if the third year students were at the same academic level as the fourth year students. Students of both years were mixed for tutorial discussions. As a matter of fact, the third year students were studying under the old curriculum. In contrast, the fourth year students had been using the SCL approach for one year in the Oral Medicine II. The researchers' curiosity arose several years ago because a third year student passed the Oral Medicine III examination without taking Oral Medicine II, a pre-requisite subject. This case promoted the researchers to test whether pre-requisite subjects were no longer appropriate.

Material and Methods

Subjects

Third and fourth year students (2006 and 2007) were the subjects. The researchers organized 8 mixed tutorial group classes, each with 16-20 students from the classes of both 2006 and 2007 (Figure 1). Both groups had mastered the pre-clinical science courses such as pathology, pharmacology and microbiology, a pre-requisite to the Oral Medicine classes. The performance at

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the pre-clinical subjects showed no significant difference between the classes of 2005 and 2007 (Table 1). Due to the policy of the pre-clinical

departments, exact scores were not made available for this study.

Figure 1: Model of mutually synergy performed by different competencies and lecturing between two groups for the solution the same problem.

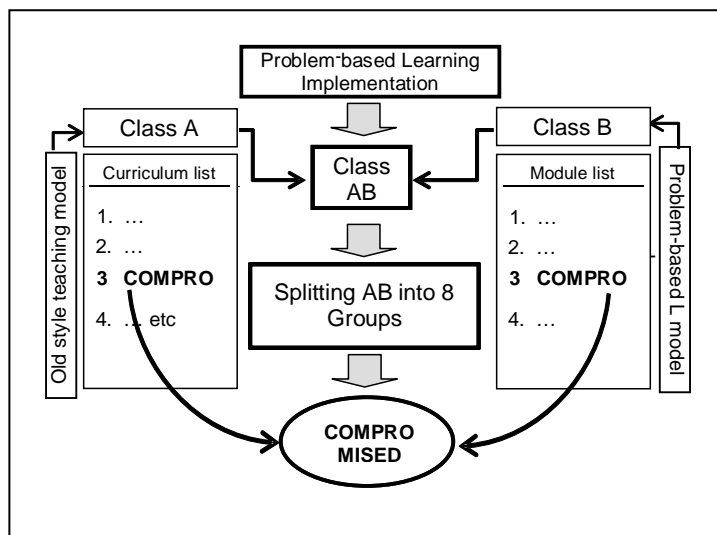


Table 1: Pre-clinical sciences subjects' of class 2007 and class 2005 prior to this study

Subjects	Score and percentage											
	Class 2007 (PBL) N = 108						Class 2005 (Non PBL) N = 78					
	A (%)	B (%)	C (%)	D (%)	E (%)	Failed (%)	A (%)	B (%)	C (%)	D (%)	E (%)	Failed (%)
Pathology	6.5	39.2	33.6	12.4	4.6	3.7	6.7	43.0	36.0	10.0	3.2	1.1
Pharmacology	4.2	53.1	29.7	8.5	3.0	1.5	4.8	49.9	27.8	12.5	2.0	3.0
Microbiology	3.5	44.3	19.2	27.1	5.0	0.9	4.8	52.8	15	20.6	4.6	2.2

Instrument and Procedure

The participants of the mixed tutorial group were senior students, who were studying Oral Medicine for the third time (Oral Medicine III), and junior students studying Oral Medicine for the first time (Oral Medicine I). There were two tutors for each group. The process of learning in tutorial discussions was assessed by the tutors in three aspects: 1. on time arrival, 2. discussion activities, 3. specific and relevant questions asked. Each aspect was scored on a scale of 1-3. One indicated the best performance and three was for the worst. At the end of the block, the result of the block test was obtained through the five questions among 100 multiple choice questions (MCQs).

The case of compromised-patient:

The compromised-patient is a patient who is medically weakened by certain causes and cannot be accepted for ideal treatment (Little *et al.*, 2002). It is necessary to understand philosophically that dentistry is similar to one of the varied specialties of medicine. Consequently, it is imperative that dentists understand the medical background of their patients before beginning dental therapy, which might fail because of the patient's compromised medical status (Lynch, 1984). The learning process of compromised patients (CP) includes diagnosis and treatment of oral problems that might reflect either localized oral diseases or the oral manifestation of systemic problems. This is a good example to stimulate students to learn

about the relationship between local oral disease and general health problems. The CP scenario is designed for two aspects of learning: the first is the diagnostic method and the second for patient management.

The design of the block test

Final examination questions were designed according to the grid of each curriculum. There were 5 cases that should be referred, to be able to answer the 100 MCQs. Four of the cases were different for the class of 2006 and the class of 2007 according to the different subjects they followed, which were Oral Medicine III and Oral Medicine I. However, both classes received one case on the same compromised-patient. There was a direction for students to look at which scenario chosen out of five scenarios to be able to understand and answer the 100 questions of MCQ. This model of assessment was referred from Azer (2003). The total assessment time was 100 minutes.

Analysis

Our objective was to see the difference in the process of learning and the results of examination between the 2007 class and the 2006 class. Our hypothesis was that the senior students would be better in the process of

learning as well as the result of the block test compared to the junior class. We assumed that the junior students would only reach the understanding of the diagnostic aspect of learning, and abandon the understanding of the patient management aspect of learning. The results of both classes on the process of learning and block test were compared through t-test independent sample.

Results

Table 2 shows the result and the statistical analysis for both groups for the three processes of learning. For “on time arrival”, “discussion activity” and “relevant questions asked” the mean score for 2007 class was 5.06 while for 2006 class was 6.48 on a 10 point scale. No significant difference was found between the scores of the 2007 class and 2006 class for the three processes of learning ($p > 0.05$).

