Student and Tutor Perception of a New Problem Based Learning Curriculum at Faculty of Medicine, Makerere University

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Background: **The Makerere University Faculty of Medicine started the implementation of the Problem Based Learning/Community Based Education and Service curriculum for incoming students in the academic year 2003/2004. It undertook an intense preparatory period of 2 years before implementation, which included sensitizing, and training tutors to take their new role.**
Objectives: **To evaluate student and tutor perception of the New PBL Curriculum at the Faculty of Medicine and to evaluate tutors perception of how well the students were doing.**
Methods: **The study was at the end of the first semester, after seventeen weeks of the new curricula implementation. A 19-item questionnaire was self-administered by the students. An open discussion led by one of the investigators followed that questionnaire filling session. A 5-point likert scale was used to rate the different aspects. A different questionnaire was administered to the 35 academic staff that had tutored the twenty tutorial groups of eight to ten students each. The data collected from the two questionnaires was analyzed using SSPS software. The Faculty Research Committee approved the study.**
Results: **Out of 180 students, 135 students filled in the questionnaire. In addition 25 tutors out of 35 filled in their questionnaire. The tutors' facilitation of the tutorials was rated highly by the students. Students' rated their (students') participation in the tutorial process as excellent. The students rated access to learning resources as inadequate and they were anxious as to whether they were learning enough. On the other hand the tutors were satisfied with the depth and scope of the discussions by the students. The majority of the tutors thought it was the right move to introduce PBL. They were however concerned about sustainability of the novel educational reform (PBL).**
Conclusion: **The students perceived the new method as acceptable. They expressed anxiety and uncertainly as to whether they were learning enough. And whereas the students were not sure they were learning enough, the tutors were satisfied with the depth of knowledge exhibited by the students. To sustain the reform tutors' concerns and fears ought to be addressed.**

Introduction

After much criticisms and calls for reform in Medical Education[1,2,3,4] many medical schools in the world have made fundamental changes in student selection processes, curricula, teaching strategies and assessment methods. The pendulum of educational reform is swinging away from traditional approaches and towards PBL with such momentum that adaptation of PBL for many schools seems inevitable[5]. In the past two decades PBL was in use in about 150 (of 1400) medical schools worldwide[6], it's

in more to date and Makerere has not been left behind. The University had in the preceding years carried out a survey[7] to find out how well her 'products' (graduates) were doing in the market place. The findings called for reform so the current changes are in part a result of an inward look and dissatisfaction of current methods, strategies, performance of graduates and impact on health indicators in the community. The Faculty of Medicine, at Makerere University introduced and started implementation of Problem Based Learning (PBL) in the academic year 2003/4 replacing a traditional medical lecture based

curriculum. In all 180 students had been admitted and signed up for the 5 programs offered: Medicine, Pharmacy, Dentistry, Radiography and Nursing. Sensitizing workshops were held, many months before the implementation of PBL to help the faculty understand the rationale for change and later their role in new curriculum implementation. The second wave of workshops was for training tutors in their presumed roles of guiding a tutorial process, writing problems, giving feedback and student assessment among others.

A core group of trainers of trainers (TOT) had been identified and had study tours and training in some schools that practice PBL. The final effort before implementation was a study tour by 20 tutors and TOT at Moi University Eldoret Kenya for a 7 day hands on experience. The pioneer group of 35 tutors, who volunteered from a pool of existing teachers for first and second year and a few representatives from the clinical years. During the implementation period working retreats took place to support the process and move forward. There was a tutor support office too to manage administrative work, provide resource materials for tutors and students to answer queries.

Definitions of PBL vary but a comprehensive example would be "an educational method characterized by the use of patient problems as a context for students to learn problem solving skills and acquire knowledge about the basic and clinical sciences" [8,9,10]. Students usually meet in small groups two or three times a week for PBL tutorials. They are presented with a problem and in a series of steps; they discuss possible mechanisms and causes of what, develop hypotheses and strategies and gather new information to redefine their hypotheses, before finally reaching a conclusion. In this process a tutor usually acts as a facilitator, guiding students in this group learning process. The identification and pursuit of their learning goals (also called students own learning objectives) is a key element of the PBL process.

At Makerere the students follow the Makerere ten steps: step one getting started; in which they introduce themselves, they choose a chair and scribe and set ground rules. Step two: They read out the problem once or twice. Step three: They then deal with unfamiliar terms arising from the problem by defining them or clarifying meaning. Step four: they develop the theme of the problem, to which they agree by consensus.

