

Academic satisfaction among traditional and problem based learning medical students

A comparative study

Ahmed I. Albarrak, PhD, Rafiuddin Mohammed, MSc, Mohammed F. Abalhassan, MBBS, Nasser K. Almutairi, MBBS.

ABSTRACT

الأهداف: تقييم الرضا الأكاديمي والأهمية الأكاديمية عند طلاب التعليم الطبي التقليدي والتعليم الطبي القائم على حل المشكلات وتقييم مواطن الاهتمام في التعليم الطبي من وجهة نظر الطلاب.

الطريقة: أجريت دراسة مقطعية في كلية الطب، جامعة الملك سعود، الرياض، المملكة العربية السعودية. شارك طلاب التعليم الطبي التقليدي والتعليم الطبي القائم على حل المشكلات عن طريق العينات العشوائية. يتألف الاستبيان من 6 أقسام رئيسية: التعليم والتعلم، والإشراف والتغذية الراجعة، وتنسيق المقررات، وتكنولوجيا المعلومات وتطوير المهارات. تم قياس معدل الاستجابة عن طريق مقياس مكون من 7 نقاط من النوع (ليكرت سكيل) بناءً على تقييم معدل الرضا الأكاديمي والأهمية الأكاديمية.

النتائج: مجموع 92 طالب من التعليم التقليدي (66 ذكور (72%)، 26 إناث (28%)) و 108 طلاب من التعليم القائم على حل المشكلات (84 ذكور (78%)، 24 إناث (22%)) تم انضمامهم للدراسة بمتوسط العمر (المتوسط \pm الانحراف المعياري) 21.32 ± 1.27 و 20.66 ± 0.97 على التوالي. كان معدل الرضا العام لدى طلاب التعليم المبني على حل المشكلات أعلى بالمقارنة مع الطلاب في التعليم التقليدي في التعليم (60.3%/84.65%)، التعلم (64.5%/81.4%)، الإشراف (51.5%/80.0%)، التنسيق للمقررات (46.9%/69.3%)، تكنولوجيا المعلومات (58.9%/74.0%)، تطوير المهارات (53.9%/79.1%) على التوالي. كان هناك دلالة إحصائية في مقارنة الرضا الأكاديمي لدى الطلاب من المجموعتين على حد سواء ($p \leq 0.001$). وكان تقييم معدل الأهمية الأكاديمية بشكل عام مماثل تقريباً لكل من الطلاب في التعليم التقليدي والتعليم المبني على حل المشكلات ولم يكن هناك دلالة إحصائية في مقارنة معدل الأهمية الأكاديمية.

خاتمة: أكثر العناصر غير المرضية لطلاب التعليم الطبي التقليدي كانت الإشراف والتدريس وتنظيم المقررات والتي تدل على سلبية النظام التقليدي للتعليم الطبي. من المحتمل وحسب نتائج الدراسة أن يكون النظام التعليمي القائم على حل المشكلات وسيلة ناجحة في تعزيز التعليم الطبي.

Objectives: To evaluate the academic satisfaction and importance among traditional learning (TL) and problem based learning (PBL) medical students, and to further evaluate the areas of concern in the academic education from the student's point of view.

Methods: A cross sectional study was conducted at the College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia from May to June 2012. The survey questionnaires were self-administered and consisted of mainly 6 sections: teaching, learning, supervision, course organization, information technology (IT) facilities, and development of skills.

Results: A total of 92 TL (males: 66 [71.7%]; females: 26 [28.3%]), and 108 PBL (males: 84 [77.8%]; females: 24 [22.1%]), with a mean age of 21.3 ± 1.3 (TL), and 20.7 ± 1.0 (PBL) were included in the study. The overall satisfaction rate was higher in the PBL students when compared with TL students in: teaching (84.7%/60.3%); learning (81.4%/64.5%); supervision (80%/51.5%); course organization (69.3%/46.9%); IT facilities (74.0%/58.9%); and development of skills (79.1%/53.9%). There was statistical significance difference in academic satisfaction comparing both groups of students ($p \leq 0.001$). The overall importance rating was almost similar in both TL and PBL of students, and found no significance in comparing importance rating.

