

PROBLEM BASED LEARNING IN BASIC MEDICAL SCIENCE TRAINING FOR 200 LEVEL PHYSIOTHERAPY STUDENTS: STUDENTS' ASSESSMENT IN THE FIRST YEAR.

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SUMMARY

Background: Problem Based learning (PBL) is increasingly becoming popular worldwide. The Department of Anatomy at the College of Medicine University of Lagos recently introduced the problem based learning approach as the style of teaching physiotherapy students in their basic medical science year.

Objective: This survey investigated the students' view of the programme, its impact on their learning as well as constraining factors.

Methods: A questionnaire-based survey was conducted at the end of the basic science academic year. The sample was the whole of a group of physiotherapy student that went through the PBL programme of the Department for one year. Results were collated and data processed using computer Microsoft excel in windows office 2003 software.

Results: A statistically significant proportion of the group rated the programme favorably and indicated it was of benefit to their learning experience. Identified areas of their learning positively impacted on include; increase in amount of knowledge (81%), better levels of interaction among colleagues (69%), improved literary research and problem solving skills (72%), higher level of confidence (81%) and an increased eagerness for clinical school (95%).

Conclusion: Problem Based Learning programme can be beneficial to pioneer physiotherapy students in basic medical science year even when it is administered newly by a Department that is still developing in the programme.

Key Words: Problem Based Learning, Physiotherapy Students, Anatomy.

INTRODUCTION

Problem-based learning (PBL) has become an increasingly popular alternative in medical education and

literature is replete with its many benefits; like its ability to foster early acquisition of cognitive skills and encourage deep learning in students (Coles, 1985; Newble and Clarke, 1986; Solomon, 1994; Hmelo-Silver, 1998). It is also found to be beneficial in increasing the level of motivation by helping to develop self directed learning skills that last for whole careers and increasing intrinsic interest in the subject of study (Norman and Schmidt, 1992; Albanese and Mitchell, 1993; Pereira *et al*, 1993; McGregor *et al*, 1995; Morrison, 2004). Other authors however, are either in total dissent about the benefits of PBL or offer a suggestion of a need for caution and necessity of further evidence to prove that the benefits are of significance compared to the cost in time, material and effort (Prince, 2004; Colliver and Markwell, 2007). In spite of this, PBL has been advocated for physiotherapy education and is already being used for physiotherapy undergraduate education (Solomon, 1994; Williams *et al*, 2003).

PBL is an instructional method in which students learn through facilitated problem solving (Hmelo-Silver 2004). In physiotherapy, scientific knowledge is applied in the care of ailments. Therefore, a good acumen at problem solving is of advantage at arriving at correct diagnosis (Saarinen-Rahiika and Binkley, 1998). PBL involves case or problem based activity where enquiry is directed at finding explanations to presented real or imagined life-like scenarios. The use of PBL in the teaching of physiotherapy students is not new (Saarinen-Rahiika and Binkley, 1998). The impression however is that introduction of changes and modification in medical curricula worldwide did not rub on Nigerian medical schools (Ibrahim, 2007). Therefore, in keeping with positive innovation and the trend towards increasing inclination to the PBL approach (Edens, 2000), and also in the belief that PBL will be of advantage to physiotherapy students, the Department of Anatomy in the College of Medicine of the University of

Lagos introduced the PBL approach in its mode of teaching of Physiotherapy students in their basic medical science year. The need to evaluate the programme as it concerns physiotherapy students has been recognized since the results of a feedback from medical students cannot be extrapolated as applicable to physiotherapy students. This is because there may be differences in the perceptions of the program between different groups of students (Dahlgren and Dahlgren, 2002).

MATERIALS AND METHODS

GROUP OF STUDENTS

The group of students assayed in this study are second year Physiotherapy students admitted for a five-year program leading to the award of a B. Physiotherapy degree. The students had either undergone an intensive one year preliminary programme at the Faculty of Science of the University of Lagos and have passed the requisite pure science based examinations or have been admitted as direct entry students through the meeting of the prescribed scores in General Certificate of advanced level examination or by being holders of a good relevant first degree from recognized institutions.

