

## Attitudes and Perceptions of Pharmacy Students of Ras Al Khaimah towards Problem Based Learning

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### ABSTRACT

Problem based learning (PBL) is a widely adopted learning methodology in international academic settings, especially in medical and health sciences universities. The prime aim of PBL system of education is integrating learning with practice. A number of studies conducted on medical and health sciences student's attitudes and perceptions indicate positive attitudes and perceptions towards their PBL curriculum. However, these studies also highlight significant negative attitudes & perception in certain aspects of PBL methodology. The objective of our study was to assess the attitudes and perceptions of undergraduate pharmacy students of RAK College of Pharmaceutical Sciences (RAKCOPS) towards their PBL experience. It was a prospective cross-sectional survey based study conducted using an attitudes and perceptions evaluation questionnaire. Majority of the pharmacy students agreed that PBL was useful for them and they 'always' enjoy learning through their PBL sessions. Students also agreed that their skills have improved after PBL sessions. Our study highlights the significant role of PBL in enhancing students problem solving, critical thinking, literature search and most importantly communication skills through team work.

**Keywords:** Problem based learning, attitudes and perception, integrating learning with practice, PBL methodology, learning through PBL.

### INTRODUCTION

Problem based learning (PBL) is a widely adopted learning methodology in international academic settings, especially in medical and health sciences universities.[1-2] Student is placed at the center of the learning process in PBL unlike the conventional modes of teaching.[3]The prime aim of PBL system of education is integrating learning with practice.[3, 4-6] PBL was first introduced at McMaster University Medical School in Canada during 1960s as a part of its teaching and learning methodology. [7] Since then, many universities have implemented PBL in both undergraduate and graduate curriculum. [1, 2, 7] Typically in PBL, students work in small groups with a faculty or a tutor who acts as a facilitator of discussions and of learning rather than as a direct source of information. [1] It is well known from the

published literatures that PBL helps in developing and enhancing various skills in students such as self-directed learning, communication, team work, problem solving and report writing.[8-10] A number of studies conducted on medical and health sciences students' attitudes and perceptions indicates positive findings towards their PBL curriculum. [4, 5, 9, 10] However, these studies also highlight significant negative attitudes & perception in certain aspects of PBL methodology. [4, 5, 9, 10]

At RAK College of Pharmaceutical Sciences (RAKCOPS), PBL curriculum was implemented since the initiation of the pharmacy undergraduate degree program in the year 2008 and the PBL methodology was introduced from the second semester of B. Pharm. At RAKCOPS, the PBL assessment is formative and it is a part of students in - course assessment. [11]

Although PBL is an effective way to develop and improve the required professional and personal skills in the medical and health sciences courses, it is very important to obtain the students feedback in order to provide insights for the future modification and to improve the quality of PBL. [12]

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### *Objective of our study:*

- To assess the attitudes and perceptions of undergraduate pharmacy students towards their PBL experience through a self-administered questionnaire.
- To improve the quality and the process of the PBL methodology at RAKCOPS by analyzing the obtained data.

### **MATERIALS AND METHODS**

It was a prospective cross-sectional survey based study conducted at RAK College of Pharmaceutical Sciences, RAK Medical and Health Sciences University (RAKMHSU) from September 2011 to February 2012. Attitudes and perceptions of undergraduate pharmacy students (B. Pharm) towards their PBL experience were assessed using attitudes and perception evaluation questionnaire. This was a self-administered questionnaire prepared based on the extensive literature review of PBL related research studies and guidelines.

The questionnaire was reviewed by three subject experts /senior faculty for its content before it was finalized. The questionnaire consists of two parts (Part-A & Part-B). A total of 19 closed ended questions were included in part-A, which assessed the attitudes and perceptions of students towards their PBL curriculum. Part-B consists of nine questions, to which the students are expected to respond by ticking; agree, strongly agree, disagree, strongly disagree.