Conclusion: The most unsatisfied elements for TL students were supervision, teaching, and course organization, which demonstrate the disadvantages of the traditional system. The PBL was potentially considered a successful method in enhancing medical education.

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From Medical Informatics and E-learning, College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Associate Professor Ahmed I. Albarrak, Chairman, Medical Informatics and E-learning, College of Medicine, King Saud University, PO Box 63709, Riyadh 11526, Kingdom of Saudi Arabia. Tél. +966 554198890. Fax. +966 (11) 4690798. E-mail: albarrak@ksu.edu.sa

In medical education, the most often practiced method is referred to as, traditional system. In this system, the critical aspect is that, students do not participate in finalizing the curriculum, which impedes the personal growth of students.¹ The traditional curriculum had inaccuracy, such as overcrowding of the curriculum, over-presentation of the same subjects, and the presence of non relevant subjects.^{2,3} These problems were reflected negatively on student's academic achievements and educational environment.⁴ Despite of these much number of disadvantages of traditional system, currently problem based learning has gained much attention and has been widely explored in many medical educations. The PBL modifications include introduction of better system of management and teaching where by a sample clinical problem or scenario is presented, which encouraged brainstorming to come up with issues that are important to fully understand the subject. Many students had successfully filled the gap in their knowledge with the PBL system alternative to traditional system.⁵ Those days were long gone where education was a transfer of knowledge from the teachers to the learners.⁶ The PBL education helps in the development of generic skills, such as problem solving, thinking ability, communication among the expert, teamwork within the group, time management and information.^{7,8} The academic satisfaction among students is a major concern to different departments of the university and also the educational planner. An evaluation system is necessary to evaluate if the new system is working to produce better consequences.⁹ Different predictor has been studied to enhance the academic performance in different perspectives.¹⁰⁻¹² A student attitude inventory (SAI) were surveyed, which focuses motivation, study methods, examination techniques, and lack of distraction towards the academic work.¹³ In another study,¹⁴ personal characteristics and their predictive potential for academic achievement were analyzed. Other study suggests that 3 levels of student feedback consisting of teacher assessment, questionnaires, and course module are to be considered in making management decision.¹⁵ An extensive review of literature in the field of traditional and PBL students'

academic evaluation in Saudi Arabia did not yield any result in comparison. Therefore, the primary objective of the study was to evaluate student's satisfaction and importance with academic activities among TL and PBL students. The secondary objective was to examine the areas of concern in the academic education from the student's viewpoint.

Methods. This is a cross sectional study conducted at the College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia from May to June 2012. This study received ethical approval. The second and third year undergraduate medical students of the College of Medicine were included in this study. All participants signed an informed consent, and assured the participants of full confidentiality. First year students were excluded as they have insufficient experience regarding the academic education system. Students who registered for short courses and training program belonging to other universities and colleges were also excluded. Before the study began, participants were thoroughly enlightened on the purpose and procedure of the study. Given the fact that the population of the study was finite and limited, the research plan was targeted on all 2nd year PBL, and 3rd year TL medical students. A self-administered questionnaire was distributed to all students in these 2 levels during their scheduled classes, and a total of 92 TL and 108 PBL medical students returned the questionnaire with a response rate of 37% for TL and 40% for PBL students. This study questionnaire was design and modified from Quad Research.¹⁶ It consists of mainly 6 sections: 1) Teaching; 2) Learning; 3) Supervision; 4) Course organization; 5) information technology (IT) facilities; and 6) Development of skills, in addition to demographic information. The modified questionnaire was evaluated by a group of professors in the College of Medicine. The questionnaire was adopted in English and no Arabic version was used. The outcome of the questionnaire was measured based on satisfaction and importance rating. The questions rating was measured by a 7 point Likert type scale that is: 0 - no difference; 1 - little-satisfied/little-important; 2 - satisfied/important; 3 - very-satisfied/very-important; -1 - little-unsatisfied/little-important; -2 - unsatisfied/not important; and -3 - very-unsatisfied/ not important at all. For practical considerations, the scale was modified to be from 1 to 7, where 1 - represents very-unsatisfied/not important at all, and 7 - very-satisfied/very-important. Furthermore, point 1, 2, and 3 were grouped as unsatisfied/not important, point 5, 6, and 7 were grouped as satisfied/important, and 4 was the neutral point.

