



PERFORMANCE OF STUDENTS IN PROBLEM BASED LEARNING (PBL) TUTORIAL SESSIONS BASED ON TUTORS' ASSESSMENT.

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ABSTRACT:

BACKGROUND: Assessment contributes towards the success of Problem-based learning (PBL), as assessment compels to drive learning and offer significant feedback to students for enhancement of their learning. Bilawal Medical College (BMC), a constituent college of Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro, Sindh Pakistan conducted first PBL session for five days in February 22-26, 2021 during implementation of foundation module, for first year MBBS, third batch. The foundation module is first module of revised curriculum in 2021 i.e. "Integrated Modular Hybrid Curriculum". **OBJECTIVE:** This study explored the students' performance in PBL tutorial session assessed by tutors. **DESIGN:** This is a cross-sectional study. **DURATION:** Study was done in last week of February 2021. **METHODOLOGY:** It was done through checklist on items related to Knowledge Acquisition (7 items), Problem-Solving and Analytical Thinking Skills (6 items), and Personal and Interpersonal development (10 items). The responses on item were on a Likert scale of a 1-5 score (SA=strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree). The data was entered in Microsoft Excel and analyzed for central tendency. **RESULTS:** Students overall performance on Knowledge Acquisition (7 items, total score 35), Problem-Solving and Analytical Thinking Skills (6 items, total score 30) and Personal and Interpersonal Development (10 items, total score 50) was remarkable (mean \pm standard deviation 88.13 ± 12.43 and median 90, and mode 95) (total items 23, total score 115). **CONCLUSION:** The findings of this study shows that students gained knowledge, and improved their problem-solving and analytical thinking skills. Students also developed the personal and interpersonal relation during PBL tutorial session.

KEYWORDS: Assessment, Checklist, PBL, Performance, Tutor-based assessment, Tutorial,

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How to cite this article: Piryani RM¹, Piryani S², Ujjan IU³, Zeba N⁴, Devrajani BR⁵
PERFORMANCE OF STUDENTS IN PROBLEM BASED LEARNING (PBL) TUTORIAL SESSIONS BASED ON TUTORS' ASSESSMENT. JPUMHS; 2021;11:04,19-23.
<http://doi.org/10.46536/jpumhs/2021/11.04.330>

Received Nov 4 2021, Accepted On 15 Dec 2021, Published On 31 December 2021

INTRODUCTION:

Problem-based learning (PBL) is a quiet different from direct learning method. PBL is student focused educational strategy where students learn curriculum content through written case scenario. It is a student-focused, inquiry-based tutorial approach where students work in small groups. It promotes self-directed learning, deep

learning, higher order of thinking skills, metacognition and generic skill like reasoning skills, problem solving skills, decision making and communication skills.
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Since, its inception in 1960s, PBL has been incorporated in curriculum in different forms. For example, some schools have

adopted pure PBL curriculum, some schools have been implementing hybrid PBL curriculum, some other schools have embraced PBL approach at different levels.² Even though PBL has been endorsed into the curriculum. There are some common core characteristics of PBL session that cut across all models.⁶ The four main characteristics of PBL session are 1) Use of problems (divided into triggers) as a starting point for learning, 2) Self-directed and self-regulated learning by students, 3) Working of students in small groups tackling these triggers (tasks), and 4) The tutors act as a facilitator for entire PBL process.^{2, 5, 7}

Assessment is a key element of any curriculum whatever the instructional method is used for teaching learning. Assessment contributes towards the success of PBL as assessment compels to drive learning and offer significant feedback to students for enhancement of their learning.^{5, 8} Assessment in PBL is both student-based assessment and tutor-based assessment.^{8- 9} Bilawal Medical College (BMC) is a constituent institute of Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro, Sindh Pakistan. It was established in 2018 and admitted first batch of students for MBBS program in 2019. It only admits male students.¹⁰ LUMHS has revised its curriculum started its implementation in 2021. It is Integrated Modular-Based Hybrid Curriculum. Problem-based learning is one of the instructional strategy incorporated in the curriculum. BMC conducted one PBL session during implementation of foundation module, the first module for first year MBBS, third batch. This study explored the students' performance in PBL tutorial sessions assessed by tutors.

Methodology:

This cross-sectional study done was at Bilawal Medical College (BMC), a constituent medical college of Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro Sindh Pakistan. LUMHS has revised the curriculum for MBBS program in year 2021. The curriculum is Integrated Modular-Based Hybrid Curriculum. BMC has started implementation of Integrated Modular-Based Hybrid Curriculum from third batch of MBBS admitted in February 2021. The first module is a Foundation Module. It covers fundamentals of Anatomy including embryology and histology, Physiology, Biochemistry, Microbiology, Pharmacology, Pathology and Community Medicine. BMC conducted five-days Problem-based learning (PBL) session on the theme "Study of Cell" in fourth week of February (22-26) 2021.

