When a Problem-Based Learning Tutor Decides to Intervene

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Abstract

Purpose

To appropriately contribute to group discussion, tutors should be experts in their field and possess facilitative skills. However, knowing when to interject is always a difficult question. This study investigated the specific scenarios or cues during group tutorial sessions that prompted or motivated tutors to interject and participate in the group discussion.

Method

From 2005 through 2008, the authors, using the interpersonal process recall method, videotaped 40 tutorial discussions led by eight experienced tutors from the departments of medicine, nursing, and clinical psychology. The tutors were later shown the tapes and asked to explore their intentions and analyze the contexts for the 636 episodes in which they had intervened in the discussions.

Results

Qualitative analyses revealed three themes for the tutors' interventions: (1) Tutorial group process included 10 categories related to discussion sequence, students' roles, and group dynamics, (2) quality of discussion included nine categories related to clarity and accuracy of the information brought forward by the students, and relevance and critical appraisal of the information in relation to the major objectives, and (3) quality and quantity of the materials discussed included eight categories related to amount, datedness, accuracy, representativeness, and source (whether primary or secondary).

Conclusions

These findings provide valuable insights into the contextual situations that lead problem-based learning tutors to intervene and provide material to build a framework for training new tutors.

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During the past 30 years, medical education has transitioned from traditional teaching to student-centered, problem-based learning (PBL). Tutors are no longer just information providers but also learning facilitators and discussion leaders.[1] But how do tutors effectively perform their many expected roles? Most of the literature describes an ideal tutor as having both expertise in his or her field and the facilitative skills necessary to participate appropriately in group discussions.[2–4] Appropriate participation, however, such as knowing when to interject, is not always easy.[5] Barrows and Tamblyn[6] believe that a successful tutor is able to call for a stop at critical moments and ask students to engage in detailed and clear thinking. Margetson[7] suggests that good tutors essentially question, probe, encourage critical reflection, make suggestions, and challenge in helpful ways—but only when necessary. But how does one define "critical moment" or "when necessary"?

To answer these questions, we applied information processing theory, commonly used in cognitive psychology, to explore the internal process tutors go through when they decided to intervene.[8] This theory describes the process of receiving external signals through selective perception and memory, then deciphering and analyzing them before reacting, as similar to the working of a computer. This process is then stored in long-term memory for future application. When viewed from this perspective, a tutor's decision to intervene or not during a tutorial discussion could be triggered by certain contextual situations as processed through his or her experience and memory. Therefore, to understand the influence of contextual situations on the behavior of a tutor, we need to understand the inner working of a tutor, an aspect often overlooked in quantitative studies.[9]

There is a general lack of comprehensive description on how contextual situations influence a tutor's behavior during a PBL tutorial session. For example, Dolmans et al[10] found that 39% of tutors altered their behaviors on the basis of group performance. Schmidt,[11] on the other hand, pointed out that tutors intervened when students were inadequately prepared or the curriculum was ill structured. Gijselaers[12] concluded that "what a tutor does in a discussion group depends on context-specific characteristics (e.g., course feature, subject area, requirement set by a discussion group) and on organizational background influencing beliefs about when certain skills should be applied." These studies only focused on the analysis of a limited amount of contextual situations. For a tutor, it is not easy to understand the subtlety of these contextual situations, nor is it easy to know under what contextual situations one can intervene, because of the difficulty in recognizing how these contextual situations are presented in a

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tutorial process. These are important aspects of the tutor training process.[13]

Another limitation of these studies is that they were retrospective, based on students' evaluations of tutors after tutorials.[9–12] Therefore, the information gathered was based on the point of view of the students, and not that of the tutors. Besides, quantitative studies cannot capture the complex teaching behavior of a tutor; this has prompted some researchers to advocate the use of qualitative methods.[13] The purpose of this study, therefore, was to use qualitative analyses based on the perspectives of PBL tutors to determine the contextual situations that may trigger intervention during a tutorial session.

Method

Setting and participants

To get a broad understanding on the contextual situations when a tutor would intervene, we included the three departments in our school of medicine. The students came from the fourth year of the medical program, the first year of the master of clinical psychology program, and the first year of the master of nursing program. The tutorial process is similar in these programs. The medical program consists of seven years of training. The first two years focus on the humanities; the third and fourth years follow a PBL curriculum, with two to three tutorials per week, in which the content is organ based, focusing on basic sciences, clinical skills, public health, and medical ethics; the final three years consist of a medical clerkship training. The master's program in clinical psychology involves twice-weekly PBL tutorials during the first year that focus on psychopathology and psychoanalysis. The master's program in nursing involves weekly PBL tutorial on nursing theory and community nursing.