There were 41 students in this group and there is a good gender balance. They had gone through the Department of Anatomy's PBL programme for nine continuous months covering all body regions. They were also involved academically with other Basic science Departments in the school who do not use the PBL approach.

QUESTIONNAIRE

A structured questionnaire was used for this study. It had an introductory part that informed prospective respondents of the aims and objectives of the study and solicited their frank and truthful responses. It also promised anonymity and gave simple instruction of the need to mark the options that was nearest to their degree of agreement/disagreement to simple stem statement with sentence completions. There were six options; Strongly agree, Agree, Undecided, Disagree, Strongly disagree and No response.

PBL PROGRAMME.

As in other PBL programmes, the main feature is to induce the students into individual and group work in arriving at answers or understanding of the basic Anatomy needed to understand. This will enable them to effectively impact professionally on simulated (usually authored by the department) common medical scenarios. The printed scenarios were circulated on Wednesday mornings and the group PBL discussion took place on the following Friday mornings. The class was randomly divided into 4 groups of about 10 students each. Each group had a lecturer from the department as a facilitator that moderated and if need be guide the discussion. Students were

encouraged to contribute freely, engage one another's ideas and ask their own questions, the only limitation being time, which was 3 hours.

Sessions took place simultaneously for all 4 groups in the dissection hall that is compartmentalized into different bays; so, each group had an appreciable measure of privacy and isolation. The materials available to the students for research were the Departmental and College libraries, Departmental museum, widely available World Wide Web connections and personal texts and notes.

Facilitators are lecturers in the department, majority of who are new to, but enthusiastic about PBL. At the onset of the programme there was an official "training the facilitators" session by the professor and head of department. Full academic meetings were called to decide and author PBL scenarios, the posers and questions and to emphasize the need to facilitate and not resort to lecture during PBL sessions. Challenges and possible solutions were discussed during these weekly meetings. This way, half of the Anatomy academic programme was covered through PBL while the remaining half was covered by the traditional lectures style.

SURVEY PROCEDURE

The questionnaires were distributed to willing students at the end of the year-long program a few days before the final examination directly by the authors. Just before the distribution, some members of the study team addressed the class briefly to solicit the students interest and encourage the judicious and correct filling of the questionnaires by letting it approximate as much as possible their honest opinions as the result was intended to further develop the program and for scientific publication. Again anonymity was promised and aptly demonstrated by asking participants to drop completed forms in drop boxes placed at class exits or to be dropped off at a later time. No incentives or rewards were promised or given to respondents. Respondents were encouraged not to leave any question unanswered, but to mark 'no response' instead if they could not make up their minds.

PROCESSING OF THE QUESTIONNAIRE

The information contained in the completed and returned questionnaires were entered manually into an Ms excel workbook (Microsoft office 2003) designed by the authors for the purpose. The variables were represented by numbers and the "count if" function of the program used to collate. After sorting using the same software, the collated figures were subjected to statistical analysis using chi square analysis also done by the same programme.

RESULTS

Thirty-five students participated in the survey out of a total of forty one given a percentage response of eighty five percent. The collated responses in percentages are given below in Tables 1 – 6.

Table 1: Responses (%) to the Sentence Completion Questions Designed to Survey Respondents views about cases/problems used for pbl, prefixed by ‘i find the pbl cases/problems’

Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No response	
Too advanced	8.7	8.7	15.4	48.7	18.5	0
Too elementary	6	2.7	12.6	32.8	45.9	0
Relevant to basic anatomy	63.9	24.4	0	4	7.7	0
Not relevant to basic anatomy	9	2.8	0	32.9	55.3	0
Cover the topics intended	45.3	27.7	0	17.3	9.7	0
Don't cover the topics intended	14.5	17.3	7.9	24.3	35.8	0

Table 2: Percentage Responses to the Sentence Completion Questions designed to Survey Respondents Attitude towards the pbl Programme and Activities, prefixed by ‘since the commencement of pbl i find i - ’