Table 3 shows the results and the statistical analysis for both groups for the block test. The average results of the two classes did not show any statistically significant difference ($p > 0.05$). Our hypothesis that the senior students would be better in the process of learning as well as the result of examination was not proven.

Table 2: The result of the learning processes (attendance, discussion activity and specific relevant questions)

	N	Mean	Standard Deviation	Significance ($p < 0.05$)
Class 2007 (PBL)	108	5.06	1.07	
Class 2005 (Non PBL)	78	6.48	2.96	-

Table 3: The results of the 5 MCQs of the block test

	N	Mean	Standard Deviation	Significance ($p < 0.05$)
Class 2007(PBL)	108	2.92	1.01	
Class 2005(Non PBL)	78	2.41	1.02	-

Discussion

Process of learning

No significant difference was found between the two groups. Assessment of the process of learning aimed to monitor students for their curiosity in learning the compromised-patient scenario. Psychologically, if someone is presented with something new they will stop to think for a minute about the sequence of events described. If they know the explanation and they

fully understand about the things explained, they will be satisfied to follow the next event or, they may think in the contrary by rejecting it (Dolmans & Snellen-Balendong, 2000; Westberg & Jason, 2004). Consequently, the discussion would be limited and the objectives of the tutorial will not be achieved.

However, the implementation of compromised-patient scenario applied for the Class of 2007, which in fact had never undergone any prior

SCL approach, showed that these students followed the first consideration. The performance of the two groups of different years with different levels of competencies as well as different models of learning revealed that the two groups were able to work in a team to solve a problem according to their capacity without any difficulties. Under the circumstances, clear explanation about the implementation of the new method before the learning process began was the key. Another reason was that the new group might have heard about the innovation implemented in the senior group and this had perhaps motivated them to join the SCL learning approach. Increasing motivation to learn is indeed one of positive effect of PBL program (Moust *et al.*, 2001). When students were confronted with a problem in the tutorial group, any prior knowledge relevant to the problem would be activated. Although the two groups were actually different in only one year's academic experience and they both already had prior knowledge of Dentistry, they were totally different in their curriculum approach.

Using the compromised-patient's problem as a starting point to learn, students generated possible explanations for each aspect according to their competencies and prior knowledge. The students formulated learning issues by themselves and determined what was relevant to study. Tutors encouraged them to direct their own learning process, which increased their motivation and made them more actively involved in the discussion. Depending on the preparation and the complexity of the problem, integration of knowledge from various competencies and disciplines would take place more or less automatically. The problem of the compromised-patient encouraged the students to gather knowledge that helped them in understanding the scenario. This kind of experience transcends the boundaries between disciplines and prior knowledge.

The block test

Two groups showed no difference in the results of the block test for compromised - patient scenario assessment. The junior group seemed to be 'fresher' in prior knowledge to answer the 5 MCQs and it might be contributed mostly in this process. The learning climate of SCL was another possibility. Psychologically, it would bring them into a better academic atmosphere that they had not experienced before. This would motivate them to develop self directed learning so that they could overcome the anxiety of obtaining low scores. The junior students' score was actually better than that of the senior class, although it was not statistically significant (Table

2). Therefore, it may be interpreted that since there was no significant difference between the two groups, the boundaries caused by the different instructional patterns were blurred. Our hypothesis that the junior class would only understand the diagnostic process of the compromised-patient case was not proven; they also managed to understand the concepts of patient management.

Because the compromised patient scenario only accommodated 5 multiple choice questions among 100 MCQs of the block test, the result of the 5 items could be biased by choice. However, the 5 items had been constructed randomly within the 100 MCQs. To answer those 5 questions, the student had to have followed the compromised-patient scenario. Therefore, it limited the chance if random guessing.

Conclusion

Students demonstrated that they could learn Oral Medicine without any pre-requisite subject knowledge. Whether this can also be demonstrated in other subjects in Dentistry should be further studied. This study indicates that new concepts or knowledge can be learnt by any student from any academic year, with any level of prior knowledge, but only if they learn it through an effective teaching-learning process. This can be termed as learning across boundaries.

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Conflicts of interest: no conflict of interest declared

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References

Azer, S.A. (2003) Assessment in a Problem-based Learning Course: Twelve Tips for Constructing Multiple Choice Questions That Test Students' Cognitive Skills, *Journal of Biochemistry & Molecular Biology*, 31, pp. 428-344.

Dolmans, D. & Snellen-Balendong, H. (2000) *Problem Construction*, (Datawyse, Universitaire Pers Maastricht), p.17.

Harsono, M. (2003) *Student Centered Learning: A teacher-training handbook*, (Yogyakarta, Gadjah Mada University), pp.11-15.

Lynch, M.A. (1984) *Dentistry and Oral Medicine*. In: Lynch, M. A., Brightman, V. J. & Greenberg, M.S. (Eds) *Burket's Oral Medicine Diagnosis and Treatment* (eighth ed) (Philadelphia, JB Lippincott Co.), pp. 788-798.

Little, J.W., Falace, D.A., Miller, C.S., *et al.* (2002) *Dental Management of the Medically Compromised Patient* (sixth ed) (St Louis, Missouri, Mosby Inc.), pp. 64-92.

Moust J.H.C., Bouhuijs, P.A.J. & Schmidt, H.G. (2001) *Problem-based learning: A student guide*, (Groningen, Wolters-Noordhoff), pp.13-17.

Snellen-Balendong, H. & Dolmans, D. (2000) *Block Construction*, (Datawyse, Universitaire Pers Maastricht), pp. 26.

Westberg, J. & Jason, H. (2004). *Fostering Learning in Small Groups. A Practical Guide*, (Colorado, Springer Publishing Company), p. 36.