We chose the participants using a purposive sampling technique to yield a sample that would be most likely contribute significant information on the contextual situations in which a tutor would intervene.[14] The criteria for selection were that the tutors had to have taken a PBL faculty training program and had to have more than two years of tutoring experience. Sampling continued until novel information was no longer being gathered.[15] The sample of eight

tutors included four from medicine and two each from nursing and clinical psychology. Eleven tutorial groups were involved, with four from medicine, three from nursing, and four from clinical psychology, and each tutorial group had six to eight students. With the exception of nursing, which had only one male student, the composition of the tutorial groups was evenly distributed between men and women.

Data collection

This study received the approval of the institutional review board of the Fu-Jen University to conduct a study involving human subjects. We explained the purpose and procedure to the participants, and we videotaped and interviewed only after receiving written consent. Data collection was based on the interpersonal process recall (IPR) method, which is generally used in psychotherapy.[16] This method involves audio- or videotaping a counseling session. A supervisor and the counselor then review the tape together, and, under the guidance of the supervisor, the counselor recalls the thinking and feeling at that moment. The purpose is to increase the counselor's awareness of the hidden meaning of interaction. Therefore, IPR provided us with an appropriate method for exploring the internal process a tutor goes through when deciding to intervene.

We collected data in the following steps: (1) The tutor and research assistant discussed and determined an appropriate portion of the course and time for videotaping. (2) Each taping session, using one health care problem as the base, followed the tutorial process of initial problem identification, formulation of hypotheses, establishment of learning objectives, and final reporting/discussion. Because the time it took for a tutorial group to go through one health care problem varied among the three departments, videotaping sessions might take one or two weeks. (3) During videotaping, the research assistant noted the instances when the tutor intervened. (4) Within a week after the PBL tutorial session, the interviewer and the tutor watched the video recording together. (5) The tutor was asked to recall the hidden intention for making each particular intervention. The interview was audiotaped. (6) Information on the tutors' intentions for intervening and

their linguistic and paralinguistic responses, such as laughter or sighing, were transcribed verbatim. (7) Each transcript was compared with the audiotape and corrected when necessary and returned to the interviewee to check for accuracy.

Data analyses

A total of 40 video recordings were produced during the 11 tutorial sessions. We used episode as our basic unit for analysis, defining one episode as an intervention when a tutor spoke up during a tutorial session. The number of episodes in each video recording ranged from 2 to 47. We identified 636 episodes from the 40 video recordings, as shown in Table 1.

We used grounded theory and constant comparative method to analyze the data.[17] The purpose of this method is to discover categories of a phenomenon (in this case, tutor intervention) that generate a theory to explain the phenomenon. Dr. Lee and one research assistant, both of whom have extensive experience with qualitative analyses and are familiar with the PBL process, independently went through a line-by-line coding and compared each new piece of data with data previously analyzed. Consensus between the two independent analysts was reached through extensive discussion of the codes and how they were developed. Once all relevant codes were identified, they were grouped together into meaningful categories. These categories were then grouped under appropriate themes, which were used to generate a theory. A record kept of the audit trail detailed the decision rules regarding the grouping of the categories and development of the themes. These decision rules were used whenever we needed to fit new codes and categories into a particular theme. Drs. Y.H. Lin and C.S. Lin were involved in reviewing drafts of the analysis and further refining the categories and themes.

Results

Based on 636 tutor intervention episodes, three themes emerged: (1) tutorial group process, (2) quality of discussion, and (3) quality and quantity of reference materials used. The number of episodes was 142 for tutorial group process, 463 for quality of discussion, and 31 for

Table 1

Videotaped Sessions and Intervention Episodes Involving Eight Tutors in Three Departments at Fu-Jen Catholic University, 2005–2008

Tutor	Department	Unit of video recording	Total video recording	No. of intervention episodes in each recording (range)	Total valid intervention episodes
1	Clinical psychology	Psychopathology	12	3–16	138
2	Clinical psychology	Psychoanalysis	12	15–47	344
3	Nursing	Nursing theory	5	4–25	48
4	Nursing	Community nursing	1	12	12
5	Medicine	Central nervous system unit	4	4–20	38
6	Medicine	Peripheral neuromuscular system unit	2	5–17	22
7	Medicine	Respiratory unit	2	11–12	23
8	Medicine	Cardiovascular unit	2	2–9	11

quality and quantity of reference materials used.