Step five: They identify the questions that need answers also called learning issues and brainstorming on them, Step six: is developing hypotheses to explain the issues by exploring and using pre existing knowledge relevant to the issues (Concept mapping). Step seven: they determine the need to clarify questions and what knowledge is required to fully explain the issues they could not satisfactorily dispose off in steps – these become the student own learning objectives (SOLOs). The SOLOs then guide Self Directed Learning (SDL). At the end of every session is – feed back: peer assessment, self-assessment and tutor assessment that is step eight. Step nine: self-directed learning (SDL) where they go out in search of answers – in the library, from experts, the Internet etc. All this (steps 1 to 8) happens on day 1 for up to 3 hours. Two days later during the report back session the tenth step is held when students through active discussion, systematically present the answers from the self-directed study sessions to the questions i.e. SOLOs earlier raised. In here they test and apply their newly acquired knowledge with guidance of a tutor.

The role of the tutor in this process is to see to it that the Makerere 10 tutorial steps are adhered to and that students are meaningfully utilizing the time allocated (3 hours) for the tutorial process and that the learning environment is optimal. To do this the tutor is equipped with a tutors' guide that contains a summary of what should be explored during each session in a step-by-step fashion. The week prior to the tutorial session a group of tutors go over the main issues of the subsequent session. The tutor

need not be an expert in the area under discussion. So the tutor facilitates and guides learning without contributing directly to the solution of the problem or being the primary source of information.

At the beginning of the program, the students had a weeklong sensitization and training in the Problem Based Learning and educational methodology through didactic lectures, demonstrations, open interactive discussion sessions, notes and references. A student support office was in place for queries, clarifications and support about curriculum issues. A week is considered as the learning time unit. An over view lecture begins the week followed by, two tutorial sessions per week; the first introducing and raising learning objectives and the second which is done two days later is termed as a report back session. Two days before report back session the students read on their own called "self directed learning". In the other days of the week are practical sessions, skills training and clinical sessions.

The PBL approach is based on principles of adult education and cognitive psychology[11, 12]. It differs fundamentally from the much-criticized traditional methods of learning which are largely teacher centred and didactic[3, 13, 14]. In view of the new educational reforms at Makerere, Faculty of Medicine in teaching and learning this study set out to investigate the student's and tutor's perception of aspects of the new curriculum after the first semester. The objectives were to evaluate how helpful tutors were, evaluate the tutorial process and the learning environment at the stage when a semester of implementation had happened in order to inform the next stage of implementation.

Methods

This cross sectional descriptive study was carried out at the Faculty of Medicine, Makerere University. It was in two parts; Part one: All the 180 first year health professional students who had enrolled for the 5 programs were invited to a central location. One hundred and thirty five students turned up and filled a self-administered anonymous questionnaire. Data analysis was carried out using SSPS software.

The questionnaire consisted of 19 items, which covered aspects of overall tutor performance as a facilitator, tutor preparedness, student participation, report back discussion sessions, depth, scope and relevance of problem content to the subject matter, access to learning resources and availability of reference materials. The questionnaire items were a 5-point Likert items of either agree –disagree type or the never-always.

Part two: self-administered anonymous questionnaires were available to 35 tutors who were involved in tutoring 20 groups of first year students at the time. The questionnaire was administered during the weekly tutors' meeting. It consisted of 20 items, which refereed to students' participation, depth and scope of discussion, whether students were learning enough, tutor preparedness and concerns. The number of items addressing each dimension varied from 2-4. The items were 5 point Likert items of either the agree-disagree type or the never –always type, or questions to which participants could respond yes or No or not sure or respond with an estimate.

Faculty Ethics and Research Committee had approved both parts of the study and students were told they were free not to fill in this anonymous questionnaire. They were assured that non-participation would attract no penalty or prejudice their studies at the Medical School. Tutors' participation in this study was also voluntary and they were free to decline participation.

Results

Of 180 students, 45 did not turn up to fill in the questionnaire and the reasons were not established. The majority of students join the university straight after Advanced level (Uganda Advanced Certificate of Education) examinations. A few get into the University as 'mature' entrants. This explains the wide age range and median age

in table 1. The Summary of most recurring issues from the open discussion with the students were as follows:

- They were worried that they may not be learning enough
- It is not clear when and where to stop reading because the tutorial objectives do not help to precisely define scope
- The tutors are too inactive in the tutorials whereas we would appreciate more interaction with them
- The available computers are not enough, and the internet speed is slow
- Over-all however we are enjoying the whole process of learning very much

The tutor participants were of 25 out of 35 tutors. The principal investigator disqualified himself and, the other members who could not attend the weekly tutors' meeting for one reason or another were left out. Only 10 (40%) of respondents were teaching biomedical sciences> the rest (52%) belonged to the clinical disciplines.