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The Statistical Package for Social Sciences version 18 (SPSS Inc, Chicago, IL, USA) was used for data analysis. Descriptive data analysis was used to compute frequencies and proportions. The non-parametric Mann-Whitney U test was used to identify statistically significant differences between TL and PBL educational systems. Differences were considered statistically significant at $p < 0.05$.

Results. A total of 200 participants were recruited to participate in the study. Table 1 shows the characteristics of the participants. The results showed statistical significant difference in the age of the 2 groups of students ($p < 0.0001$). The study revealed that majority of PBL students are more satisfied than the TL students in teaching with different factors, such as, content of the lectures (90.0%/72.9%), delivering lectures (85.1%/55.2%), tutorial sessions (89.2%/59.2%), practical session (83.2%/55.1%), course intellectual stimulation (81.7%/55.1%) duration of teaching (77.4%/48.6%), size of seminar group (84.0%/58.2%), and showed statistical significant ($p < 0.0001$) (Appendix 1 & 2, Table 2). Nearly half of the TL students are not satisfied with elements of learning, such as, availability of learning resources (48.7%), and adequate advantages of learning program (51.5%). On the other hand, more than 80% of PBL students believed that the course of the present curriculum developed their knowledge. There was a strong difference among medical student of TL and PBL with respect to satisfaction rating ($p < 0.0001$), and no significance with respect to importance rating in the learning elements (Appendix 1 & 2, Table 2). With respect to assessment of criteria, the data showed that 45.5% of TL students and 73.1% PBL students are satisfied, and in feedback on academic performance, 45.3% of TL students and 77.3% of PBL students are satisfied. A significant difference was observed between these 2 student groups with respect to satisfaction rating of supervision and feedback ($p < 0.0001$), whereas no significant difference appeared when they were asked to rate the importance rating (Appendix 1 & 2, Table 2). Most TL students reported that they are satisfied with the availability of computers (77.6%), accessing university e-mail (62.2%), and IT staff support (64.6%). At least half of the TL students are not happy with accessing printing resources (56.6%), and IT training (56.5%). The PBL students are most satisfied with the availability of computers (90.2%) for their course curriculum. It is reported that few students of PBL are not satisfied with the use of IT training (38.8%), and IT staff support (35.7%). In addition, a significant difference was observed

Table 1 - Characteristics of the participants included in a study conducted at the College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia.

Variables	Traditional	Problem based learning	P-value
Age, mean \pm SD	21.3 \pm 1.3	20.7 \pm 1.0	<0.001
Male, n (%)	66 (71.7)	84 (77.8)	0.326
Female, n (%)	26 (28.3)	24 (22.1)	
Total	92	108	

Table 2 - Comparing traditional versus problem based learning (PBL) academic satisfaction and academic importance.

Characteristics	Academic satisfaction			Academic importance		
	n	Mean rank	P-value	n	Mean rank	P-value
Teaching			<0.0001			0.085
PBL	108	124.28		99	101.52	
Traditional	92	72.58		90	87.83	
Learning			<0.0001			0.778
PBL	108	118.77		99	95.55	
Traditional	92	79.05		89	93.33	
Supervision and feedback			<0.0001			0.173
PBL	108	119.26		100	100.63	
Traditional	92	78.47		90	89.81	
Course organization			<0.0001			0.051
PBL	108	115.43		99	102.29	
Traditional	92	82.97		90	86.98	
Information technology facilities			<0.002			0.717
PBL	108	112.15		101	97.35	
Traditional	92	86.83		90	94.48	
Development of skills			<0.0001			0.279
PBL	108	118.33		100	91.05	
Traditional	92	79.57		89	99.44	

between the students of TL and PBL in the elements of IT facilities ($p < 0.01$), and no significant observed in importance rating (Appendix 1 & 2, Table 2). Majority of PBL students were satisfied with the curriculum syllabus (80.6%), daily and weekly timetable (62.4%), and course handbook (73.4%) provided to them. Nearly half of the TL students are unsatisfied with the academic elements of course organization. Comparison of the 2 groups showed a significant difference regarding satisfaction rating of course organization ($p < 0.0001$), and no significant difference was shown with respect to importance rating of elements in this dimension (Appendix 1 & 2, Table 2). In TL, 53.4% of students