Tutorial group process

Situations when tutors intervened were related to the tutorial process, such as the sequence of the discussion, roles played by the students, and group dynamics, as listed in Table 2. Episodes related to sequence of discussion included situations such as discussion of a tutorial problem that did not follow a proper logical sequence, and the influence of traditional passive learning method on the discussion. Episodes related to student roles included group leaders ineffectively providing leadership, and an ineffective recorder. Situations involving group dynamics included tutorial groups getting stuck or falling silent, too much or too little verbal response, nonverbal negative responses, unhelpful interpersonal interaction, students with unusual behavior, and positive outcomes occurring.

When students first entered a PBL course, they were not used to the tutorial discussion format. Because of the influence of the traditional teaching method, they were accustomed to reporting back to the tutor, or following a certain sequence (e.g., seating plan) to speak. One tutor noted the intention for her intervention when the tutorial procedures were not going well as "I felt that they need to stop and find a common viewpoint before proceeding. I allowed them time to discuss among

themselves and pointed out a common path for them to find a conceptual framework, which worked well."

Concerning students' roles, tutors intervened when the tutorial leader or recorder was unable to carry out his or her responsibilities. Another tutor noted that "I pointed out to them that they needed to make good written record of the discussion, because oral discussion is quickly forgotten. If the discussants were speaking too fast, the recorder might miss some essential details. I thought it was important to point this out to them."

In relation to group dynamics, tutors interjected when a group became dysfunctional because of excessive or insufficient verbal and nonverbal communication among the students, the presence of interpersonal conflicts or students with unusual behavior, or the tutor trying to liven up the atmosphere. One tutor described the intention for his intervention as "Because the group was getting too quiet, I reminded the group leader to show initiative by leading the discussion."

Quality of discussion

There was a correlation between tutors' interventions and the quality of the group discussion. We classified such qualities into the following categories: accuracy of the content, clarity of the content, guidance to bring out important issues, depth and elaboration in discussion, making the tutorial problem more lively,

linking between hypotheses or main topics, critical appraisal or creativity, appropriate reasoning and conclusion, and completeness, as shown in Table 3.

One tutor noted that, when students brought out important issues, he did not want them to overlook them, but encouraged them to go into greater depth. He stated, "When important issues were brought up by the students, sometime they glossed over them and did not connect them with the issues they had discussed before. I therefore pulled them back and asked them to think more deeply about those issues." Other situations that prompted tutors to intervene to encourage students to focus on learning objectives included discussions of the learning issues that did not have appropriate depth or breadth, and students ignoring important data or not knowing how to consolidate learning issues into learning objectives. The strategies of tutors' interventions in such situations were to ask questions to stimulate students to think, to bring the discussion back to the health care problem, or to directly point out to them the learning objectives they had missed.

When dealing with the written health care problems we used in our school, our students sometimes find it difficult to appreciate or understand the feeling of a patient on the basis of the description. Tutors therefore may use real-life situations to make the health care problem livelier, or describe their own experience to stimulate the students to think more deeply about psychological issues. For example, one tutor simulated the expression and action of a psychiatric patient going through the side effects of drugs to make students understand why patients hide or refuse to take their medication. This tutor also demonstrated the symptoms of such a patient at home after refusing to take medication to show how this can cause suffering and conflicts in the family. By adding these details, the health care problem became livelier and closer to real life.

Discussion content should have an appropriate level of conjecture and completeness. If a discussion was too scattered, a tutor intervened. One tutor described his intention as "If I did not intervene, the discussion would continue to be scattered. Because they are young

Table 2

Ten Categories of Situations in Which Tutors at Fu-Jen Catholic University Intervened During Group Discussions: Tutorial Group Process, 2005–2008

Category (no. of occurrences)	Situations
Discussion of tutorial problem did not follow proper sequence (32)	• Hypothesis generation occurred before problem/issue identification process was completed • Decision or diagnosis occurred during brainstorming session
Influence of traditional passive learning method (8)	• Students reporting to the tutors or seeking answers from tutors, instead of engaging in group discussion • Students speaking according to seating sequence instead of spontaneous free discussion
Group leader not effective (29)	• Group leader was too nervous • Group leader could not control time effectively; spending too much time on certain issues
Recorder not effective (5)	• Did not record important points • Used sentences too long or too brief • Misunderstood the discussants
Tutorial group got stuck or no response (31)	• The group was silent, confused • Short, quick response from some students, but no thoughtful contribution
Too much or too little verbal response (5)	• Students asked too many or too few questions, or made too many or too few comments
Nonverbal negative response (8)	• Students expressing nonverbal negative responses (frowning, shaking head, laughing, or showing anger) or other negative body language due to frustration with lack of group progress
Unhelpful interpersonal interaction (8)	• Competition and argument among students • Getting a free ride by going along with others' point of view • Strong vocal students dominating quiet students
Students with unusual behavior (8)	• Students who are argumentative or confrontational • Students who engaged in unproductive, nonsensical talks • Quiet students showing passive-aggressive behavior
Positive outcome occurred (8)	• When positive outcomes occurred, tutors tried to give positive feedback to make the group more energized

and cannot see the forest for the trees, I asked them to rule out the possibilities one by one, to finally arrive at the core, and then we discussed the core problem."