The questionnaire was administered to all the B. Pharm students (n=76) of different semesters of RAKCOPS by the study investigator (s) during one of the student free hours at their respective classrooms. All the pharmacy students were included in the study. The obtained data was entered in Microsoft excel 2007 and was analyzed using SPSS version 18.0. The results are presented in frequency & percentages.

### **RESULTS AND DISCUSSION**

The main intention of our study was to assess the positive & negative attitudes and perceptions of

undergraduate pharmacy students to PBL, so that necessary steps can be taken to improve the process and methodology of PBL.

Although several standard questionnaires were available to evaluate the attitude and perceptions regarding PBL, we preferred to develop our own questionnaire after referring to those and incorporated the items designed to evaluate the PBL methodology at our university. [4, 5, 7, 9, 11] These types of questionnaires are considered beneficial for the faculty to monitor the students' attitude and perceptions & utilize the obtained data in further improvement to give constructive feedback. [13]

### *Demography of the survey respondents*

A total of 76 undergraduate pharmacy students responded to the questionnaire. In terms of gender, 18.4 % (n =14) were male while 81.6% (n=62) were female. The age range of the respondents was 19-24 years. Out of 76 students surveyed, 22 (28.9%) were from year-1, 15 (19.7%) were from year 2, 20 (26.3%) were from year 3 and 19 (25%) from year 4 of B. Pharm. Since the number of male respondents was very low in our study, we did not evaluate the difference in attitudes and perceptions between male and female respondents. However, good number of studies have highlighted the gender difference in the attitude and perceptions regarding learning through PBL. [12-14]

### *Usefulness of PBL and Learning through PBL*

A total of 65 respondents (85.5%) found PBL sessions to be 'useful' while a small number of respondents 5 (6.6%) reported as 'stressful'. It was observed that 47 (61.8%) students enjoyed learning through their PBL sessions 'sometimes', while another 19 (25%) reported as 'always' (Table 1). Good number of the study respondents 52.6% (n=40) mentioned that they 'always' learn from their class mates or their group members during the PBL sessions, while 38.2% (n=29) reported as only 'sometimes' (Table 1). Majority of the pharmacy students agreed that PBL

was useful for them and they enjoyed learning through their PBL sessions. Our findings are thus in agreement with other studies which have revealed the same. [5, 9, 13]

**Table 1:** Students' opinion regarding PBL and the sessions

Sl. No:	Items	Number (Percentage)
1	<b>Having PBL in my course is</b> <ul style="list-style-type: none"> <li>• Useful</li> <li>• Not useful</li> <li>• Stressful</li> <li>• Waste of time</li> </ul>	65 (85.5%) 01(1.3%) 05(6.6%) 05(6.6%)
2	<b>I enjoy my PBL Sessions</b> <ul style="list-style-type: none"> <li>• Always</li> <li>• Sometimes</li> <li>• Very rarely</li> <li>• Not at all</li> </ul>	19(25.0%) 47(61.8%) 05(6.6%) 05(6.6%)
3	<b>I learn from my class mates or my group members during the PBL session</b> <ul style="list-style-type: none"> <li>• Always</li> <li>• Sometimes</li> <li>• Very rarely</li> <li>• Not at all</li> </ul>	40(52.6%) 29(38.2%) 04(5.3%) 03(3.9%)
4	<b>I think the topics covered in PBL session should be taught in the class room</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• For some topics</li> <li>• Not sure</li> </ul>	33(43.4%) 16(21.1%) 26(34.2%) 01(1.3%)
5	<b>I prefer to have the lecture</b> <ul style="list-style-type: none"> <li>• Before the PBL session</li> <li>• After the completion of the PBL</li> <li>• Any time</li> </ul>	31(40.8%) 13(17.1%) 32(42.1%)
6	<b>I like PBL, which is</b> <ul style="list-style-type: none"> <li>• Stand alone</li> <li>• Integrated</li> <li>• ok with both</li> </ul>	22(28.9%) 15(19.7%) 39(51.3%)
7	<b>The time period I need to complete PBL write up / notes making after my second Session is</b> <ul style="list-style-type: none"> <li>• &lt; 01 week</li> <li>• 01 week</li> <li>• 02 weeks</li> </ul>	36(47.4%) 25(32.9%) 15(19.7%)
8	<b>I prefer to have PBL sessions with</b> <ul style="list-style-type: none"> <li>• 02 sessions</li> <li>• 03 sessions</li> <li>• 2 or 3 depending on the course</li> <li>• Does not matter</li> <li>• Not Sure</li> </ul>	21(27.6%) 16(21.1%) 33(43.4%) 02(2.6%) 04(5.3%)
9	<b>The minimum time gap between my first and second PBL session should be</b> <ul style="list-style-type: none"> <li>• 4 days</li> <li>• 5 days</li> <li>• 01 week</li> <li>• Does not matter</li> <li>• Not Sure</li> </ul>	29(38.2%) 09(11.8%) 34(44.7%) 02(2.6%) 02(2.6%)
10	<b>I am happy with the allotted time of TWO hours for each PBL session</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Not at all</li> <li>• Not Sure</li> </ul>	54(71.1%) 08(10.5%) 10(13.2%) 03(3.9%)
11	<b>The time duration I need for each of your PBL sessions is</b> <ul style="list-style-type: none"> <li>• 01 hour</li> <li>• 01.30 hours</li> <li>• 2 hours</li> <li>• Does not matter</li> <li>• Not Sure</li> </ul>	17(22.4%) 14(18.4%) 11(14.5%) 02(2.6%) 31(40.8%)