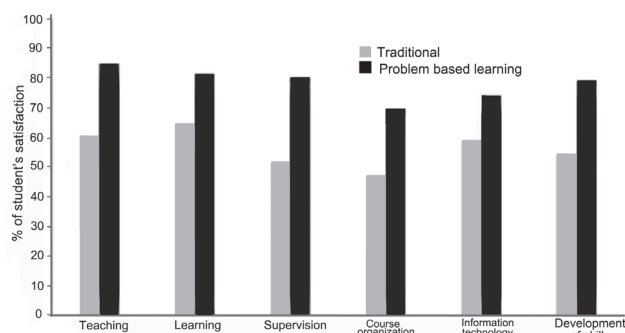


Figure 1 - The overall mean percentage of academic satisfaction among traditional and problem based learning students.

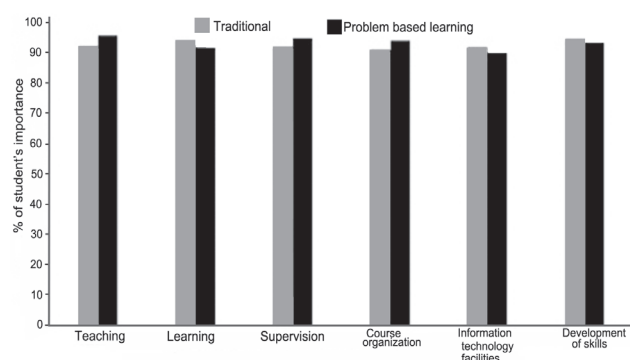


Figure 2 - The overall mean percentage of academic importance among traditional and problem based learning students.

were satisfied with the developing skills that support program academic achievement. More than 60% of TL students believed that developing skills are necessary for future working life. In addition, 59.2% of TL students reported not satisfied with accessing opportunities skills that developed outside of the course. On the other side, 84% of PBL students were satisfied with the developed of skills through problem based learning techniques. There was strong evidence that showed statistical significant difference among medical student of TL and PBL with respect to satisfaction rating ($p < 0.0001$), and no significant with respect to importance rating in the elements of developing skills (Appendix 1 & 2, Table 2). The overall satisfaction rate was higher in PBL students than TL in teaching (84.65%/60.3%); learning (81.4%/64.5%); supervision (80.0%/51.5%); course organization (69.3%/46.9%); IT facilities (74.0%/58.9%); and development of skills (79.1%/53.9%) (Figure 1). The overall importance rating was almost similar in both TL and PBL students (Figure 2). Further, the current study demonstrated that mainly there was no

statistical significant with respect to gender comparing academic satisfaction and importance rating except in few comparisons as shown in Appendix 3.

Discussion. This study was intended to measure the satisfaction and importance rating that is essential for the academic development among medical students. Student outcomes and retention are among the key measures for the quality of the education. Student satisfaction has been identified as one of the factors that affects the quality and overall effectiveness of an academic program.¹⁷ The higher the level of satisfaction with the academic program, the higher the likelihood that the student will stay at the medical school. This study collected the data of satisfaction and importance rating to evaluate and comment independently with the academic activities. Teaching and learning are becoming increasingly important in medical education. In the current study the comparison of TL and PBL students showed statistical difference ($p < 0.0001$) for the element teaching while academic importance showed no significant differences (Table 2). Further, the results demonstrated that most of the TL students were not satisfied in teaching with variables, such as, course intellectual stimulation (44.9%) and duration of teaching (51.4%), which signifies the disadvantage of traditional education system (Appendix 1). Similar findings were reported by Manzar and Manzar¹⁸ who found that most of the students (57.2%) were not satisfied with current level of teaching patterns. Further meta analyses study showed that PBL curriculum found to be more stimulating and useful than traditional curriculum, which was found to be non-relevant, passive and boring.¹⁹

