Student perceptions of group function in a pharmacy Problem-Based Learning course

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Abstract

In problem-based learning (PBL), student-directed small groups work towards the resolution of a problem facilitated by a tutor. PBL tutors anecdotally describe groups that function poorly despite intervention and student achievement is likely to be compromised in these situations. This study explored pharmacy students' perceptions of group function in PBL. Eight face-to-face semi-structured interviews were performed. Themes identified from the transcripts were compared and contrasted. Groups worked well when all participants contributed and when distractions were minimal. Conversely, dissatisfaction arose when individuals did not contribute or appeared less committed, leading to feelings of frustration. Factors influencing pharmacy PBL group function were similar to those in undergraduate medical and nursing literature although the influence of overseas students and a fear of intervening in some situations were additionally identified. Further student and tutor PBL training are recommended and student assessment has since been modified to include reflection on group function. Overseas students' experiences and the influence of power within groups are areas for further research.

Keywords: *Group dynamics, problem-based learning, education pharmacy undergraduate*

Introduction

Problem-based learning (PBL) group function

In PBL, learning is student-directed with participants working in small groups facilitated by a tutor. Importantly there is an emphasis on process; the interaction between students when problem-solving is essential for learning. Anecdotally, tutors observe that some PBL groups work well together but others under-perform. A review of PBL and small-group teaching literature identified factors affecting group function and a relationship between group function and productivity.

Factors influencing PBL group function can be divided into three main areas; those arising from the students, the tutors and 'external' factors. External factors include group size, the case itself, assessment methods used and the physical environment (MacPherson *et al* 2001).

Reports on the tutor's influence are mixed but this may be due to different perceptions of the role. Tutor dominance and a lack of knowledge on when to intervene are frequently identified as being detrimental (Biley & Smith 1999, Lucero *et al* 1985) and problems can occur when the tutor is uninterested or has little enthusiasm (Virtanen *et al* 1999).

The students themselves appear to have the largest influence. Behaviours encountered in less productive PBL groups include student dominance (de Grave *et al* 2001), lack of motivation (Dolmans *et al* 2001) and lack of participation. Lack of participation has been reported amongst quiet students (Hendry *et al* 2003), students from ethnic minorities (Duek 2000) and those not willing to share information (Brysiewicz *et al* 2002). Student-directed strategies to resolve problems are preferred, and ongoing training and reflection are recommended.

The extensive educational literature on small-group teaching highlights similar issues. However, additional influences such

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as status and culture are identified. For example, Ruddock (1978) suggests that students disguise their lack of knowledge in order to protect their status, but also to project a professional image. This suggestion is lacking in the PBL literature, but in healthcare where professional autonomy is anticipated by students, is worthy of consideration.

The pharmacy PBL course in Manchester
PBL is a recent development in pharmacy education, especially in the UK. It was introduced to the MPharm degree course at the University of Manchester in 2002 (Hanning *et al* 2002). Groups of eight to ten students attend a compulsory course of ten three-hour PBL tutorials during their final year (Mackellar *et al* 2005). At the time of this study, the course was assessed by means of an individual essay and group poster presentation.

The pharmacy PBL tutors perceive that difficulties with group dynamics persist and student evaluation questionnaires have also consistently identified problems. However, reasons for these problems have not been explored in student evaluations and tutor-led interventions have been largely unsuccessful. Additionally, student comments about poor group performance have not always originated from those groups perceived to under-perform. Student perceptions may therefore offer additional insight into group function.

Some evidence suggests that students in well-functioning PBL groups perform better in examinations than those who experience problems (Wigen *et al* 2003). The proposed benefits of PBL, for example improved understanding and retention, may not be achieved when there are group problems and Eva (2002) argues that a poor team environment could also reinforce or create ill-conceived biases amongst students.