### *Allotted Time and Time gap for PBL Sessions*

Majority of the respondents (n=54, 71.1%) mentioned that time allotted for each of the PBL sessions i.e. 2 hours and time period to complete the PBL related assignments (five to seven days) after the first session was sufficient. Whereas as a small number of respondents (n=10, 13.2%) stated that time allotted for each PBL session was inadequate for them. A total of 47.4% (n=36) students replied that they needed less than one week time period to complete any PBL write up and notes making after their second session. Most of the students 44.7% (n= 34) responded that the minimum time gap between their first and second PBL session should be of one week. The details of perception regarding allotted time for and time gap between each PBL session are presented in table 1. Thus majority of the students were satisfied with the allotted time for the PBL sessions and the time required for completing their assignments. This is in accordance with another study, which reported higher level of satisfaction among the students regarding time allotted for each of the PBL session. [1]

### *Number of PBL Sessions for each Topic*

Great number of the students 43.4% (n= 33) preferred to have 2 or 3 sessions for each PBL topic followed by 21(27.6%) respondents who mentioned it as only two sessions (Table 1 ). In RAKMHSU, majority of the PBLs are of two sessions, which is in accordance with international standards. However, some of the survey respondents preferred to have three sessions.

### *Type of PBL*

More than half of our respondents 51.3% (n=39) were satisfied with either stand alone or integrated PBL, whereas 22 (28.9%) respondents preferred to have only standalone PBLs. The details of preference for the type of PBL are presented in table 1.

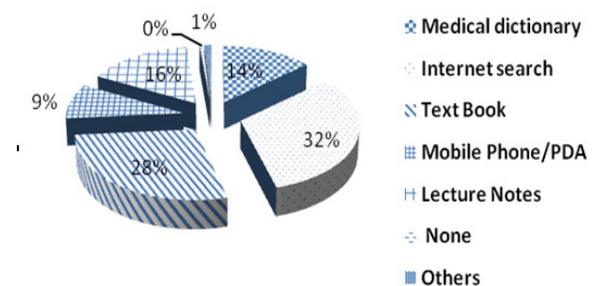
### *Covering the PBL topic through class room teaching*