In this study, both learning systems students were similarly satisfied with the practical sessions, and are successfully filling the gap in their knowledge base. In practical sessions the students were actively involved in small groups and engaged in real life research problems. The difference is that in traditional practical classes students follow a prescribed experimental procedure whereas in PBL the responsibility of running the experiment will be on the students themselves so that they must be aware of all steps of such experiments. It is believed that intellectuality of course is the important part of the curriculum, in which interesting subjects to be included. The PBL facilities help students learn the empirical proficiency needed for problem solving which is absent in traditional learning. This is the reason why PBL with its innovative approaches has been gaining importance in teaching and learning processes. Teaching and learning qualities are designed to ensure that

students gain the appropriate clinical and scientific knowledge. However, teaching and learning specifically are different in traditional and PBL methods. Findings in the current study revealed that there is a statistical significant ($p < 0.0001$) between TL and PBL regarding academic satisfaction whereas academic importance did not show any significant difference (Table 2). This could be due to the fact that problem based learners are actively involved in collaborative discussion where by facilitators helps learning through open ended questions designed that make students to think. Bereiter and Scardamalia²⁰ reported that PBL students are responsible for their own learning, which required reflective and critical thinking about what is being learned. In other studies, it was documented that interactive teaching style and group discussions were more preferred by students than lecture based learning.^{21,22} In traditional learning teachers talk more than the students, and the students get less opportunity to learn the subject. Further, the results of this study demonstrated that 51.5% of TL students are not satisfied with the learning program because it is based only on one-way communication, where lecturer becomes aware of students problems. Similar results were shown where self-directed learning was found more effective than lectures.²³ The current study showed that PBL students have more analytical ability than TL students due to the skills and logical thinking ability developed by PBL method. The critical thinking and metacognitive skills are not tangible in traditional method.^{24,25} The TL students (51.3%) are less satisfied compared to PBL students (67.1%) regarding the use of online resources. Similar results were reported that PBL students use self-chosen learning resources, whereas TL students use faculty chosen resources.²⁶

In medical education, supervision and feedback are considered as basic tools of the learning process. In different studies it was reported that supervision was an essential factor and feedback plays major role in the development of education.^{27,28} In this study, the result of supervision and feedback showed statistical significant between TL and PBL students in academic satisfaction ($p < 0.0001$), and no significant regarding academic importance. Further results demonstrated that nearly 50% of TL students are not satisfied with the assessment criteria and feedback on academic performance, whereas 70% of PBL students are satisfied (Appendix 1 & 2). Another study²⁹ found that 19.5% of PBL students accepted tutor feedback while majority disagreed (67.4%). Direct observation and constructive feedback make it easier to students for clinical learning.³⁰ In addition, feedback assists the reflection of self-education.³¹ In the current study, TL facilitators

may either neglect the importance of feedback, or they are not aware about the strengths and weaknesses of the conducive manner of learning. In both cases the students may not be able to evaluate whether they are achieving their learning goals.³² In this study, the result of course organization showed statistical significant differences between TL and PBL students in academic satisfaction ($p < 0.0001$), and no significance in academic importance (Table 2). Further results demonstrated that most of the TL students are not satisfied with the prior notification of changes to course arrangements and timetable. Gallagher and Stepien³³ compared course scores for PBL and TL, and found PBL scored higher results. In the traditional system, the critical aspect is that students do not participate in finalizing the curriculum, which impedes the personal growth of students.¹ In another study,³⁴ they demonstrated that learner satisfaction becomes the starting point for curriculum redesign based on the learner satisfaction approach. Therefore, course organization evaluation is essential for the diversity of academic institutions. Indeed, the current study results demonstrated that the course organization and its subsequent planning is inadequacy in TL compared to PBL.

The rapid advances in communication and information technology in the last few years, coupled with the pervasion of the worldwide web into everyday life have brought important implications in the education field. Medical schools nowadays provide comprehensive computer services and its applications for students. The IT facilities become a central component of the learning and teaching environment. Advances in information technology brought a great impact on medical education, such as the way of curriculum design and delivery of lectures. In a previous study³⁵ on utilization of information technology in medical education, they found that most of students reported adequate skills at word processing (55%), e-mailing (78%) and surfing the internet (67%). In this study, the result of IT facilities showed statistical significant between TL and PBL students in academic satisfaction ($p < 0.001$), and no significant in academic importance (Table 2). Building of knowledge and developing skills of students are important objectives of medical education. All medical school curricula are designed to attain these goals. In the present study, PBL students showed higher satisfaction compared to TL in all levels of skill development element, namely, skills to support academic achievement, gaining experiences, and access to various opportunities for skills development. A statistically significant was shown between the 2 groups of students ($p < 0.001$) in satisfaction, and no significant