	SA	A	U	D	SD	NR
“Am Eager to Attend	46.7	23.3	13	10	6.7	0
“Prefer Sessions to Lectures	26.1	26.1	16	9	22.8	0
“Gain more in Pbl Sessions than Lectures”	32.4	19.1	16	16	16	0
“Personally Rsearch before Sessions”	36.7	16.7	20	17	10	0
“Prefer Group to Personal Research”	35.4	25.7	16	6.5	16.2	0
“Participate during Sessions”	40	26.7	17	6.7	10	0
“Don't Participate during Sessions”	6.7	10	13	17	53.3	0

KEY: SA; Strongly Agree, A; Agree, U; Undecided, D; Disagree, SD; Strongly Disagree, NR; No Response

Table 3: Percentage Responses to the sentence completion questions designed to Survey Respondents Impression of Personal Positive Impact of PBI Prefixed by ‘since the commencement of PBI Find - ’

	SA	A	U	D	SD	NR
“My Knowledge Base Has Improved”	65.4	16.2	5.7	5.6	7.1	0
“I am better at Material Search”	45.8	21.7	24.8	3.8	3.9	0
“I am better at Problem Solving”	37.9	31	13.8	10.3	6.9	0
“I Study More”	44.1	34.2	12.9	2.9	5.9	0
“I Interact better with Mates”	48.3	20.7	17.2	6.9	6.9	0
Pbl Activity helpful in Theory Exams	77.3	12.8	6.7	0	3.2	0
Pbl Activity helpful in Practical Exams	65.5	24.1	6.9	3.4	0	0
“I am more Eager for Clinical School.”	76.9	18.2	0	4.9	0	0
“My Confidence Level Increased”	56.2	25.1	7.9	0	10.8	0

Table 4: Responses (%) to the Sentences Competions Designed to Asses Opinions of Respondents, Prefixed By ‘In My Opinion I – ’

	SA	A	U	D	SD	NR
Recommend we have more of Pbl	63.3	23.3	10	0	3.3	0
Recommend we have less of Pbl	6.7	3.3	13.3	23.3	53.3	0
Recom more of Lectures than Pbl	20	10	16.7	30	23.3	0
Recommend we Stop Pbl Entirely	3.3	3.3	6.7	13.3	73.3	0
Think Pbl not Suited for Anatomy	0	4.1	4.3	4.8	86.7	0
Think Pbl Not Suited for Any Basic Medical Science	11	0	4.3	11	73.7	0

KEY: SA; Strongly Agree, A; Agree, U; Undecided, D; Disagree, SD; Strongly Disagree, NR; No Response

Table 5: responses (%) to the sentences completions questions designed to test motivation for participating during pbl sessions, prefixed by ‘when i find myself actively participating during pbl sessions, usually, it is due to the –

	Sa	A	U	D	Sd	Nr
Desire to make others benefit	42.8	14.6	10.7	10.8	21.1	0
Need to test my knowledge	64.4	19.6	13.1	0	2.8	0
Compulsion	23.8	4.9	8.4	16	46.8	0
Peer pressure	3.9	14.7	10.8	10.7	59.9	0
Love for pbl	37.2	23.4	16.5	13.2	9.7	0

KEY: SA; Strongly Agree, A; Agree, U; Undecided, D; Disagree, SD; Strongly Disagree, NR; No Response

Table 6: Responses (%) to the Sentences Completions Prefixed by ‘when i find myself not actively participating during pbl sessions, ‘usually, it is due to –‘

	Sa	A	U	D	Sd	Nr
Timidity	21.3	7.5	17.8	7.5	46	0
Peer pressure	7.5	0	22.4	14.8	55.3	0
Lack of knowledge	12.3	4.6	7.5	15.9	59.7	0
Dislike for session	11.2	0	11.2	3.7	73.9	0
Communication handicap	19.7	3.7	3.7	12.6	60.2	0

KEY: SA; Strongly Agree, A; Agree, U; Undecided, D; Disagree, SD; Strongly Disagree, NR; No Response

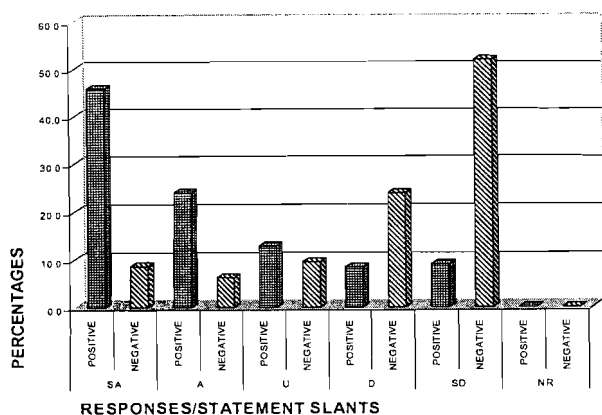


Figure 1: Agreggate Responses to Positive and Negative Statements.