This suggests that developing and encouraging well-functioning PBL groups is important and a more thorough understanding of student experiences would better inform tutors attempting to improve group dynamics. A variety of methods have been used to study PBL group function (Table I). These were used to inform the methodology of this study in which interviews were judged as being most appropriate. Through using interviews as an exploratory method, it was anticipated that further research involving the perceptions of a significantly larger sample of students would be developed.

Aims and objectives

The aims of this study were to explore pharmacy student perceptions of group function in PBL and identify student strategies for dealing with difficult situations.

The objectives were:
To obtain student descriptions of situations where PBL groups work well and where there are problems
To obtain student descriptions of feelings associated with perceived productive and difficult PBL group situations
To obtain accounts of any action students take when they perceive their group is not functioning well
To make recommendations for dealing with PBL group problems

Methods

An interview schedule consisting of five interview topics was prepared using Mason's stepwise procedure for qualitative interviews (Mason 2002, p12). The interview was piloted and amended to include an additional introductory question. The university research ethics committee advised that the study did not require ethical approval.

Interviews
Two students took part in a pilot of the study. Semi-structured face-to-face interviews of around 30 minutes were carried out and transcripts reviewed by a member of academic staff. A purposive sample of eight students was then initially selected by two PBL tutors. Tutors were briefed to approach a range of students who were then emailed by the researcher. Interviews were arranged with seven of these individuals.

With written consent, six interviews were performed in a private room at the university (one student changed her mind about participating immediately before her interview; a reason was not requested). They were tape-recorded and carried out in the two-week period following the students' tenth PBL tutorial. It was felt important to perform interviews after the final PBL tutorial to prevent any anxiety about future tutorials. This had a negative impact on the number of participants recruited as interviews were performed in the month preceding examinations; a sample size of 15 was originally planned.
The interviewees (including pilot-study) consisted of three males and five females. No mature students were interviewed; one male was an overseas student whose first language was not English.

Analysis
Interviewees were each allocated a pseudonym, which was used throughout the analysis. Transcripts were split into themes that were then compared and contrasted; this included the two pilot interviews. As described by Miles and Huberman (1994), the themes used were initially descriptive and based upon those in the literature, then became more

Table I. Research methods used to study group function in PBL

Method	Researchers
Observation	Tipping *et al* (1995), Biley and Smith (1999)
Questionnaires	Brysiewicz *et al* (2002), Das Carlo *et al* (2003)
Group-function assessment tools	Mpofu (1998), Wigen *et al* (2003)
Focus groups	MacPherson *et al* (2001)
Interviews	Rono (1997), Biley and Smith (1999)

inferential once the researcher became more familiar with individual comments and made comparisons between interviews.

Results

The analysis of interview transcripts yielded eight themes; the findings are described below in relation to four larger areas. Direct student quotes are used throughout the results; they were selected for their clear illustration of each argument.

PBL as a learning method
Attitudes towards PBL as a learning method were identified and its novelty appears to enhance five students' enjoyment, as one explains:

"It's not like anything else we've ever done which is why I think I probably find it interesting cause it's not the same boring stuff that we have at uni" (Amit).

Pharmacy students experience a variety of teaching methods with PBL used solely in two final year modules. If a PBL curriculum were implemented, as in some medical degrees, then students may not have other methods with which to compare it so favourably, a possibility that Cooke and Moyle (2002) also consider. However, the individuals in the groups and familiarity with the PBL process appear to have more recognisable effects.

Interviewees' comments suggest that not all participants are familiar with the PBL process, or that they deliberately cut short the tutorial. For example they do not discuss some problems, but associate this with good group-functioning.

"Sometimes somebody will come out with something, with an idea and then we'll all agree with it because it seems right and we don't really tend to analyse it too much if it seems right", "it's like get the answers, get them down and we can get out" (Amit).

Hendry *et al* (2003) also identify that students take short-cuts, but that tutors perceive this happens more than the students do. This questions whether the students can tell if their group is progressing well and raises doubts about how well they are able to distinguish good from poor group function. This phenomenon has been reported by Tipping *et al* (1995), where observers identify problematic behaviour in tutorials that students report have gone well.

