

PROBLEM-BASED LEARNING

## Students' and Tutors' Perceptions of Problems in PBL Tutorial Groups at a Brazilian Medical School

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**ABSTRACT Introduction:** *There are few published studies that address the problem of dysfunctional tutorial groups. Most studies are restricted to student or faculty opinions separately and to specific aspects affecting the tutorial group function. This study examined teacher and student perceptions of frequency and importance of problems observed in tutorial groups in a new PBL program.*

**Methods:** *Tutors (n=30) and students in the second (n=75) and third (n=53) year completed a questionnaire at the beginning of the 1999 academic year. The questionnaire had 33 items grouped as seven "factors" related to tutor performance, feedback, assessment, educational resources, student performance, educational problems and external factors*

**Results:** *The most important problems identified were related to tutors (mainly in training aspects) and students (mainly in problem discussion). Students and feedback (quality) were the most frequent. There were statistically significant differences between tutors' and students' (higher) and between second and third year (higher) students' perceptions of different factors.*

**Conclusions:** *(1) Marília Medical School (FAMEMA) has problems in the tutorial group function mainly related to contributions of students and tutors. (2) Students' and tutors' opinions, as well as those of second and third year students, differ and therefore all need to be consulted to solve tutorial group problems. (3) It is necessary to develop a better student training program and also to improve the tutors training program. (4) There is a need for continued evaluation of problem-based learning at FAMEMA. We must look at perceptions of students from all years.*

**KEYWORDS** *Problem-based learning, tutorial group problems, teachers'/students' perceptions, groups dysfunction, problems' frequency/importance*

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## 1. Introduction

There is great variability in the productivity of tutorial groups. Tutorial group function relies heavily on several factors, one of which is group dynamics (Hitchcock & Anderson, 1997; Kaufman, 1985; Mpofu *et al.*, 1998a; Schmidt, 1993; Tipping *et al.*, 1995). The results of Tipping *et al.* (1995) revealed a generally low awareness of effective group dynamics and the absence of a mechanism for reflection that could help groups analyze and learn from their behavior.

Kaufman and Holmes (1996) examined teachers' and students' perceptions of faculty, student and administration aspects of tutoring. Faculty members expressed a need for further training in group dynamics and evaluation. Students expected a tutor to be a skilled group facilitator, leaving the task of learning to the students. Several key administrative factors affected teachers' and students' perceptions of tutorials, including: frequent changing of tutorial group composition, end-of-unit exam and recruitment of tutors. Dolmans *et al.* (1998) found a positive relationship between a tutorial group's success and all motivational and cognitive dimensions. Several studies investigated the implications of students' participation in the tutorial groups considering their learning conceptions (Caplow *et al.*, 1997); communications apprehension (Blue *et al.*, 1998); and quality assessment of tutorial sessions (Virtanen *et al.*, 1999). De Grave *et al.* (2001) showed that unequal participation, lack of interaction and lack of elaboration were identified by the students as the main factors affecting tutorial group functioning. This study also showed a significant difference between classes on the average scores on four of the six factors analyzed (lack of elaboration, lack of cohesion, lack of motivation and personal difficulties). The tutors' role and responsibilities have been extensively studied. Problem-based learning literature has accumulated significant evidence regarding the importance of the tutor on tutorial group productivity. This evidence was reviewed in two recent studies (Maudsley, 1999; Neville, 1999). Another factor that has been extensively studied is the quality of the cases used. All studies observed that good quality clinical cases lead to well functioning and productive groups (Barrows, 1985; Barrows & Tamblyn, 1980; Dolmans & Snellen-Balendong, 1997; Kamin & Hawkins, 1997; Majoer *et al.*, 1990; Mpofu *et al.*, 1997; Waterman & Butler, 1985). The quality of the discussion of the problem in the tutorial group defines the learning issues (Barrow, 1988; Schmidt, 1983, 1993). Van der Hurk *et al.* (1999) demonstrated that students feel that the quality of the problem, the discussions in the tutorial group and the tutors' performance are important factors in generating useful learning issues. The methods and the tools used for student assessment in a problem-based curriculum may also affect tutorial group function. Frequent summative assessments may disturb tutorial group productivity, because students give priority to preparing for the tests rather than to learning issues for the next tutorial session (Kaufman & Holmes, 1996). External factors related to tutorial group functioning, such as lack of