The mean age of the study population was 42.2 years and the age range was 29 –56 years. Two thirds of the tutors had a teaching experience of over 5 years. All the tutors had training for tutoring. The sex ratio was close to 1:1. In summary the tutors were concerned about inadequate numbers of tutors to handling all the students in the various years of their education unless mass recruitments were made. There was need for more learning resources since, what is enough now may be irrelevant as the years pass by. There was also need not only to continually train and build capacity of the tutors but also to pay them better salaries. The majority (68%) had a teaching experience of more than 5 years albeit in the traditional curriculum. And 20% (5) had over 15 years of teaching experience.

Table 1. Student characteristics

Parameter	Characteristics
Sex ratio	M: F 1.3:1
Age range	19 - 41 years
Median age	21 years
Mean age	22yrs 4month

Table 2. Indicates ratings by students of the different parameters

Parameter	Rating					
	SA	A	N	DS	D	NS
Over all tutor performance excellent	15.6%	50.4%	23.0%	5.9%	4.4%	0.7%
Tutor appeared well prepared for class	12.6%	34.8%	31.1%	12.6%	7.4%	1.5%
Tutor guided group clearly	16.3%	48.9%	25.9%	3.7%	4.4%	0.7%
Tutor was enthusiastic	17.0%	32.6%	30.4%	14.1%	4.4%	1.5%
Tutor was helpful	20.7%	46.7%	25.2%	3.0%	2.2%	2.2%
Tutor motivated me to work	26.7%	40%	24.4%	3.7%	3.0%	2.2%
Work load was appropriate	8.9%	25.2%	36.3%	20.0%	5.9%	3.7%
Course was well organized	4.4%	32.6%	31.1%	22.2%	8.1%	1.5%
Discussion relevant to problem	28.9%	57%	10.4%	2.2%	1.5%	0%
Scope & depth of discussion covered all objectives	19.3%	43.7%	15.6%	15.6%	5.2%	0.7%
My interest is subject matter deepened	21.5%	54.8%	13.3%	8.1%	1.5%	0.7%
Group participation satisfactory	41.5%	52.6%	3.0%	2.2%	0	0.7%
Assessment methods satisfactory	11.1%	40%	33.3%	9.6%	4.4%	1.5%
Clinical sessions challenging & worthwhile	25.2%	34.1%	14.8%	19.3%	5.9%	0.7%
Learning Resources were accessible	12.6%	31.1%	28.1%	19.3%	8.1%	0.7%
Learning resources were adequate	5.9%	27.4%	26.7%	28.9%	10.4%	0.7%
Overview lectures were useful	17.8%	35.6%	21.5%	11.1%	11.9%	2.2%

SA = Strongly Agree , A = Agree,   N = Neutral, DS = Disagree strongly, D = Diagree, NS = Not stated

Table 3.   Teaching experience of tutors

YEARS	NUMBER	PERCENTAGE
< 5	7	28
5-10	11	44
11-15	2	8
> 15	5	20

Table 4. Ratings of different parameters by the tutors

Parameter	Always	Most times	Sometimes	Never	Not stated
• Tutors read subject matter before tutorial	24% (6)	28% (7)	44%(11)	4% (1)	-
• Tutors get lost on details	0	4% (1)	68% (17)	20% (5)	-
• Students raised learning objectives successfully	52% (13)	48% (12)	0	0	-
• Tutors very satisfied with depth and scope of discussion in the tutorials	36% (9)	64% (16)	-	-	-
• Tutor support office very supportive	40% (10)	56% (14)	0	0	-
• Tutors kept time	28% (7)	52% (13)	0	4% (1)	-
• Tutors carried tutors' guide into tutorial session	76% (19)	20% (5)	4% (1)	0	-
• Compliance to 10 tutorial steps	96% (24)	4% (1)	0	0	-

Table 5. Responses to further questions

PARAMETER	YES	NO	NOT SURE
Students learning enough	80%	8%	12%
Found the tutorial assessment very useful	60%	4%	36%
Was it the right move to go PBL?	84%	0	16%

Discussion

It was important for the planners and administrators of the new curriculum to assess the perceptions of students and tutors after the first 17 weeks (semester) of implementation, so as to get a feel of how things went on but also inform the next planning session for the second semester that was to follow.