Our PBL session followed four essential characteristics described by Cees P. M. van der Vleuten and Lambert W. T. Schuwirth: 1) Use of problems (divided into triggers) as a starting point for learning, 2) Self-directed and self-regulated learning by students, 3) Working of students in small groups tackling these triggers (tasks), and 4) The tutors act as a facilitator for entire PBL process. (5) The tutorials were conducted on first four days and seminar on the last day. The schedule of PBL session and abridged students guide is given in Table 1. Students were divided randomly in seven groups Group (A, B, C, D, E, F, G); each group comprised of 14-15 students. Students oriented on first day in lecture hall for about 90 minutes. Topics for presentation in seminar was allocated randomly to groups on fourth day of PBL session. Student groups themselves selected leader and scribe for group work on every day on rotation basis.

The performance of students in PBL classes was assessed by the teacher or instructors at the end of tutorial on fourth day. It was done through checklist on items (statements) related to Knowledge Acquisition (7 items), Problem-Solving and Analytical Thinking Skills (6 items), and Personal and Interpersonal Development (10 items). The responses on item were on a Likert scale of a 1-5 score (SA=strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree). The checklist used was adapted from the study Evaluation of a new assessment tool in problem-based learning tutorials in dental education. conducted by Allareddy V *et al.*,¹¹

Informed consent was taken from the participant students and study was approved by the institutional review committee of BMC.

Non-probability purposive sampling technique was used in this study. Out of 100 students of first year MBBS third batch, 86 students participated in PBL session. All 86 students of seven groups were assessed by the respective tutor.

The data was entered in Microsoft Excel and analyzed for central tendency (mode, median and mean with standard deviation).

Results:

Out of 100 students of first year MBBS third batch, 86 students participated in PBL session. All 86 students of seven groups were assessed by the respective tutor for skills on Knowledge Acquisition, Problem- Solving and Analytical Thinking Skills and Personal and Interpersonal Development during PBL tutorial

Table 1. The schedule of PBL session and abridged students guide

Time/Day	Day 1	Day 2	Day 3	Day 4	Day 5
Place	First Year Lecture Hall	*Tutorial Room	*Tutorial Room	*Tutorial Room	*Tutorial Room
09:00-10:30 am	Orientation of students Group meet tutor	SDL and group discussion	SDL and group discussion	SDL and group discussion	Finalize presentation for seminar Assemble in lecture hall
Place 10.30-12.30	*Tutorial Room				First Year Lecture Hall
(PBL tutorial in identified tutorial room allocated to each group) 10.30-12.30 am	Introduction of students Make Ground Rule	Discus Learning objectives of Trigger 1 in front of tutor	Discus Learning objectives of Trigger 2 in front of tutor	Discus Learning objectives of Trigger 3 in front of tutor	Presentation by Students Group 15 minutes are allocated for each group presentation (8 minutes for presentation and 7 minutes for discussion)
	Introduce Trigger 1	Introduce Trigger 2	Introduce Trigger 3		
	Group Discussion on Trigger 1	Group Discussion on Trigger 2	Group Discussion on Trigger 3	Allocate topic with learning objective for presentation	
	Analyze & generate learning needs from Trigger 1	Analyze & generate learning needs from Trigger 2	Analyze & generate learning needs from Trigger 3	Students Prepare presentation for seminar	
	Develop Learning objectives For Trigger 1	Develop Learning objectives For Trigger 2	Develop Learning objectives For Trigger 3	Prepare presentation for seminar and discuss with tutor	
12:30- 13:15 pm	Lunch	Lunch	Lunch	Lunch	Lunch
13:15-3:00 pm	Self-directed learning (SDL) on Learning objectives of Trigger 1	SDL on Learning objectives of Trigger 2	SDL on Learning objectives of Trigger 3	Assessment	
2 hours with flexible time	SDL at home / hostel	SDL at home / hostel	SDL at home / hostel		

*Seven Tutorial Rooms were identified; one for each group (Group A, B, C, D, E, F, G)

Table 2: Score of Knowledge Acquisition of students in PBL Tutorial Session evaluated by Tutors