motivation, were studied by Dolmans *et al.* (1998) and De Grave *et al.* (2001). However, other external factors, such as educational units' structure or program and learning resources as library, laboratories and computers, can also disturb tutorial sessions (Barrows & Tamblyn, 1980; Komatsu *et al.*, 1998; Rankin, 1996; Saunders *et al.*, 1985; Taylor & Lande, 1996).

Two concerns stimulated the present study: a general theoretical concern and a more locally defined interest. The theoretical question relates to the several factors identified in previous research (tutors, students, assessment, feedback, educational resources, educational problems and external problems) and their impact on tutorial group function, which is something that needs to be better understood. The local reason is that Marília Medical School (FAME-MA) was the first Brazilian MD program to initiate a radical and comprehensive educational change that requires close monitoring. The new curriculum involves: problem-based learning; student centered education; integrated education; community orientation; integration with local health services; orientation to health priorities; assessment that is more formative than summative; small group learning; self-directed learning and integration of all three health determinants: biological, psychological and social perspectives (Komatsu *et al.*, 1999). The groups are composed of eight students and they are together for 12 weeks (two educational units). The educational problems (PBL tasks) are health situations adapted from real clinical cases and become increasingly complex. The students' performance in the tutorial sessions are evaluated on their contribution to the learning process of the group, by themselves, peers and tutors. For this study two research questions were identified: (1) in the perceptions of students and tutors what are the most frequent and most important problems affecting tutorial group function? and (2) are there differences between students and tutors, and between third and second year medical students regarding their perceptions of the most important and frequent problems in the tutorial group function?

## 2. Method

### 2.1. Material

The questionnaire was based on 33 common problematic situations previously observed in the tutorial groups at FAMEMA. These situations were collected in two groups of students who can be considered representative for their year (first and second) at the end of 1998. A group of 26 tutors generated a list of situations as part of an advanced workshop on tutorial group evaluation in August of 1998. This technique resulted in a questionnaire with 27 statements about critical incidents in the tutorial group. Another six statements were added to increase the reliability and content validity of the questionnaire. In the final version of the questionnaire the statements are grouped according to some underlying factors: *tutors* (seven statements), tutorial session *feedback*

(three statements), students *assessment* (three statements), *educational resources* (six statements), the way *students* work in the tutorial group (eight statements), the educational *problems* used in the units (two statements) and *external* problems (four statements). Students and tutors were invited to answer the questionnaire by analyzing the statements according to their importance, that is the magnitude of their effect on the educational process, and the frequency of occurrence at medical course of FAMEMA. “Importance” was graded on a 5-point scale ranging from 1, “this is not a problem”, to 5 “this is a problem, which hampers tutorial group functioning”. The “frequency” scale ranged from 1, “never occurs”, to 5, “always occurs”. Internal consistency (reliability) of the seven factors used in the research was tested by using Cronbach alpha-coefficient with an ideal level for alpha  $>0.70$ . Alpha reliability of the role questionnaire was 0.85, indicating that the instrument measures one, large concept, functioning of the tutorial groups. Alphas of the sub-clusters ranged from 0.81 to 0.85. The Persons correlations between the clusters are all significant ( $p < 0.0001$ ), ranging from 0.56 to 0.81. This is another indication for good correlation of the factors.

## 2.2. Subjects

Subjects were all second and third year medical students and tutors from FAMEMA. The questionnaires were distributed at the beginning of 1999, so they had worked in problem-based learning tutorial groups for at least 1 year. Questionnaires were sent to all second and third year students and to tutors who had worked as tutors in 1997 and 1998. The response rate was 97.4% (75 out of 77) for the second year students, 75.3% (55 out of 73) for the third year students and 72.3% (34 from 47) tutors; therefore the response average was 81.7%. Six questionnaires could not be analyzed because they were not filled in correctly. Therefore the analysis was based on 158 questionnaires of 30 tutors, 75 second year students and 53 third year students. Fifty four percent were men and 46% were women. The mean age of the second year students was 20.15 years old, ranging from 18 to 24 years. In the third year the mean was 21.06 years old, ranging from 19 to 26. For the tutors the mean was 40.45 years old, ranging from 29 to 50.

