Research article

Facilitators' influence on student PBL small group session online information resource use: a survey

Christopher B Reznich*[1] and Elizabeth Werner[2]

Address: [1]Office of Medical Education Research and Development A206 East Fee Hall College of Human Medicine Michigan State University, East Lansing, MI 48824 U.S.A and [2]Office of Academic Programs A254 Life Sciences College of Human Medicine Michigan State University East Lansing, MI 48824 U.S.A

Email: Christopher B Reznich* - reznich@msu.edu; Elizabeth Werner - wernere@msu.edu

* Corresponding author

Abstract

Background: In problem-based learning curricular research has focused on the characteristics of good facilitators and how they influence student performance and satisfaction. Far less frequently addressed has been the question of how PBL facilitators influence the small group session activity of students. We investigated the impact that facilitators' encouragement of use or non-use of the Internet would have on the students' use of online information resources.

Methods: Survey of student and facilitator perceptions of facilitator behavior and student use of online information resources.

Results: Students who used online information resources rated their facilitators' behavior as more encouraging, while students in groups who didn't use online information resources during problem-based learning small group sessions rated their facilitators' behavior as less encouraging. This result was statistically significant.

Conclusions: Our study supports the role of the facilitator as an influence on medical students in small groups, particularly with respect to facilitator verbal behavior encouraging or discouraging student use of information technology in the problem-based learning small group session.

Background

What is the impact of the facilitator on students during a PBL session? In problem-based learning (PBL) curricular research has focused on the characteristics of good facilitators and how they influence student performance and satisfaction [1,2]. Far less frequently addressed has been the question of how PBL facilitators influence the activity of students. This question lies in the arena of professional behavior and learning characteristics, areas that are now receiving increased emphasis among medical educators. In one study by Chaves, et al. [2] a survey was used to examine the roles of facilitators and students. The results

indicated that students recognized that the facilitators were modeling professional behavior. However, specific behaviors were not examined

One skill that has becoming increasingly important for medical students is the willingness and ability to use the vast information resources that are available on the Internet [3,4]. Significant national medical education initiatives such as the Association of American Medical Colleges' Medical School Objectives Project have focused on information management and technology [5,6]. Preferred methods for integrating information management

into medical education include embedding information management experiences throughout the curriculum [5].

At the College of Human Medicine, Michigan State University, the year two curriculum uses a problem–based learning model for the learning and integration of all basic science content. Students meet in small groups of 7–8 students with a faculty facilitator for 3 2-hour sessions each week. At these meetings the students use paper or video cases to stimulate their learning and integration of the relevant basic sciences. In general, each PBL discussion focuses on a two-part case, the first part describing a patient with a presenting complaint, and the second part presenting history/physical, laboratory and radiological findings, as suitable. The format for each case discussion is to identify the *cues*, the facts of the case in terms of signs, symptoms, and other pertinent data; develop a *hypothesis list* of basic science principles and concepts that explain as many of the cues as possible; and a list of *learning issues* that will guide students in independent learning activities prior to their next PBL session. Typically, students spend approximately one hour on this initial case discussion. After between-session independent learning, students engage in a "return to the case" discussion to apply new learning to their understanding of the case. Students spend approximately one hour on this phase of the PBL process, at which time students then begin to discuss a new case. During the academic year, each student works with five different facilitators who are physicians and/or basic scientists. Facilitators are trained and encouraged to act as "process experts" and to avoid contributing to the discussion of content. This curriculum has been in place for over 10 years.

In 2000, the College renovated all of the rooms used for the PBL group meetings. Each room is now equipped with a networked computer and a projector. Students and facilitators are able to access the Internet during group meetings to search for information, images, etc. Some case information such as radiographs or pathology slides must be accessed via Blackboard ™, a commercial web-based course management tool, during their tutorial meeting time. Other electronic resources included an expanding library of on-line journals available thought the MSU Main Library web site. We have sought to integrate the use of online information resources using this technology during PBL tutorials, and have introduced PBL facilitators to the technology via faculty development demonstrations and workshops.

We have observed that some of our senior facilitators are not eager to use nor encourage student use of online information resources in the groups. Recognizing this issue, we questioned the impact that the facilitators' encouragement of use or non-use of the Internet and other elec-

tronic information tools would have on the students. Would the students' use of online information resources be associated with their perceptions of their facilitators' encouragement or lack of encouragement with respect to the use of such resources? Our specific hypotheses, based upon the work of Chaves, et al, and Schmidt and Moust cited above, were that student perceptions of positive facilitator encouragement would be associated with greater student use of online information resources. Conversely, we hypothesized that student perceptions of facilitator discouragement would be associated with less student use of online information resources. We designed a brief survey study in an attempt to test these hypotheses.