Participation in group discussions
Specific participation issues are discussed below.

Quiet students
Shy or quiet students who may be afraid of appearing stupid and feel anxious about contributing are discussed by the interviewees. One student describes how she is reluctant to contribute when the group falls silent;
"that makes you even more afraid to say anything cause you think well everyone else knows everything so I'm not going to say that and make myself look stupid" (Rebecca).

These individuals are frequently identified by other researchers as being detrimental, such as Rono (1997) and Hendry *et al* (2003). However, in the study by Hendry *et al* (2003), whilst students identified that quiet peers were their most commonly encountered problem, they were actually least likely to hinder learning.

Students with difficulties understanding the discussion
Overseas students may struggle with the language and terminology in discussions and two participants describe how these peers often give brief and simplistic explanations during feedback. One student comments:

"The problem is the language barrier and you can't, you know you definitely can't say anything cause it's not their fault, they, they can't help the fact that English isn't their first language"; "it's not their fault, and I'm not having a go at them" (Sobia).

The effects of language difficulties, culture and ethnicity on group dynamics are not well recognised in PBL but are explored in the small-group teaching literature. A number of studies have shown that minority students tend to be less assertive and talk less than their peers (Webb 1982). These students may feel ignored or a lack of self-worth (Towson 1985), issues that are worthy of further investigation but that were not explored in this study.

Deliberate non-participation
Researchers identify this problem frequently, for example Brysiewicz *et al* (2002) discuss "lazy students". It seems to be more important to the pharmacy students than any other participation problem as there is a strength of feeling behind their comments. Those students who "cannot be bothered" to participate also display disruptive behaviour and its effect on the group seems to be one of de-motivation. Typical comments included:

"it's the minority, it's a couple of people and erm, they just sit there and they just say nothing and they do nothing" or *"they're sitting there having a chat about what they did at the weekend"* (Sobia).

There appears to be a relationship between the strategies students use to overcome participation problems and their attitude towards them. Two participants describe how they regularly try to involve quieter group members and are tolerant of differences in understanding, behaviours similar to those described by Hendry *et al* (2003). When individuals do not participate because they "cannot be bothered", students are much less likely to intervene. They seem uncomfortable with this type of intervention compared with the more encouraging measures above. There is a feeling of helplessness and perhaps fear, of the consequences of entering into a discussion about deliberate non-participation.

"If the people in the group just can't be bothered then you can't do anything to make them be bothered" (Seema).

"I have never heard anyone say anything to anyone, I think everyone's just too respectful, we just don't say anything" (Sobia).

Whilst other researchers have investigated the actions students take to resolve PBL group problems and their perceived effectiveness, student feelings and their willingness to intervene have not been examined.

Individuals in the PBL group
The students acknowledge that some problems are related to certain individuals. Students who are carrying out an assigned role (usually chairperson) and the mix of personalities within the group were identified.

Students perceive the chairperson is important in maintaining good group function and when collated, their comments build up a profile of the ideal chairperson, with which medical students in a study by Mpofu *et al* (1998) agree. The chairperson is perceived to be less effective when they are quiet or not familiar with the PBL process. An example of a typical comment is given below:

"the chairperson didn't know what she was doing and it was, it was kind of the case where she didn't know what she was doing so she just kind of gave up" (Seema).

Interestingly, it is only the females who make comments relating to the effectiveness of the chairperson. Mpofu *et al* (1998) identify different perceptions about the importance of the chairperson. In their study, males rated group leadership as an issue of little importance when females reported the opposite. It is difficult however, to substantiate the existence of such a relationship in this study due to the small number of males (three) interviewed.