From the results indicated in Table 2 and the open discussion that followed the administration of the questionnaire more than a third (36.4%) of the students were not comfortable with the scope and depth of the discussions in the tutorials and they cited the reasons of not being sure what the limits for each objective were. These findings confirm what others have found, that students get anxious that the PBL learning strategies may be misdirected or inefficient, as PBL does not clearly limit the depth and scope of what they learn. And the process may provide little guidance on best way of achieving learning goals through self directed learning. However we had not exactly anticipated that this new freedom of searching and directing one's learning would generate so much anxiety. The anxieties could be explained by the fact that most, if not all the students came to PBL from educational backgrounds where teachers had directed students' learning. So

the sudden shift was unfamiliar and uncomfortable to say the least.

This anxiety problem should be addressed within the PBL tutorials[15] where students take, develop and refine the necessary inquiry and exploratory skills that enable them cover sufficiently the required depth and scope of knowledge and in a manner that promotes more retention. A sufficient amount of orderly information in the tutors' guide is critical in achieving this coupled with good tutor training. Tutor training is needed for tutors to be able to address anxiety issues regularly and appropriately. The results from the tutors responses indicated that the students were learning enough even though latter i.e. students did not think so.

The tutor's role and usefulness in the process was applauded as indicated by the ratings in table 2, with only one in ten disagreeing with the fact that over all tutor performance was excellent.
A lot of effort went into getting the tutors ready to play their roles of facilitation. Sensitization and training workshops, started at least a year in advance, and finally a trip was made to a PBL practicing school, for hands on experience and observing tutorials and their management in action.

The role of a tutor/facilitator is critical in the PBL tutorial teaching and learning processes[17,18]. Some of the desirable characteristics of a tutor were highlighted in this study and the students rated them: tutor being well prepared for a session had only 2 out of 10 saying the tutor was not well prepared. On whether tutors were being helpful only 5.2% of students thought that tutors were not helpful.

Introducing change successfully is no mean feat; it takes good planning, preparation and resources [19,20]. The preparedness and good will of the human resource component is critical. This study too assessed tutor perception and the findings used to further inform the implementation process. The average age of tutors was 42 years and the average overall teaching experience was 10

years. All the tutors had been trained and sufficiently exposed to tutoring. A well trained relatively young but experienced workforce is what this combination of characteristics suggest. These characteristics and enthusiasm shown by the tutors and students may turn out to be critical elements for success.

There was near total compliance with the Makerere ten tutorial steps the tutors enjoyed tutoring, most kept time, they carried their tutors' guides to the tutorial rooms and most of them read before each tutorial. This combination of factors re-affirms commitment and if maintained may promise sustainable change.

Of the tutors, 17 (68%) admitted to sometimes getting 'lost' on some details when students were discussing. It may be that is why over 95% of tutors read about the subjects of the tutorials before they tutored. Getting 'lost' is a potential source of anxiety on part of the tutors and may induce them to call for content experts as tutors. It is practically difficult to have experts for each field that is under discussion. Experience elsewhere shows that with a well-written tutors' guide and prior training of the tutors should be sufficient for non-subject experts to do a good job of facilitating.

Non-Committal responses from students
A number of student responses were neutral or non-committal with their responses. For some reason these students did not seem to have an opinion. This was mostly for the question of whether the workload was appropriate. 49 students did not commit themselves– this collaborates with their anxiety of boundaries of where and when to stop reading and information search.

Students' participation

The whole group was most decisive about group participation in the tutorials. They were only 4 students who did not commit, and 94.1% (127) agreed or strongly agreed that as far as the students' participation in the tutorial process was concerned they

were active, keen and enthusiastic. This is welcome revelation and a key ingredient for student centered learning. The keenness and thirst for knowledge, is possibly what happens for every group of students who join a Medical School, but it is also true the PBL does provide a more challenging, and enjoyable approach to education[16].

The tutors perceived the students as active and there were, no reports of 'parasite' students made. They nearly always raised all learning objectives successfully. The depth of discussion was very satisfactory! This is contrary to what students thought that they were not learning enough in the new PBL curriculum. In as much as tutors expressed fears of inadequate depth before implementation of the curriculum began, when they (tutors) finally got in the tutorials they were impressed with not only scope and depth but also variety of references the students managed to come up with each time.