## 2.3. Procedure

The questionnaires were hand distributed to the students and tutors at the end of the second unit of the year, in the middle of April 1999. The completed questionnaires were handed back to the Health Sciences Education Committee Office at Marilia Medical School until the end of the third unit of the year, May 1999.

## 2.4. Analysis

The data were entered into EXCEL and then imported into the Statistical Packages for Social Sciences (SPSS 8.0 for Windows) for analysis (Norusis,

1998). Descriptive statistics were used to rank the responses of the 33 questions and to investigate how the seven grouped factors related to importance and frequency. To answer the second research question, involving comparison of the mean scores on each of the six factors between tutors and students, and second and third year students, independent samples *t*-tests were used.

### 3. Results

#### 3.1. Importance and Frequency of Factors Occurrence as Perceived by Students and Tutors

Table 1 presents the descriptive statistics and *t*-test of students and tutors for importance of the seven factors, which grouped the 33 questions. It is important to note that students rank tutors as the most important factor that influenced tutorial group functioning while the tutors rank students as the most important factor. Students and tutors disagree significantly on the factors: tutors ( $p=0.000$ ); assessment ( $p=0.005$ ); problems ( $p=0.033$ ); and external factors ( $p=0.000$ ). Students had always higher means, educational resources excepted.

Table 2 presents the descriptive statistics and *t*-tests on the estimated frequency with which the seven factors occur in the tutorial groups, according to students and tutors. It is important to note that the factor “tutors” is ranked second by tutors but ranked last by students. Students ranked “students” first. There were statistically significant differences between students and tutors on the factors: assessment ( $p=0.012$ ), educational resources ( $p=0.031$ ), students ( $p=0.004$ ), problems ( $p=0.001$ ) and external factors ( $p=0.000$ ). In all but one factor (tutors) students rated these problems as more frequent than tutors did.

**Table 1.** Seven factors: importance according to students and tutors

Factors	Category	<i>N</i>	Mean*	SD	<i>t</i>	df	Sig.
Tutors	Students	128	3.52 (1)	0.61	0.46	156	0.000
	Tutors	30	2.98 (2)	0.40			
Feedback	Students	128	3.10 (5)	0.84	0.76	156	0.448
	Tutors	30	2.97 (3)	0.81			
Assessment	Students	128	3.32 (3)	1.01	2.87	156	0.005
	Tutors	30	2.73 (6)	1.01			
Ed. res.**	Students	128	2.90 (6)	0.69	-0.25	156	0.803
	Tutors	30	2.93 (4)	0.77			
Students	Students	128	3.36 (2)	0.67	0.99	156	0.321
	Tutors	30	3.22 (1)	0.71			
Problems	Students	128	3.27 (4)	0.92	2.16	156	0.033
	Tutors	30	2.88 (5)	0.76			
Externals	Students	128	2.78 (7)	0.80	3.64	156	0.000
	Tutors	30	2.20 (7)	0.71			

\*Students and tutors descending ranking order means; \*\*educational resources.

Tables 3 and 4 present individual items with the highest importance ranking for each factor for the groups of students and tutors.