In each PBL group there will be a mix of personalities and some students may find it difficult to work with one another. Students seem to accept this;
"there's certain people in the group that I gel with and there's certain people that I don't" (Sobia). Hendry *et al* (2003) confirm the presence of these "personality clashes" in PBL groups involving medical students. This is inevitable and is representative of future workplace situations; that students are exposed to it before they start their professional lives is probably good. Certainly studies in medical education suggest that graduates exposed to PBL are more competent at working in a team (Jones *et al* 2002) and with other health professionals (Rolfe *et al* 1995) than their traditionally taught counterparts.

Career aspirations were cited frequently in this study, a theme not encountered in other studies on group function in PBL. Importantly, the students appear to have beliefs about what is relevant for their future careers and what is not. These students are close to graduating and it is appropriate that they consider what knowledge and skills they will require. However, there seems to be a mismatch between students' beliefs and the reality of what they need to know. Biley and Smith (1999) also express concern at students' perceptions of what they should learn. Significantly, some students may not participate when they perceive information is not relevant. For example:

"my aim is to work in a community pharmacy and the amount of clinical knowledge in some of the, some of the topics, is just going into too much detail and I find that really boring " (Sunil)

That PBL tutorials take place in the hospital environment probably reinforces this view, although there are no reports in the literature with which to compare it.

In addition to career aspirations, other individual characteristics may influence group function including academic ability. The more able pharmacy students appear to study the more difficult (and possibly more interesting) learning objectives and vice versa. One female confirms this although she makes contradictory comments about how deliberate it is:

"The people who know what they're talking about will generally go for the more difficult ones, er, we don't do it like 'oh, you're going to do a difficult one', it's just done subconsciously"

"if it's something you don't understand and you're relying on that person, you're better off going with somebody you know who will produce good, you know, good feedback". (Sobia)

This may be suggestive of power in the group's negotiation process, possibly belonging to more intelligent students, a phenomenon not identified in the PBL literature. Ruddock (1978) does identify the "authority of knowledge" in the small group learning environment. However, apart from the above comments, there was no specific evidence from the interviews to further suggest its presence.

External influences on group function
The size of each group is beyond the students' control; however there are sometimes students who are absent or who do not participate which would increase the workload for others. However, one student disputes any effect on the group:

"if in a group of eight people, two of them don't contribute, six of them have the majority so, it has very little effect at all on PBL, so in a way it's interactive, it's just that there are two people not contributing" (Sunil).

Two students report finding PBL group work hard at the beginning and end of the semester when distractions from coursework and exams are most noticeable. Other researchers confirm that problems with these parallel activities are widespread (Zanolli *et al* 2002; Reynolds 2003).

Unfortunately, as the pharmacy students' contribution in these tutorials is not assessed, there is little incentive for less motivated students to work to a high standard. Willis *et al* (2002) explored student perceptions of assessment in PBL and found that students viewed assessment of group process important; it allowed them to gain credit for the process of learning. Literature relating to small-group teaching also supports this; rewarding students for the group's achievement promotes cooperation and has a greater impact on group interaction than any instructions given by the tutor (Webb 1982). This suggests that assessment of group function, or the PBL process, may have far-reaching effects on many problematic areas including motivation and participation. Interestingly, assessment of the pharmacy PBL course was actually only mentioned by one interviewee.

Discussion

Recommendations – the way forward for this course
The value of training for students and tutors in PBL has previously been highlighted. This study further emphasises the importance of several aspects of training. Students need to be made familiar with the PBL process and receive an introduction to the types of problem their group may encounter. This is probably best balanced by positive student experiences and suggestions for how to deal with problems. The setting of ground rules may also help as this is widely suggested in both the small-group teaching and PBL literature, for example by Chambers & Wall (2000) and Azer (2004).

This PBL course has aims and objectives that are solely related to the acquisition and application of knowledge, which is not a true reflection of what occurs in tutorials. It may also therefore be beneficial to state the broader educational aims and objectives of the course.

Perhaps most significantly, changes to the way in which this PBL course is assessed could improve group function. Through rewarding students for the process of learning, motivation and hence participation is likely to improve. A portfolio assessment has since been introduced in which students now identify enjoyable and less successful tutorials, reflect on reasons for their occurrence and make recommendations for improving group work.