Methods

For this study, we defined "online information resources" as information resources accessible via the MSU campus network or the Internet. The major campus network resource was Michigan State University's Electronic Reference Library, a compendium of electronic texts, journals and databases. The most frequently used Internet resources included a variety of medical information sites accessed via Google web searching and Medline searching. Excluded from the definition of online information resources were any resources accessed via the PBL course's Blackboard web site, including PBL cases, radiographs, and other supporting materials.

Institutional review board approval for the survey was granted on August 30, 2001. Students and facilitators were excluded from the research if they so desired. Two survey forms were developed, one for facilitators comprising five questions, another for students comprising four questions. Each group was asked to respond to several questions about perceptions of facilitator verbal behavior regarding use of online information resources. For all questions, facilitators were asked to rate their perceptions of their own verbal behavior or their individual PBL group's performance using online information sources, and students were asked to rate their perceptions of their facilitator's verbal behavior or their own group's performance. "Verbal behavior" was defined as verbal expression either encouraging students to or discouraging students from using online information resources. The first question asked students and facilitators to rate their perceptions of facilitators' verbal behavior on a 10-point scale as either consciously encouraging (1) or consciously discouraging (10) students to use online information resources. Students and facilitators were asked how often facilitators consciously encouraged student use of online information resources and how often facilitators discouraged student use of online information resources by choosing one of four possible rates per class: "0 times," "1–3 times," "4–6 times," and ">6 times." Finally, students and facilitators were asked to estimate the average

Table 1: Cross-Tabulation of Student Perceptions of Facilitator Encouragement of Student Use of Online Information Resources and Reported Student Use of Online Information Resources

		Reported Student Use of Online Information Resources		
		No Student Use Reported	Student Use Reported	Totals
Student Perceptions of Facilitator Encouragement of Student use of Online Information Resources	No Perceived Facilitator Encouragement Reported	12 (17.5%)	10 (14.5%)	22 (32%)
	Perceived Facilitator Encouragement Reported	2 (3%)	44 (65%)	46 (68%)
Totals		14 (20.5%)	54 (79.5%)	68 (100%)

Pearson Chi-Square = 22.937, p > .000

number of times students used online information resources per PBL tutorial using the same scale. Survey questions were identical on both forms with one exception: There was a change of person in the subject of the survey items to account first person (facilitator) or third person (student) perspective. A pilot test of the survey was conducted during October 2001. The results of a pilot test indicated a need to match students and their individual PBL group's facilitator in order to obtain useful data. The final survey was administered during March 2002. All statistical analyses were performed using SPSS v. 11.0.

Results

The survey was distributed to 106 students and 14 facilitators. Seventy-four (71%) student forms and 10 (71)% facilitator forms were returned. Sixty-eight students (64%) and 9 facilitators (64%) returned complete survey forms and indicated their willingness to participate in the research. Six student respondents (7%) elected not to have their surveys used in the study. One facilitator (7%) returned a completed survey, but indicated he/she was unwilling to participate in the research.

The majority of students indicated that, in their perception, their PBL facilitator consciously encouraged student use of online information resources in the PBL small group discussion on average from one to three times per class. Given the small or nil numbers in the two highest categories (4–6 times, >6 times), for purposes of analysis the results for all instances of student perception of facilitator encouragement for student use of online resources were combined into one cell. Thus there were 46 students (68%) who reported their perceptions of their facilitators encouraging student use of online information resources 1 – >6 times, while 22 students (32%) reported no perceptions of their facilitators encouraging student use of online information sources (Table 1).

The majority of students indicated that their PBL sessions used online information resources on average from one to three times per sessions. Given the small numbers in the highest two categories (4–6 times, >6 times), for purposes of analysis the results for all instances of use were combined into one cell. Thus there were 54 students (79.5%) who reported their groups as using online information resources, 1 – >6 times, while 14 students (20.5%) reported no use of online information resources.

Using the combined counts, we constructed a 2 × 2 table cross-tabulating students perceptions of facilitator encouragement of student use of online information resources with reported student use of online information resources (Table 1).

The Chi-Square analysis presented in Table 1 indicated a statistically significant difference in students' reports of their use of online information resources according to whether or not they perceived their facilitators as encouraging their use of such resources. Of the students who reported not using online information resources (n = 14), the overwhelming majority (12 of 14) reported perceiving no facilitator encouragement to use online information resources. Of the students who reported using online information resources (n = 54), the overwhelming majority (44 of 54) reported perceiving facilitator encouragement to use online information resources. These results were significant at the .0001 level.