Apparently there is more disagreement than agreement between students and tutors about the most important and most frequent problems taking place. Students and tutors disagree more on estimated frequency than on importance of the problems. In the combined student and tutor ranking of the 33 items, the most important problem is that “tutors are not familiar with key concepts of proper PBL methodology”. Tutors also see this as the most frequent problem, but according to students the most frequent problem is that “students have

**Table 2.** Seven factors: “estimated frequency of occurrence” according to students and tutors

Factors	Category	N	Mean*	SD	t	df	Sig.
Tutors	Students	127	2.51 (7)	0.63	0.42	154	0.676
	Tutors	29	2.57 (2)	0.72			
Feedback	Students	128	2.72 (3)	0.92	0.80	153	0.425
	Tutors	27	2.57 (1)	0.86			
Assessment	Students	121	2.87 (2)	1.07	2.55	144	0.012
	Tutors	25	2.28 (5)	0.91			
Ed. res.**	Students	127	2.70 (4)	0.72	2.18	152	0.031
	Tutors	27	2.36 (4)	0.78			
Students	Students	128	2.93 (1)	0.62	2.89	154	0.004
	Tutors	28	2.56 (3)	0.55			
Problems	Students	126	2.69 (5)	0.75	3.40	150	0.001
	Tutors	26	2.15 (6)	0.61			
External	Students	126	2.58 (6)	1.18	3.57	150	0.000
	Tutors	26	1.73 (7)	0.58			

\*Students and tutors descending ranking order means; \*\*educational resources.

**Table 3.** Items with the highest importance ranking among the seven studied factors

Factor	Item
Tutor	“Tutors are not familiar with key concepts of proper PBL methodology.”
Students	“Lack of proper problem exploration discussion, without adequate exploration of the problem to elaborate the learning questions.”
Students’ assessment	“The assessment system (PBEE) used does not force the student to have a deep knowledge of the issues.”
Educational problems	“Problems are too concise, making the elaboration of learning objectives difficult.”
Tutorial feedback*	<i>Students</i> —“Students can misinterpret peers’ and tutors’ feedback on their behavior in the groups as criticism on their personality.” <i>Tutors</i> —“The evaluations at the end of each tutorial session (feedback) are too general, not standardized and do not address individual needs.”
Educational resources*	<i>Students</i> —“Not enough library learning resources.” <i>Tutors</i> —“Little utilization of all different learning resources available.”
External factors	“A lot of parallel activities using study time and interfering with the students performance in the tutorial groups.”

\*Tutors and students disagree on the “most important” item.

**Table 4.** Items with the highest ranking among the seven factors for “frequency estimated of occurrence”

Factor	Items
Students*	<i>Students</i> —“Little, superficial and in general poor concern with psychological aspects of the problem being studied.” <i>Tutors</i> —“Little, superficial and in general poor concern with social aspects of the problem being studied.”
Students assessment	“The assessment system (PBEE) used does not force the student to have a deep knowledge of the issues.”
Tutorial feedback*	<i>Tutors</i> —“The evaluations at the end of each tutorial session (feedback) are too general, not standardized and do not address individual needs.” <i>Students</i> —“Students can misinterpret peers’ and tutors’ feedback on their behavior in the groups as criticism on their personality.”
Educational resources	“Little utilization of all different learning resources available (Bibliographic references, journals, audiovisuals, CD-ROMs, labs, etc.)”
Educational problems*	<i>Students</i> —“Problems are too concise, making the elaboration of learning objectives difficult.” <i>Tutors</i> —“Excessive number of unit learning objectives to be reached in each problem.”
Tutors*	<i>Tutors</i> —“Tutors are not familiar with key concepts of proper PBL methodology.” <i>Students</i> —“Presence of non-medical tutors.”
External factors	“A lot of parallel activities using study time and interfering with the students performance in the tutorial groups.”

\*Tutors and students disagree on the “most frequent” item.

little, superficial and in general poor concern with the psychological aspects of problem being studied”.

### 3.2. Importance and Frequency Differences between Second and Third Year Medical Students

Table 5 compares second and third year students. In relation to importance, the ranking order of the seven factors for both groups was similar. There were statistically significant differences between the two student groups with respect to importance judgements related to the factors “tutor” ( $p=0.022$ ), “feedback” ( $p=0.019$ ) and “student” ( $p=0.045$ ). On all factors third year students’ importance perceptions were higher than second year’s.

Table 6 presents the perceptions of the two student groups (second and third year) regarding the frequency estimates of the seven factors. Second and third year students largely disagree. Significant differences were found for the factors related to tutors ( $p=0.000$ ), feedback ( $p=0.000$ ) and students ( $p=0.001$ ). In all cases the third year scores are higher than are those of the second year.