Quality and quantity of reference materials used

Concern about the reference materials used by the students was often the reason that tutors intervened. We counted eight categories related to reference materials: quantity, datedness, representativeness, literary value, accuracy, clarity, originality, and language, as shown in Table 4.

One tutor intervened when he felt that the source of the information was not academic: "I thought it was strange, and the information was not accurate. I asked

him where he got the information, and he said from the Web. I pointed out that they have to be careful with the information from the Web, because there is no verification process and people can post whatever information they want. Basically you have to watch the source of your information."

When students were using Chinese journals, tutors often initiated a discussion on the quality of the journals: "When I noticed that they were having difficulty pronouncing certain terms, probably because of the translation process, I asked them if they wanted to read the original English text. Personally I think reading the English text is better because it is easier to understand, but one's English must be good."

Discussion

PBL is now widely used in medical curricula, and tutors are an important component of PBL tutorials. And yet there is a lack of evidence-based research on when a PBL tutor decides to intervene.[18] Our study shows that interventions fall into three themes: tutorial group process, quality of discussion, and quality and quantity of reference materials used. These findings provide a framework for training new tutors. Baroffio et al[19] pointed out that the design of faculty development workshops should consider specification of teaching contexts because they impact the effectiveness of workshops. Therefore, they used preselected scenarios representing common tutorial situations (e.g., a disruptive or silent student or a nonresponsive group) to assist tutors in developing strategies to facilitate small-group sessions. In Tables 2–4, we have listed various situations in which tutors can intervene. Planners of faculty development workshops can select appropriate situations to develop tutorial skills for their tutors. For example, tutors often used questions to help students learn how to identify important learning issues and establish learning objectives. To help make the health care problem livelier, tutors often shared their own experiences with the students to make the problem seem more related to real life and to facilitate student discussion. These two situations require different skills during the intervention process.

A PBL tutor is a facilitator of student learning and therefore should be familiar with the tutorial process and know when to intervene.[2–4] We found that the three most common process situations when tutors intervened were (1) discussion of a tutorial problem that did not follow the proper sequence, (2) a tutorial group getting stuck or becoming silent, and (3) an ineffective group leader. These situations occurred most often in clinical psychology and nursing tutorials, mainly because those students were encountering a PBL course for the first time. Even though those students had received some preliminary training, when they got into an actual discussion of the health care problem they were still influenced by the traditional teaching method, addressing their tutor only and not interacting with their fellow students. Students also formed hypotheses too quickly, without adequate discussion, and

Table 3

Nine Categories of Situations in Which Tutors at Fu-Jen Catholic University Intervened During Group Discussions: Discussion Quality, 2005–2008

Category (no. of occurrences)	Situations
Accuracy of the content (52)	• Wrong or biased understanding • Confusion, conflict of opinions • Misleading statement • Doubtful theory • Statement did not fit with the description in the tutorial problem
Clarity of the content (87)	• Did not explain the details on important issues • Unclear statement of point of view • No statement on the background information or resources • Argumentative viewpoints, but the group did not understand what these were • Students agreeing on conflicting viewpoints
Guidance to bring out important issues (142)	• Students brought out important learning issues, but there was a lack of thorough discussion • Issues discussed were too broad without focus • Ignoring important data and physical findings during the initial problem exploration and engaged in frivolous discussion • A lack of breadth in coverage • Did not know how to group the learning issues to generate learning objectives
Depth and details in discussion (58)	• Jumping to another main topic before an adequate discussion of the current topic • Oversimplification of presenting symptoms or patient background • Inappropriate criticism
Making the tutorial problem more lively (14)	• Students could not appreciate the reality and importance of the important presentation
Linking between hypotheses or main topics (36)	• Linking between units • Linking among different hypotheses or main topics • Linking between information in the literature and the topic under discussion
Critical appraisal or creativity (32)	• When differences in opinions emerged • Could not determine whether two opinions were in conflict or in agreement • Ignoring basic research methodologies • Could not see there were unresolved issues • Superficial coverage without applying critical appraisal method • Holding on to one's biased opinion • Belief in a standard answer for everything
Appropriate reasoning and conclusion (5)	• Quick conclusion while explaining causes or basic mechanisms • Simplistic and absolute viewpoint on issues • Engaging in circular argument • Ignoring important mediator or moderator
Completeness (37)	• Scattered ideas and incomplete sentences during problem exploration • Too few hypotheses or learning objectives • Discussion did not cover all the learning objectives or important issues • Incomplete definition or understanding of the subject during discussion • Too much details without proper synthesis