difference appeared regarding importance (Table 2). A similar study³⁶ reported that traditional learning is not effective in improving students' skills. In another study,³⁷ PBL was shown to improve the analysis, synthesis, and lifelong learning skills. In PBL, students are capable of self-directed learning skills, and purifying their acquired knowledge. Thus, PBL is not only a problem solving issue, but rather developing skills and knowledge.

Although the current study provides insight into some of the important subject comparison between TL and PBL method, it has some limitations. The sample size limits the generalization of the results and findings of the study at a single university. A large number of samples could not be collected due to the restricted number of students in each program. Further, the limitation of this study is that it relies on data that measures only student perceptions, which may not always be entirely capable of providing accurate results. Future research should examine satisfaction of the academic staff towards the students and the effectiveness of students in each learning system as they are the core of education system in the university. In addition, readers should also be reminded that the PBL is a new approach that still needs more and more evaluations.

In conclusion, this study results demonstrated that PBL method is an effective way of delivering medical education in comparison to TL. Both PBL and TL students believe that all the academic factors considered as important and are essential for the institutional development. Notably, PBL students are highly satisfied with all factors specified in the current study. The most unsatisfied elements for TL students were supervision, teaching, and course organization, which demonstrate the disadvantages of traditional learning system. However, there is strong evidence that PBL students are more satisfied with the implementation of PBL method in comparison to TL methods. These results should help the academic developer to implement various planning and strategies for the future education among medical students.

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Appendix 1 - Traditional students responses regarding academic activities.*

Characteristics	Satisfaction rating			Importance rating		
	Un-satisfied	Satisfied	Total n (%)	Un-important	Important	Total
<i>Teaching</i>						
Content of lectures - your main subject(s)	23 (27.1)	62 (72.9)	85	6 (7.1)	79 (92.9)	85
The way in your lectures are delivered	30 (44.8)	37 (55.2)	67	7 (8.5)	75 (91.5)	82
Usefulness of seminars (tutorial sessions)	29 (40.8)	42 (59.2)	71	9 (12.0)	66 (88.0)	75
Usefulness of practical/lab sessions	22 (30.1)	51 (69.9)	73	4 (4.9)	77 (95.1)	81
The course is intellectually stimulating	31 (44.9)	38 (55.1)	69	6 (7.7)	72 (92.3)	78
The amount of timetabled teaching	36 (51.4)	34 (48.6)	70	9 (11.0)	69 (88.5)	78
The size of seminar group	33 (41.8)	46 (58.2)	79	3 (3.8)	77 (96.2)	80
<i>Learning</i>						
The course is developing your subject knowledge	15 (18.3)	67 (81.7)	82	4 (4.7)	81 (95.3)	85
The opportunities to develop practical skills for future	23 (30.3)	53 (69.7)	76	2 (2.4)	81 (97.6)	83
The development of your analytical ability	21 (31.8)	45 (68.2)	66	3 (3.9)	74 (96.1)	77
Availability of online teaching and learning resources	37 (48.7)	39 (51.3)	76	9 (10.8)	74 (89.2)	83
Your learning program takes adequate advantage of learning technology	34 (51.5)	32 (48.5)	66	6 (8.2)	67 (91.8)	73
<i>Supervision and feedback</i>						
Clarity of information about assessment criteria	36 (54.5)	30 (45.5)	66	6 (7.7)	72 (92.3)	78
Usefulness of feedback on your academic performance	35 (54.7)	29 (45.3)	64	7 (8.6)	74 (91.4)	81
Opportunities for informal discussion with staff	32 (48.5)	34 (51.5)	66	6 (7.4)	75 (92.6)	81
Sufficient contact time with teaching staff	36 (49.3)	37 (50.7)	73	6 (6.9)	81 (93.9)	87
Access to a member of staff in your department (others has personal tutor) for general academic and pastoral advice if needed	22 (34.9)	41 (65.1)	63	8 (9.9)	73 (90.1)	81
<i>Course organization</i>						
Overall organization of the course	40 (55.6)	32 (44.4)	72	8 (9.4)	77 (90.6)	85
Relevance of the course handbook	37 (50.7)	36 (49.3)	73	10 (12.0)	73 (88.0)	83
Prior notification of changes to course arrangements	43 (57.3)	32 (42.7)	75	6 (7.4)	75 (92.6)	81
The way your timetable is spread over day/week	38 (57.6)	28 (42.4)	66	6 (7.4)	75 (92.6)	81
Range topics covered in your syllabus	31 (44.3)	39 (55.7)	70	7 (8.9)	72 (91.1)	79
<i>Information technology (IT) facilities</i>						
Availability of computers	19 (22.4)	66 (77.6)	85	8 (9.4)	77 (90.6)	85
Access to the internet/e-mail via university systems	31 (37.8)	51 (62.2)	82	5 (6.0)	78 (94.0)	83
Access of printing resources	43 (56.6)	33 (43.4)	76	6 (7.3)	76 (92.7)	82
Training in the use of IT	39 (56.5)	30 (43.5)	69	7 (9.7)	65 (90.3)	72
Helpfulness and support from IT staff	23 (35.4)	42 (64.6)	65	7 (9.0)	71 (91.0)	78
<i>Development of skills</i>						
Developing skills to support academic achievement	34 (46.6)	39 (53.4)	73	6 (7.5)	74 (92.5)	80
Developing skills you need for future working life	29 (39.2)	45 (60.8)	74	7 (8.3)	77 (91.7)	84
Gaining experience you need for future working life	32 (40.5)	47 (59.5)	79	1 (1.3)	77 (98.7)	78
Access to opportunities for skills development outside your course	42 (59.2)	29 (40.8)	71	4 (4.8)	79 (95.2)	83