## 4. Discussion

The present study showed that from both students’ and tutors’ perspectives, the most important problems that can disturb tutorial session function were related

**Table 5.** Seven factors: importance among second and third year students

Factors	Category	N	Mean*	SD	t	df	Sig.
Tutors	2nd year	75	3.42 (1)	0.63	2.31	126	0.022
	3rd year	53	3.67 (1)	0.56			
Feedback	2nd year	75	2.95 (5)	0.87	2.37	126	0.019
	3rd year	53	3.31 (4)	0.76			
Assessment	2nd year	75	3.25 (4)	0.98	0.97	126	0.334
	3rd year	53	3.42 (3)	1.05			
Ed. res.**	2nd year	75	2.82 (6)	0.67	1.50	126	0.138
	3rd year	53	3.00 (6)	0.71			
Students	2nd year	75	3.26 (2)	0.64	2.02	126	0.045
	3rd year	53	3.50 (2)	0.69			
Problems	2nd year	75	3.25 (3)	0.97	0.30	126	0.771
	3rd year	53	3.30 (5)	0.86			
External	2nd year	75	2.75 (7)	0.82	0.40	126	0.701
	3rd year	53	2.81 (7)	0.78			

\*2nd and 3rd students descending ranking order means; \*\*educational resources.

**Table 6.** Seven factors: “estimated frequency of occurrence” among second and third year students

Factors	Category	N	Mean*	SD	t	df	Sig.
Tutors	2nd year	74	2.32 (7)	0.58	-4.27	125	0.000
	3rd year	53	2.78 (5)	0.59			
Feedback	2nd year	75	2.48 (6)	0.87	-3.80	126	0.000
	3rd year	53	3.07 (2)	0.87			
Assessment	2nd year	69	2.77 (2)	1.08	-1.21	119	0.230
	3rd year	52	3.00 (3)	1.06			
Ed. res.**	2nd year	75	2.60 (5)	0.70	-1.97	125	0.051
	3rd year	52	2.85 (4)	0.74			
Students	2nd year	75	2.78 (1)	0.58	-3.46	126	0.001
	3rd year	53	3.15 (1)	0.62			
Problems	2nd year	74	2.63 (4)	0.76	-1.04	124	0.300
	3rd year	52	2.77 (6)	0.73			
External	2nd year	74	2.64 (3)	1.14	0.599	124	0.550
	3rd year	52	2.50 (7)	0.81			

\*2nd and 3rd year students descending ranking order; \*\*educational resources.

to the behavior of tutors and students. The importance of these two factors in tutorial group’s success is in accordance with the studies by Caplow *et al.* (1997); Hitchcock and Anderson (1997); Dolmans *et al.* (1998); Virtanen *et al.* (1999) and some others. For the “tutors” factor, students and tutors agree that the problems are mainly related to the tutor’s mastery of the problem-based learning methodology. These results agree with the literature and they were well reinforced in two recent studies on the tutor’s role from Maudsley (1999) and Neville (1999). Recent studies also reveal that tutors’ performance depends on others factors such as contextual factors (Gijsselaers, 1997) and also the

tutorial group's productivity (Dolmans *et al.*, 1999). In the present study, regarding the "students" factor, both students and tutors emphasized poor learning objectives due to lack of, or inadequate problem exploration in tutorials. These results agree with those found at Maastricht University's medical school by Van der Hurk *et al.* (1999).

The results on estimated frequency of occurrence of factors causing problems in the tutorial group showed that students ranked themselves highest while tutors thought that the factors dealing with feedback occurred most frequently. Within the factor "students" the items ranked highest were related to the students' lack of interest in the psychological and social aspects of the problem. Since the biopsychosocial model was first proposed by Engel in 1977, many medical schools have attempted to implement it instead of the biomedical model. The integrated approach to the three dimensions (biological, psychological and social) appears to be very difficult for students and some proposals to improve this integration have been published (Almy *et al.*, 1992; McDougall & Reade, 1993; Schmidt, 1998; Sperry, 1991). However, the models studied merely pertain to clerkships and residence training. The problems of tutorial feedback were mainly the result of students' superficiality and misconceptions about the opinions of peers and tutors. Although identified as an important factor, "tutors", was not identified as a frequent factor disturbing tutorial groups in Marilia Medical School.