Regarding whether the topics covered in PBL session should be taught in the class rooms, 43.4% (n=33) of the students responded as 'yes', while 21.1% (n=16) responded as 'no'. A total of 26 (34.2%) respondents

mentioned that some of the topics covered in PBL session should be taught through didactic lectures. Regarding the delivery of the lecture related to the PBL topic, 42.1% (n=32) preferred to have the lecture any time before or after the PBL, while 40.8% (n=31) told they wanted their lecture before PBL (table 1). Having a lecture on PBL related topic before the PBL session might affect the critical and analytical thinking and problem solving skills. Instead the topic related to PBL can be discussed with the learning group after the completion of PBL sessions. This is also supported by a study conducted by Ghosh S who reported that tutorial classes after the PBL sessions are beneficial to students in gaining more knowledge regarding the concepts. [15]

### *Resources used*

The different resources used by the students for searching information before their second PBL session were internet 80.3% (n=61) followed by text books 69.7% (n=53) and lecture notes 39.5% (n=30). The details of different resources referred by the students are presented in figure 1. Depending on their learning pattern, our study respondents used different types of resources for preparing for their PBL sessions. It is paradoxically significant that majority of our study respondents have used internet as a main source for learning and preparing. This finding of ours was in accordance with a study, which reported students' reliance on electronic resources rather than the printed materials for the learning process of PBL. [16] Easy accessibility and availability of the information could be the main reason for it, but there is a threat that the available information may not be accurate or peer reviewed and it may be misleading. [17]



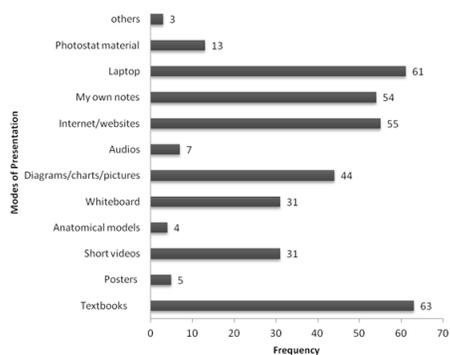
**Fig 1:** Different references used by students in PBL

### Accessibility and availability of resources

Good part of the students 59 (77.6%) reported that they were satisfied with the accessibility and availability of various learning resources required for the preparation for PBL session. The opinion regarding availability and accessibility of learning resources are presented in table 1. Our findings are in contrast to a study, in which only 34.4% of students reported the availability of adequate learning resources for preparing for their PBL sessions. [1] A study by M Das et al. has expressed that lack of learning resources can be a factor for student dissatisfaction in PBL. [18] Hence adequate learning resources are a must for the proper conduct of the PBL process which supports our study.

### Presentation modes used

The most commonly used presentation modes by students during the discussion & presentation of second session of PBL were textbooks 81.6% (n=62) followed by internet/website 71.1% (n=54) and lecture notes 69.7% (n=53). Different presentation modes used by the students are presented in figure 2.



**Fig 2:** Different modes of presentation used in PBL

It is noteworthy from our study that majority of the students utilized textbooks followed by laptop for the power point presentation. Only very small numbers of respondents have used other modes of presentations such as posters, audios or anatomical models. Studies suggest that using different modes of presentation will help in enhancing students' communication and presentation skills, self-confidence, application of acquired knowledge base and understanding group dynamics. [19] A study conducted by Kinnunen P et al.

reports the significance of referring multiple resources resulted in increased ability of the students to search for the information. [20]

### Challenging part of PBL

Regarding the most challenging part of the PBL session, a total of 33 students (43.4%) reported it as presentation and discussion. This was followed by identifying the actual problem 38.2% (n=29) and designing the objectives 36.8% (n=28). Different challenges faced by the students are presented in table 2. However, this was in contrast to a study where identifying the actual problem and writing the hypothesis as most challenging part of PBL. [8]

### Volunteering as a Leader and Scriber

It is interesting to note that a small number of students reported that they have never volunteered to be a leader (n=6, 7.9%) or scriber (n=9, 11.8%) during all the PBL sessions that they have experienced. The details of the number of times, students volunteered as a leader & scriber are presented in table 2. Students who have never volunteered to be a leader or a scriber should be identified and must be encouraged for it. [12] Krishnan S in his study has mentioned that students felt the leadership role gave them the decision making rights as well as helped them in directing the team to successful outcomes. [21]

### Venue of PBL Sessions

Preponderance of the students 63.2% (n=48) expressed that PBL sessions should be conducted in PBL rooms only, whereas the choice of 14 (18.4%) students was 'any place' (Table 2). Conducting PBL sessions in the PBL rooms has an added advantage of limiting the distractions faced by the students.