*Significant at $p < 0.1$

KEY: SA; Strongly Agree, A; Agree, U; Undecided, D; Disagree, SD; Strongly Disagree, NR; No Response

DISCUSSION

In this survey, the response rate is eighty five percent, which appears adequately sufficient for the result of this survey to be construed as aggregating the group’s opinion about the subject matter (Parashos et al, 2005). Non response bias issues were therefore not put into cognizance in this report (Asch et al, 1997).

Figure 1 indicates the tilt of the class’ opinion to an oversimplified question that summarizes the responses to a like/dislike, good/bad and want/don’t want level. To arrive at this extrapolation, thirteen sentence completion question/ statements which aggregate ‘like/good/want’ and eleven questions that connotes ‘dislike/bad/don’t

want’ were gathered. The exercise suggests that at the simplest level of ‘good/bad’ the students favored ‘good’. Of note however is that the percentage that disagreed (75.7%) with negative connotation question /statement completions is more than the percentage that agreed (69.7%) with positive connotation sentence completions. Furthermore, a paired student’s t-test at $p < 0.1$ of the arrived figures was statistically significant. It therefore appears that this group of students polled favorably towards PBL, but more so because it is not such a ‘bad’ thing than that it is actually a ‘good’ thing.

In Table 1 the result to the sentence completion questions designed to survey respondents’ views about cases/problems used for PBL is presented. The result shows that 79% percent agree that the cases/problems used are relevant and 73% at least agreeing that they cover topics intended for the PBL sessions. In PBL the quality, relevance and general adequacy of the cases/problems used to direct learning and teaching of intended topics are pivotal (Keppell, 2005; Vanleit and Cubra, 2005). In the first year and with the pioneer set of the PBL programme, it is encouraging to note that this important aspect of the programme has met the students’ expectation.

A good attitude towards the PBL programme and the activities involved is shown in Table 2. This is to be expected as the aggregate opinion of opinions suggests a likeness for the programme. It can be posited based on this that the acclaimed benefit of PBL is not lost in this group of students even as they are the first group to go through the programme in a Department introducing PBL for the first time (Norman and Schmidt, 1992; Albanese and Mitchell 1993, Vernon and Blake, 1993; Morrison,

2004) It is this impact of PBL that the survey items reported in Table 3 are designed to assess. There is a general opinion in the impression of the students that the developing program affords these benefits even in its evolution. The survey report also indicates a student impression of augmentation of knowledge, which is in consonance with views elsewhere as reported (Prince *et al*, 2003). Expectedly, the opinions of the students favor an increase in the proportion of PBL activities as 63.3% of respondents would like an increase in time allotted for PBL and over half (53.3%) at least disagreed with the suggestion of more didactic lectures than PBL (Table 4).

From Table 5 it is seen that the factor that drives this group of student most to participate is the quest for and need to acquire knowledge. PBL provides a good platform for this as a result of interaction with fellow students and facilitators. On its own, the position of drive for knowledge is a good argument in favor of PBL as it is not ideal for students to wait for the examination to test the knowledge acquired. Exhibition and trial of knowledge is facilitated during PBL group discussions (Schmidt *et al*, 2006). Timidity which is identifiable in this survey as the greatest factor that contributes to non- participation (Table 6) would militate against maximizing the opportunities available with PBL. This is instructive as it highlights the need for facilitators widen their reach and increase the level of engagement with the students.

CONCLUSION

PBL programme can be beneficial to pioneer physiotherapy students in basic medical science year even when a department that is still developing in the program administers it newly.

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