group leaders did not know how to lead group discussions. In contrast, students in the department of medicine already had one year of PBL experience and therefore required fewer interventions from their tutors. However, even though these students were familiar with discussion sequence and role play, group dynamics were still a problem for them, including silence, lack of direction, and interpersonal conflicts. These types of behavior can make a group dysfunctional, thereby affecting their study.[20] Problems in group dynamics are quite common in PBL courses. Therefore, most of the previous studies focused on how tutors should deal with dysfunctional tutorial groups.[21] We found that when a group was functioning well, their tutor gave positive feedback to make the group more energized. Such intervention was common among the eight tutors. We suggest that focusing on positive feedback is equally important for future study, because positive feedback probably leads to positive outcomes on group dynamics.

Some recent studies have suggested that PBL tutors should function not only as facilitators but also as discussion leaders.[1] Shields et al[1] found that training tutors as discussion leaders had a significant and positive impact on learning in tutorials, achieving course objectives, improving overall course satisfaction, and increasing a standardized national exam's mean score. That study did not answer the question of what situations prompted the tutors to intervene during group discussion. Our results show that contextual situations that led to tutor intervention were related to the discussion content and the materials the students had based their discussion on. On discussion content, the most common reason for intervening was to bring out important issues, followed by clarifying content and deepening the discussion. Regarding discussion material, most of the intervention was related to representativeness and accuracy of the materials. Shields et al[1] pointed out that the tutors should be trained to become discussion leaders by learning how to use questions to encourage discussion and how to summarize using schematics to illustrate concepts. Our findings provide more details on the contextual situations that trigger tutors to intervene during group discussion. Knowing when to intervene is a valuable attribute of an effective discussion leader.[3]

One unique aspect of our methodology was that we used videotaping to record the interaction between students and their tutors. This method avoided errors based purely on memory recall, because videotape replay returned the tutors to the precise situations to help them to recall the motives behind their interventions. This differs from the use of questionnaires, which usually ask students to assess tutors' performance

Table 4
Eight Categories of Situations in Which Tutors at Fu-Jen Catholic University Intervened During Group Discussions: Quality and Quantity of Materials Discussed, 2005–2008

Category (no. of occurrences)	Situations
Quantity of reference material (3)	• Too few or too many
Datedness of the material (3)	• Whether the material was classical or recent literature and appropriate for the course
Representativeness (7)	• Whether the material presented reflected the focus on the main objective
Literary value (2)	• Impact factor of journal • Professional opinion on various textbooks • Evaluation of the information from the Web
Accuracy (8)	• Evidence to determine accuracy of information gathered
Clarity (3)	• Whether the source of the information and date of publication were clearly presented
Originality (2)	• Whether information was from original or secondhand source
Language (3)	• English or Chinese source

over an entire semester or even longer period, thereby capturing overall impressions not based on specific situations.[9–12] However, our study has three limitations: (1) Of the 636 episodes analyzed in this study, 76% came from two tutors in clinical psychology, 9% from two tutors in nursing, and 15% from four tutors in medicine. Even though we used a purposive sampling strategy to select participants, and sample size control is not the intent of a qualitative study such as this,[14,15] a better balance in the number of episodes from these departments, and the inclusion of other disciplines in future studies, may generate additional useful information. (2) Our results show the contextual situations that prompted tutors to intervene, but we do not know whether these interventions were effective in promoting group function. Previous studies focused mostly on the relationship between group function and tutor behavior,[10–12] and not on the relationship between tutor behavior and contextual situations, mainly because there was no adequate literature that explored the content of contextual situations.[18] Here, we describe the different contextual situations that led tutors to interact with students during group discussions; such information provides a structural framework for future tutor efficacy studies.[13] (3) In this qualitative study, our results were based on observations of tutors from three different disciplines. We could not relate the training background of the tutors with the types of contextual situations that led to intervention. Frequency of intervention was based on eight tutors. Future quantitative studies involving more tutors may provide information on the relationship between a tutor's training or background and the contextual situations in which they intervene, and this will be helpful for faculty development workshops.[22]

Acknowledgments

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