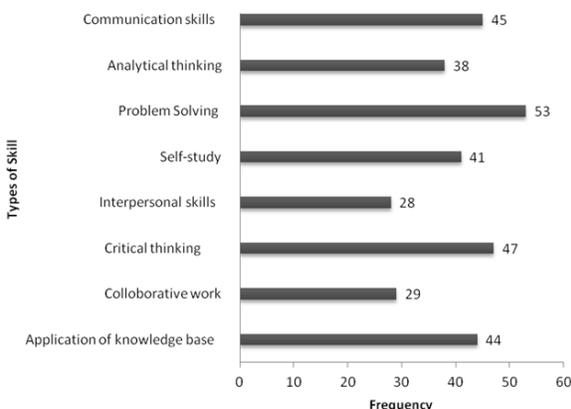
### Distractions during PBL Sessions

Larger number 55.3% (n=42) of respondents reported that other group members personal conversation was the main distraction they faced during their sessions followed by noise outside the PBL rooms 29(38.2%). The details of different distractions faced by students are presented in table 2. Distractions such as noise, personal conversations and ringing of mobile

phones during the learning sessions may affect the whole PBL learning process. [22-23]

#### Skills gained through PBL Sessions

As reported, problem solving was the most important skill gained by the students 53(69.7%) followed by improvement in critical thinking 47(61.8%). The important skills improved by PBL methodology have been presented in figure 3.



**Fig 3:** Important Skills improved through PBL

#### Having PBL topic related questions in exams

A good number of the students 59.2% (n=45) expressed that the topics covered in PBL should not be assessed in quizzes or in semester exams (Table 2).

#### Students' opinion regarding the PBL sessions

Majority of the students 60 (78.9%) agreed that the quality of the PBL triggers given to them were excellent. This is supported by a study by O'Grady et al who has reported that defining appropriate problem triggers is of fundamental importance in engaging students and in achieving the intended learning outcomes by them. [24]

Good number of the study respondents 57(75%) also agreed that they receive constructive feedback from their PBL facilitators after their PBL sessions. Effective communication is essential to the PBL process. This involves inter group and intra group communication, which includes facilitator-and student communication. [23]Discussion in the tutorial groups has shown to have positive cognitive and motivational effects on student learning. [25]

Greater part of study respondents 47(61.8%) agreed that "all their team members actively participated in the PBL discussions". However, more than half of the study respondents 44 (57.9%) felt that some of their group members worked more than their peers. Details of different opinions of respondents regarding the PBL are presented in table 3. It was noted in a study that students during their active discussion of the PBL problem with their peers, attempted to understand the underlying principles or processes much better. Moreover small group discussion helped students to enhance their knowledge, which leads to the improvement in their critical thinking and analyzing skills during the problem solving. [25]It was also shown to enhance their basic interest in the subject matter. [25]

A good number of respondents agreed that some of their group members worked more than their peers. This is in agreement with a study conducted by Chakravarthi S et al. where the students have responded that "not all learners are active" during the PBL learning sessions. [26] The success of PBL depends on the collectivism of mutual trust and confidence of each individual. [26] Group members who are quiet and are not actively participating are found to be a problem in PBL process The tutor should play an important role here by finding out the exact reasons for their being quiet and to appropriately address the issue. [26]

#### CONCLUSION

Majority of the pharmacy students believed that learning through PBL sessions is very beneficial for them. Our study highlighted the significant role of PBL in enhancing students problem solving, critical thinking, literature search and most importantly communication skills through team work. This different mode of learning is distinct from didactic lectures. The data obtained from the study will be useful to improve the quality and the process of the PBL methodology at RAKCOPS.