Limitations of the study
The perceptions of eight pharmacy undergraduates from a cohort of 115 were explored. It was not intended that a representative group were selected for this study, but that a range of student opinions were explored. However, tutors were not asked to explain how they selected students so it is possible that a more motivated group were interviewed.

All students were aware of the researcher's position as a PBL tutor and member of university staff. Whilst they expressed their dissatisfaction with aspects of PBL, the researcher's status is likely to have influenced some responses. For example, students made very little reference to their PBL tutors.

It is also unclear how these findings apply to other healthcare professions, as pharmacy graduates have traditionally been less likely to work in teams, a principle that is central to the PBL philosophy.

Areas for further work
The benefits of using PBL as part of a traditionally taught course in pharmacy are still unclear. Whilst the most appropriate method with which to investigate this would have been to compare cohorts of students before and after the introduction of PBL in 2002, the views of graduates who undertook the PBL course would still be useful.

This study exclusively used pharmacy students' perceptions to explore group function. Research involving pharmacy tutors, for example action research with problematic groups, would be a useful way of exploring this alternative perspective.

Some themes from the interviews that are not well explored in PBL are also worthy of further investigation. The experiences and perceptions of overseas students and their peers' attitudes towards them were not explored, but are important. The existence of power in the groups and its influence on group function are suggested by this study and are also worthy of investigation, despite the likely methodological difficulties. The effectiveness of PBL for students with a variety of academic abilities is a little explored area although this has more implications for courses that have a PBL curriculum.

Interprofessional learning is increasingly being introduced to undergraduate healthcare courses. The added effects of perceived professional status amongst students in the multidisciplinary PBL group would certainly be worthy of further research, together with the perceived effects on future team-work.

Norman (2001, p820) describes the dysfunctional group as the "Achilles heel of PBL" and pessimistically suggests that there are in fact, some PBL groups for whom all interventions will be unsuccessful. Until the acceptable level of productiveness in groups is clearer, the challenge for both students and tutors is to ensure problematic behaviour is both recognised and discussed at the earliest opportunity. With more pharmacy schools opting to add PBL to their teaching methods, there is a real need for programme leaders to be familiar with implementation issues including the critical importance of achieving satisfactory group function.

References

Azer (2004) Becoming a student in a PBL course: twelve tips for successful group discussion. *Medical Teacher*; 26(1): 12-15

Barrows HS, Tamblyn RM (1980) *Problem–based learning: An approach to medical education*. New York, Springer Publishing Company

Biley FC, Smith KL (1999) Making sense of problem-based learning: the perceptions and experiences of undergraduate nursing students. *Journal of Advanced Nursing*; 30(5): 1205-1212

Brysiewicz P, Cassimjee R, McInerney P (2002) An exploratory survey of undergraduate nursing students' experiences of group work within a problem-based curriculum. *Curationis*; 25(4):12-20

Chambers R, Wall D (2000) *Teaching made easy: A manual for healthcare professionals*. Abingdon, Radcliffe Medical Press

Cooke M, Moyle K (2002) Students' evaluation of problem-based learning. *Nurse Education Today*; 22: 330-339

Das Carlo M, Swadi H, Mpofu D (2003) Medical student perceptions of factors affecting productivity of problem-based learning tutorial groups: does culture influence the outcome? *Teaching and Learning in Medicine*; 15(10): 59-64

de Grave WS, Dolmans DHJM, van der Vleuten CPM (2001) Student perceptions about the occurrence of critical incidents in tutorial groups. *Medical Teacher*; 23(1): 49-54

Dolmans DHJM, Wolfhagen IHAP, Scherpbier AJJA, van der Vleuten CPM (2001) Relationship of tutors' group-dynamics skills to their performance ratings in problem-based learning. *Academic Medicine*; 76(5): 473-476