Learning Resources

The issue of adequacy of learning resource had the poorest rating. Students indicated that they needed more books, and better Internet speed and space. The learning resources at the Faculty of Medicine have not changed much over the past 5 or so years, the introduction of PBL has highlighted the need to beef up learning resources especially because 40% of the students' time is dedicated to going out to search for answers to the questions raised in the tutorials. It is likely that since the traditional outgoing curriculum was lecture based, the shortage of learning and reference materials was not as acute or visible. Traditional or non-traditional, learning resources need improvement.

The top fears of tutors were about Human resource Management issues especially as the program expands to include more students who are at different stages of their education. Other areas of concern included worry about learning resources, that current ones would get out stripped; they worried

about students not turn out as intended (better health workers).

When asked about priority areas to work on. They indicated investing in staff, bettering learning resources as the most critical areas. This is a pertinent concern for all PBL schools[5,21] and therein lies that disadvantage of PBL compared to the traditional lecture based curriculum, the PBL curriculum seems to require more resources and time on part of the tutor.

Conclusion

The students perceived the new methodology of teaching and learning as well thought through and acceptable however, there was insecurity on part of the students as to whether they were learning enough in terms of depth and scope and inadequacy of learning resources. The tutors were on the contrary impressed with the scope and depth of the students learning.

Educational outcomes of these new technologies ought to be systematically documented by robust research methodologies to justify PBL in concrete terms.

References

1. World Health Organisation. Training and Preparation of teachers for Schools of Medicine and of allied health sciences. Geneva: *WHO technical report series* No. 521: 1973

2. Muller S. Physicians for the twenty first century: Report of the project panel on the general and professional education of the physician and college preparation for medicine. *J. Med Educ*. 1984; 59:1-208

3. Lowry S. What's wrong with Medical Education in Britain? *BMJ*. 1992; 305:1277-1270

4. Kamien M. The reform of Medical Education. *Med J Aust*. 1993; 158:226-227

5. Berkson L. Problem Based Learning: Have the expectations

been met? *Acad. Med.* 1993; 68: 579-588

6. Schmidt HG, Neufeld VR, Nooman ZM & Ogunbode T. Network of community-oriented educational institutions for the health sciences. *Acad. Med.* 1991; 65:259-263

7. Feasibility study Report, Faculty of Medicine, Makerere University, 2000

8. Albanese MA, Mitchell S. Problem Based Learning: a review of literature on its outcomes and implementation issues. *Acad. Med.* 1993; 68:52-81

9. Barrows HS. *Problem Based Learning applied to Medical Education*. Revised edition. Southern Illinois University school of Medicine, Springfield, Illinois. 2002

10. Neufeld VR, Barrows HS. The McMaster philosophy: An approach to Medical Education. *Journal of Medical Education*. 49; 11:1040-1050

11. Knowles M. The adult learner: a neglected species. Houston: Gulf Publishing Company. 1990

12. Norman GR, Schmidt HG. The Psychological basis of PBL: a review of the evidence. *Acad. Med.* 1992; 67: 557-565

13. Schmidt HG. Problem Based Learning: rationale and description. *Med. Educ*. 1983; 17: 11-16

14. Des Marchias JE, Bureau MA, Dumais B, Pigeon G. From traditional to problem based learning: a case report of complete curriculum reform. *Med. Educ.* 1992; 26: 190-199

15. Paul M Finucane, Steve M Johnson and David J Pideaux. Problem Based Learning: its rationale and efficiency. *MJA*. 1998; 168: 445-448

16. Geoffrey RN, & Henk GS. Effectiveness of problem based learning curricula: Theory, practice and paper darts. *Med Edu*. 2000; 34:721-728

17. Gillian Mandsley. Roles & Responsibilities of the PBL tutor in the Undergraduate Medical Curriculum. *BMJ*. Vol 318. 6 March 1999

18. Dolmans DHJM, De Grave W, Wolfaghen IHAP, Van der Vleuten CPM. Problem based learning: future challenges for educational practice and research. *Medical Education* 2005; 39:732-741

19. Des Marchias JE. Learning to become a physician at Sherbrooke: A full switch to a student centered MD Program. Network Publications, Maastricht, The Netherlands 2001.

20. Schwartz P, Mennin SP & Webb G. Problem Based Learning: Case studies, experience practice, Kogan Pahe, London. 2001.

21. Mennin SP, Martinez B & Urrola N. The cost of Problem Based versus Traditional Medical Education. *Med. Edu*. 1986; 20:187-194