**Table 2:** Students' opinion regarding the conduct of PBL sessions

Sl. No:	Items	Number (Percentage)
1	<b>PBL sessions should be conducted in</b> <ul style="list-style-type: none"> <li>• PBL rooms</li> <li>• Class Rooms</li> <li>• Any Place</li> <li>• Does not matter</li> <li>• Not Sure</li> </ul>	48(63.2%) 02(2.6%) 14(18.4%) 10(13.2%) 02(2.6%)
2	<b>I am satisfied with the accessibility and availability of different learning resources for your PBL sessions</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Not Sure</li> </ul>	59(77.6%) 07(9.2%) 10(13.2%)
3	<b>The most challenging part of my PBL session is/are</b> <ul style="list-style-type: none"> <li>• Reading the trigger</li> <li>• Designing the objective</li> <li>• Identifying the actual problem</li> <li>• Leading the session (Leader)</li> <li>• To be the Scriber</li> <li>• Presentation and discussion</li> <li>• Writing the hypotheses</li> <li>• Others</li> <li>• None</li> </ul>	18(23.7%) 28(36.8%) 29(38.2%) 24(31.6%) 10(13.2%) 33(43.4%) 22(28.9%) 03(3.9%) 09(11.8%)
4	<b>So far, I have volunteered myself to be the leader</b> <ul style="list-style-type: none"> <li>• Once</li> <li>• Twice</li> <li>• Thrice</li> <li>• Four times</li> <li>• 06 times</li> <li>• 07 times</li> <li>• &gt;08 times</li> <li>• Never</li> </ul>	23(30.3%) 24(31.6%) 10(13.2%) 04(5.3%) 03(3.9%) 02(2.6%) 04(5.3%) 06(7.9%)
5	<b>So far, I have volunteered myself to be the Scriber?</b> <ul style="list-style-type: none"> <li>• Once</li> <li>• Twice</li> <li>• Thrice</li> <li>• Four times</li> <li>• 05 times</li> <li>• 06 times</li> <li>• 07 times</li> <li>• &gt;08 times</li> <li>• Never</li> </ul>	23(30.3%) 23(30.3%) 08(10.5%) 04(5.3%) 03(3.9%) 01(1.3%) 02(2.6%) 03(3.9%) 09(11.8%)
6	<b>Following are the distractions I face during our PBL sessions</b> <ul style="list-style-type: none"> <li>• Ringing of Mobile phone</li> <li>• Other group members personal conversation</li> <li>• Noise outside the PBL rooms</li> <li>• None</li> <li>• Any other</li> </ul>	14(18.4%) 42(55.3%) 29(38.2%) 24(31.6%) 03(3.9%)
7	<b>The PBL topics should be evaluated in quizzes / assignments /other assessments</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Not Sure</li> </ul>	16(21.1%) 45(59.2%) 15(19.7%)

**Table 3:** Students' attitude to the PBL sessions

Items	Agree n(%)	Strongly agree n(%)	Disagree n(%)	Strongly Disagree n(%)
As a team member I have contributed effectively	50(65.8)	26(34.2)	-	-
I am always in time for all my PBL sessions	41(53.9)	33(43.4)	2(2.6)	-
The quality of triggers are excellent	60(78.9)	12(15.8)	4(5.3)	-
Some of the group members work more than the others	44(57.9)	20(26.3)	10(13.2)	2(2.6)
I receive constructive feedback from my PBL facilitator	57(75)	12(15.8)	6(7.9)	1(1.3)
All my team members actively participate in the PBL discussion	47(61.8)	10(13.2)	18(23.7)	1(1.3)
The triggers given to us are very simple	34(44.7)	7(9.2)	32(42.1)	3(3.9)
The triggers given to us are complex	30(39.5)	3(3.9)	38(50)	5(6.6)
We distribute our work for the discussion and presentation during the second session.	37(48.7)	13(17.1)	17(22.4)	9(11.8)

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## CONFLICT OF INTEREST

-Nil-

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