*Total number of cases is not the same for each variable due to omission of neutral values

Appendix 2 - Problem based learning students responses regarding academic activities.*

Characteristics	Satisfaction rating			Importance rating		
	Un-satisfied	Satisfied	Total n (%)	Un-important	Important	Total
<i>Teaching</i>						
Content of lectures - your main subject(s)	10 (10.0)	90 (90.0)	100	6 (6.4)	88 (93.6)	94
The way in your lectures are delivered	14 (14.9)	80 (85.1)	94	2 (2.2)	87 (97.8)	89
Usefulness of seminars (tutorial sessions)	10 (10.8)	83 (89.2)	93	6 (6.6)	85 (93.4)	91
Usefulness of practical/lap sessions	16 (16.8)	79 (83.2)	95	2 (2.2)	90 (97.8)	92
The course is intellectually stimulating	15 (18.3)	67 (81.7)	82	3 (3.4)	85 (96.6)	88
The amount of timetabled teaching	19 (22.6)	65 (77.4)	84	4 (4.3)	88 (95.7)	92
The size of seminar group	15 (16.0)	79 (84.0)	94	4 (4.3)	88 (95.7)	92
<i>Learning</i>						
The course is developing your subject knowledge	11 (11.1)	88 (88.9)	99	6 (6.2)	90 (93.8)	96
The opportunities to develop practical skills for future	19 (19.6)	78 (80.4)	97	7 (7.5)	86 (92.5)	93
The development of your analytical ability	13 (13.5)	83 (86.5)	96	6 (6.8)	82 (93.2)	88
Availability of online teaching and learning resources	28 (32.9)	57 (67.1)	85	11 (12.8)	75 (87.2)	86
Your learning program takes adequate advantage of learning technology	16 (17.8)	74 (82.2)	90	7 (7.8)	83 (92.2)	90
<i>Supervision and feedback</i>						
Clarity of information about assessment criteria	25 (26.9)	68 (73.1)	93	8 (8.3)	88 (91.7)	96
Usefulness of feedback on your academic performance	20 (22.7)	68 (77.3)	88	9 (9.6)	85 (90.4)	94
Opportunities for informal discussion with staff	18 (20.0)	72 (80.0)	90	3 (3.3)	87 (96.7)	90
Sufficient contact time with teaching staff	18 (20.2)	71 (79.8)	89	1 (1.1)	86 (98.9)	87
Access to a member of staff in your department (others has personal tutor) for general academic and pastoral advice if needed	17 (20.0)	68 (80.0)	85	3 (3.2)	92 (96.8)	95
<i>Course organization</i>						
Overall organization of the course	39 (40.6)	57 (59.4)	96	2 (2.2)	89 (97.8)	91
Relevance of the course handbook	25 (26.6)	69 (73.4)	94	10 (10.6)	84 (89.4)	94
Prior notification of changes to course arrangements	35 (37.6)	58 (62.4)	93	3 (3.2)	90 (96.8)	93
The way your timetable is spread over day/week	26 (29.5)	62 (70.5)	88	5 (5.6)	84 (94.4)	89
Range topics covered in your syllabus	19 (19.4)	79 (80.6)	98	7 (7.4)	87 (92.6)	94
<i>Information technology (IT) facilities</i>						
Availability of computers	10 (9.8)	92 (90.2)	102	5 (5.2)	91 (94.8)	96
Access to the internet/e-mail via university systems	20 (20.0)	80 (80.0)	100	5 (5.3)	90 (94.7)	95
Access of printing resources	27 (29.7)	64 (70.3)	91	8 (8.7)	84 (91.3)	92
Training in the use of IT	33 (38.8)	52 (61.2)	85	14 (15.7)	75 (84.3)	89
Helpfulness and support from IT staff	30 (35.7)	54 (64.3)	84	13 (14.4)	77 (85.6)	90
<i>Development of skills</i>						
Developing skills to support academic achievement	15 (16.0)	79 (84.0)	94	9 (9.5)	86 (90.5)	95
Developing skills you need for future working life	17 (18.7)	74 (81.3)	91	7 (7.4)	88 (92.6)	95
Gaining experience you need for future working life	17 (18.9)	73 (81.1)	90	6 (6.3)	90 (93.8)	96
Access to opportunities for skills development outside your course	28 (30.1)	65 (69.9)	93	3 (3.1)	93 (96.9)	96