Duek JLE (2000) Whose group is it, anyway? Equity of student discourse in problem-based learning in Evensen DH, Hmelo CE (Eds). *Problem-based learning: A research perspective on learning interactions*. London, Lawrence Erlbaum Associates

Eva (2002) Teamwork during education: the whole is not always greater than the sum of the parts. *Medical Education*; 36: 314-316

Hanning L, Price,G, Scanlan J, Silverthorne J, Cantrill J, Hey R, Freeborn S, Cooke J (2002) A new approach to clinical pharmacy practice teaching in the four-year degree course. *Pharmaceutical Journal*; 269: 163-165

Hendry GD, Ryan G, Harris J (2003) Group problems in problem-based learning. *Medical Teacher*; 25(6): 609-616

Jones A, McArdle PJ, O'Neill PA (2002) Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Medical Education*; 36: 16-25

Lucero SM, Jackson R, Galey WR (1985) Tutorial groups in problem-based learning in Kaufman A (Ed) *Implementing problem-based medical education: lessons from successful innovations*. New York, Springer Publishing Company

Mackellar A, Silverthorne J, Thomas S, Price G, Cantrill C (2005) Problem-based learning in the fourth year of the MPharm at Manchester. *Pharmaceutical Journal*; 274:117-120

MacPherson R, Jones A, Whitehouse CR, O'Neill PA (2001) Small group learning in the final year of a medical degree: a quantitative and qualitative evaluation. *Medical Teacher*; 23(5): 494-502

Mason J (2002) *Qualitative researching*, 2nd ed. London, Sage Publications

Miles MB, Huberman AM (1994) *Qualitative data analysis: an expanded sourcebook*. 2nd ed. London, Sage Publications

Mpofu DJS, Das M, Stewart T, Dunn E, Schmidt H (1998) Perceptions of group dynamics in problem-based learning sessions: a time to reflect on group issues. *Medical Teacher*; 20(5): 421-427

Norman G (2001) Holding on to the philosophy and keeping the faith. *Medical Education*; 35(9): 820-821

Reynolds F (2003) Initial experiences of interprofessional problem-based learning: a comparison of male and female students' views. *Journal of Interprofessional Care*; 17(1): 35-44

Rolfe IE, Andren JM, Pearson S, Hensley MJ, Gordon JJ (1995) Clinical competence of interns. *Medical Education*; 29: 225-30

Rono F (1997) A students' review of the challenges and limitations of problem-based learning. *Education for Health*; 10(2): 199-204

Ruddock J (1978) *Learning through small group discussion: a study of seminar work in higher education*. Guildford, Society for Research into Higher Education

Tipping J, Freeman RF, Rachlis AR (1995) Using faculty and student perceptions of group dynamics to develop recommendations for PBL training. *Academic Medicine*; 70: 1050-1052

Towson S (1985) Melting pot or mosaic – cooperative education and interethnic relations in Slavin RE (Ed) *Learning to cooperate, cooperating to learn*. London, Plenum

Virtanen PJ, Kosunen EAL, Holmberg-Martilla DMH, Virjo IO (1999) What happens in PBL tutorial sessions? Analysis of medical students' written accounts. *Medical Teacher*; 21(3): 270-276

Webb NM (1982) Student interaction and learning in small groups. *Review of Educational Research*; 52 (3): 421-445

Wigen K, Holen A, Ellingsen O (2003) Predicting academic success by group behaviour in PBL. *Medical Teacher*; 25 (1): 32-37

Willis SC, Jones A, Bundy C, Burdett K, Whitehouse CR, O'Neill PA (2002) Small-group work and assessment in a PBL curriculum: a qualitative and quantitative evaluation of student perceptions of the process of working in small groups and its assessment. *Medical Teacher*; 24(5):495-501

Zanolli MB, Boshuizen HP, De Grave WS (2002) Students' and tutors' perceptions of problems in PBL tutorial groups at a Brazilian medical school. *Education for Health*; 15 (2):189-201