Statement or item	Median	Mode	Mean	StD
Student brought new information to each session	4	5	4.21	0.84
Student brought relevant information to each session	4	4	4.24	0.65
Student brought information that facilitated others learning	4	4	4.01	0.68
Students ideas/information were always correct	4	4	3.83	0.86
Student used appropriate "language in the field"	4	4	3.84	0.84
Student integrated newly acquired knowledge with previous knowledge	4	4	3.83	0.80
Student applied knowledge from self-study to explain issues in case	4	4	3.94	0.79

Table 3: Score on Problem Solving and Analytical Thinking Skills of students in PBL Tutorial Session evaluated by Tutors

Statement or item	Median	Mode	Mean	StD
Student reported information in his/her own words rather than notes	4	5	4.28	0.73
Students presented information that was clear and understandable	4	4	4.10	0.70
Student asked appropriate questions to stimulate discussions	4	4	3.81	0.73
Student generated hypothesis to explain problems under discussion	3	3	3.52	0.73
Student evaluated hypothesis in light of available evidence	4	4	3.52	0.77
Student defined and took responsibility for learning goals and objectives	4	4	5.05	0.70

Table 4: Score on Personal and Interpersonal Development of students in PBL Tutorial Session evaluated by Tutors

Statement or item	Median	Mode	Mean	StD
Student communications tended to take over the group process in a non-contributory manner	2.5	1	2.63	1.59
Student interrupted others with comments	2	1	2.30	1.27
Student was always on time to each session	5	5	4.40	0.77
Student attended every session	4.5	5	4.22	1.01
Student responded well to criticism by others	4	4	3.86	0.68
Student was engaged/interested in each session	4	4	4.13	0.61
Student provided leadership	4	4	3.94	0.87
Student listened carefully with understanding	4	4	4.16	0.65
Student demonstrated sensitivity to psychosocial issues	4	4	3.70	0.84
Student assessed own performance accurately	4	4	3.87	0.82

Session on a Likert scale of a 1-5 score (SA=strongly agree, A=agree, N=neutral, D=disagree, SD=stronglydisagree). Score is mentioned in the Table 2-4.

Students overall performance on Knowledge Acquisition (7 items, total score 35), Problem-Solving and Analytical Thinking Skills (6 items, total score 30) and Personal and Interpersonal Development (10 items, total score 50) was remarkable mean \pm standard deviation 88.13 \pm 12.43 and median 90, and mode 95 (total items 23, total score115).

DISCUSSION:

The objective of this study was to explore the students' performance in PBL tutorial sessions assessed by the tutors. So, this study gives an account of students' performance in PBL tutorials of first PBL session conducted at Bilawal Medical College (BMC) Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro, Sindh Pakistan implementing Integrated Modular Hybrid Curriculum from 2021. The checklists are the tools to assess attainment of acceptable standards of performance during PBL tutorials.⁹ In this study checklist was used for the assessment of performance of students during PBL tutorial for the criteria on three domains i.e. knowledge acquisition, problem-solving and analytical thinking, and personal and interpersonal development. Overall, the students participated in the PBL tutorials of first PBL session seem to gain skills for knowledge acquisition, problem-solving and analytical thinking, and personal and interpersonal development positively, assessed by the tutors in this study. Data of study done by Allareddy V et al supported that PBL has a constructive effect on the knowledge acquisition, critical thinking skills, problem-solving skills, lifelong self-directed learning in health professions students, and enrich personal and inter personal development skills.¹¹ Niwa M et al reported that PBL approach improves knowledge acquisition and has better learning outcomes in basic sciences education.¹² Das Gupta A

mentioned that PBL stimulates critical thinking skills in medical undergraduates and boosts self-directed learning.¹³ Shamim B and Syed AT documented that Students trained under PBL method shows better interpersonal skills, better psychosocial knowledge and better attitude towards patients.¹ Positive correlation was observed between tutors' assessment and exam scores by study done by Cordero M. et al.⁴ In this study tutor only assessed performance of students during PBL Tutorials on three domains i.e. knowledge acquisition, problem-solving and analytical thinking, and personal and interpersonal development. This study is limited to the experience of one PBL session conducted in one medical school, non-probability purposive sampling technique and probability of subjective variation among tutor on scoring the students at the end of tutorial sessions on fourth day of PBL session.

Conclusion

Despite of limitation of the study, the findings of this study shows that students gained knowledge, and improved their problem-solving and analytical thinking skills. Students also developed the personal and interpersonal relation during PBL tutorial session.

Acknowledgment: Authors would like acknowledge the tutors who facilitated the PBL session process, conducted tutorial sessions and assessed the students' performance.

Conflict of Interest: No any conflict of interest

Disclosure: Nothing to disclose

Funding: No funding required

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