*Total number of cases is not the same for each variable due to omission of neutral values

Appendix 3 - Comparing academic satisfaction and importance with respect to gender.

Characteristics	Traditional					PBL				
	Male		Female		P-value	Male		Female		P-value
	N	Mean rank	N	Mean rank		N	Mean rank	N	Mean rank	
<i>Teaching</i>										
Satisfaction	66	47.19	26	44.75	0.693	84	55.35	24	51.54	0.599
Importance	66	44.43	24	48.44	0.519	78	45.65	21	66.14	0.003
<i>Learning</i>										
Satisfaction	66	49.22	26	39.60	0.119	84	54.83	24	53.33	0.836
Importance	65	44.33	24	46.81	0.685	78	46.02	21	64.79	0.007
<i>Supervision and feedback</i>										
Satisfaction	66	48.98	26	40.19	0.154	84	57.11	24	45.38	0.105
Importance	66	42.35	24	54.17	0.057	79	47.34	21	62.40	0.033
<i>Course organization</i>										
Satisfaction	66	46.58	26	46.29	0.962	84	54.91	24	53.06	0.798
Importance	66	42.17	24	54.67	0.043	78	46.77	21	62.00	0.026
<i>Information Technology facilities</i>										
Satisfaction	66	42.73	26	56.06	0.031	84	52.67	24	60.92	0.254
Importance	66	41.83	24	55.58	0.026	79	48.87	22	58.64	0.160
<i>Development of skills</i>										
Satisfaction	66	48.50	26	41.42	0.251	84	54.81	24	53.42	0.847
Importance	66	42.54	23	52.07	0.113	79	47.20	21	62.93	0.024

Supplements

- * Supplements will be considered for work including proceedings of conferences or subject matter covering an important topic
- * Material can be in the form of original work or abstracts.
- * Material in supplements will be for the purpose of teaching rather than research.
- * The Guest Editor will ensure that the financial cost of production of the supplement is covered.
- * Supplements will be distributed with the regular issue of the journal but further copies can be ordered upon request.
- * Material will be made available on Saudi Medical Journal website