Particularly students considered the "assessment" both frequent and important. The main problem was that the assessment system used during the two first years (Problem-Based Exercise Evaluation—PBEE) had low content validity. Recently this assessment system was changed to one that forces the student to have a deeper knowledge of the issues and has a higher content validity. The same problem that was earlier identified by Kaufman and Holmes (1996) was also observed in our medical school with the new evaluation system, that is: preparation for the test disturbs the tutorial sessions. The factor assessment had a large standard deviation for all groups indicating that they have divergent opinions about the effect of assessment in the groups.

The "educational problems" factor was considered to have average importance and frequency. The highest ranked items were related to educational problems that were considered very concise, while the same problems were meant to lead to a large number of unit learning objectives. These results related to the quality of our educational problems agree with those in the studies made by Van der Hurk *et al.* (1999). The need to improve the quality of the problems is clear and the suggestion by Kamin and Hawkins (1997) of using a protocol to assess the curricular validity of the problems could be helpful.

Although ranked as important in the "educational resource" factor, "not enough library resources" was not ranked as very frequent at the Marilia Medical School. However, it was noted that, even if the library resources are sufficient, the available learning resources are not used extensively. The reasons

for this could be that either students do not receive enough stimulation from tutors or they do not fully realize their importance.

The “external factor” affecting the tutorial sessions indicates that students are involved in too many parallel activities (study groups, scientific research projects, students organizations, etc.). These activities are time consuming, but are important for the students. Problems arise when they are involved in several of them at the same time. Students need to balance their academic, political, cultural, sports and leisure activities, trying not to disturb their participation in their tutorial sessions.

Besides that differences between students and tutors perceptions were observed and that students almost always estimated the importance and frequency of the different factors higher, this study also identified differences between second and third year students. Others studies (e.g. Colin *et al.*, 1999; Mpofu *et al.*, 1998a,b) found similar differences. Mpofu *et al.* (1998a,b) found differences in what students and tutors perceived as important and differences across students, as they become more familiar with problem-based learning methods. De Grave *et al.* (2001) also observed different opinions between students in different years. Whereas other studies showed that the more experienced students were also more adapted to the system, the present study showed that the more experienced students were also more critical on the factors related to tutors, students and feedback. This contradiction can be explained in different ways. FAMEMA’s third year students were the first students who participated in a PBL curriculum and they were very concerned about the results. Otherwise the students in the De Grave *et al.* (2001) study may have become indifferent to the effects of the group malfunctioning and they find their way despite that. Also the well tuned Maastricht system might easily turn students in experienced PBL students who do no longer make these kinds of mistakes, while in Marilia the pioneer PBL students have no student role-models they can learn from; instead all elder students are taught traditionally.

This study had some limitations. (1) The seven factors model investigated several components of the tutorial process, but some aspects related to the students’ learning process in the tutorial group were not investigated. (2) Tutors who participated in the study were also pioneers in the program and are probably more enthusiastic about problem-based learning methodology. (3) We studied students in the first and second years of a new problem-based curriculum at Marilia Medical School which is the first PBL program in Brazil. This fact generated a lot of concern among the students, especially those in the first PBL year (third year students).

The main conclusions and suggestions of this study are as follows. (1) Marilia Medical School has problems in the tutorial group function. Several factors stand out including those related to contributions of students and tutors. (2) Students’ and tutors’ opinions, as well as those of second and third year students, differ and therefore all need to be consulted if the coordinators plan

different approaches to solve tutorial group problems. (3) It is necessary to develop a better student training program which addresses the issues identified by students: how they work in the tutorial sessions, giving and receiving feedback and the use of educational resources. Also the tutors training program must be improved mainly in giving and receiving feedback. (4) There is a need for continued evaluation of problem-based learning at FAMEMA. We must look at perceptions of students from all years.

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