We were able to collect data addressing the hypothesis that student perceptions of facilitator verbal behavior would be associated with incidence of student use technology. The mean scores of students perceptions of facilitator verbal behavior regarding the use of online information resources, as rated on a 10-point scale with "1" = consciously encourages students to use online information resources to "10" = consciously discourages students to use online information resources, was compared

Table 2: Mann-Whitney U Test of Student Ratings of Facilitator Verbal Behavior and Student Use of Online Information Resources

	n	Mean Student Ratings (Mean Ranks)	Mann-Whitney U	Significance (2-tailed)
Reported group NOT USING online information resources during PBL session.	14	4.92 (45.71)	221.00	.015
Reported group USING online information resources during PBL session.	54	3.83 (31.59)		

Table 3: Mann-Whitney U Test of Student Ratings of Facilitator Verbal Behavior and Facilitator Self-Ratings of Their Verbal Behavior

	n	Mean Student Ratings (Mean Ranks)	Mann-Whitney U	Significance (2-tailed)
Facilitators	9	3.88 (37.85)	323.50	.747
Students	68	4.05 (40.31)		

with their self-reports of use of online information resources according to the combined data presented in Table 1. Given the unbalanced groups, a Mann-Whitney U test was performed (Table 2).

The results indicate that students in groups who didn't use online information resources during PBL tutorials rated their facilitators' behavior more toward the midpoint or "neutral" end of the perception scale, while students who did use the information resources rated their facilitators behavior more toward the "encouraging" end of the perception scale. This result was significant at the .015 level.

The ratings of facilitators' verbal behavior on the 10-point encouragement-discouragement scale were consistent between students and facilitators. The mean facilitator self-rating was 3.88, while the mean student rating was 4.05. A Mann-Whitney U test was performed to compare ranks of scores of both groups (Table 3).

The lack of a statistically significant result indicates that students and facilitators ratings of facilitators' verbal behavior on the 10-point encouragement-discouragement scale were consistent with each other.

Discussion

Any apprehension we may have had regarding some facilitators' lack of eagerness about online information resources was fortunately not borne out by the data. Indeed, only one student reported a perception of their facilitator actively discouraging the use of online information resources, a perception not shared by the student's colleagues in that small group.

The results of the analysis appear to support our hypothesis that student perceptions of facilitator behavior are associated with student use of online information resources, with greater student use of such resources associated with greater facilitator encouragement of this usage. A comparison of two groups, those who used online resources versus those who did not, showed a significant difference with respect to perceptions of facilitator encouragement behavior and their association with desired student performance.

These results support the notion described by Schmidt and Moust that interpersonal expertise, as evidenced by a "genuine and personal interest in the students and their learning" is a requisite for effective PBL group facilitation[1] Furthermore, the results provide empirical support for those responsible for faculty development in PBL and technology to impress upon facilitators the importance of their role in encouraging students to experiment with these important skills.

Our study was very narrowly defined to address student and facilitator perceptions of facilitator behavior, based upon self-reports of use of online information resources. The study would have been strengthened with use of more rigorous observational methods such as video or audio-tape, or of logs of students' online activity. Given the obtrusiveness of these methods, we chose not to implement them. Our study was also limited to small group problem-based learning sessions, and would have been enriched by assessment of facilitator behavior, for example, during clinical rounds or other teaching formats. Furthermore, this study focused on associations of facilitator behavior with student use of online resources. Other variable are worthy of study: the effect of individual student

technical expertise on group use of technology; the effect of facilitator modeling of the use of online resources; the effect of formal prompting and instructional support (e.g., via student handouts and periodic assignments) are but a few other lines of inquiry that could be pursued.

Conclusions

While it may not create new paradigms of medical education, our study does support the role of the facilitator as an influence on medical students in small groups, particularly their usage of information technology to answer questions as they arise. If we expect the physicians of tomorrow to be competent users of such tools, then it makes sense to encourage using these tools throughout medical education. It's comforting to know that facilitators' efforts in this area seem to bear fruit.

Competing interests

None declared.

List of abbreviations

PBL Problem-based Learning

AAMC Association of American Medical Colleges

SPSS Statistical Package for the Social Sciences

Authors' contributions

CR and EW participated in the design of the study and development of all instruments. CR obtained institutional review board approval, conducted the statistical analysis, and wrote the first draft of the manuscript. ER coordinated the subject recruitment and revised the manuscript. CR revised the reviewed manuscript. All authors read and approved the final manuscript.

References

1. Schmidt HG Moust JHC: **What Makes a Tutor Effective? A Structural-equations Modeling Approach to Learning in Problem-based Curricula.** *Academic Medicine* 1995, **70:**708-714.
2. Chaves JF, Lantz MS, Lynch MD: **Tutor and Student Perceptions of the Tutor's Role in Problem-Based Learning.** *J Dent Educ* 2001, **65:**222-230.
3. Kramer M Cath A: **Medical Resources and the Internet: Making the Connection.** *Archives of internal Medicine* 1996, **156:**833-842.
4. Wang KK Song LMWK: **Concise Review for Primary-Care Physicians: The Physician and the Internat.** *Mayo Clinic Proceedings* 1997, **72:**66-71.
5. Panel Medical Informatics Advisory: **Report II: Contemporary Issues in Medicine: Medical Informatics and Population Health.** Washington, DC, Association of American Medical Colleges; 1998:3-15.
6. Salas AA Anderson MB: **Introducing Information Technologies in Medical Education: Activities of the AAMC.** *Academic Medicine* 1997, **72:**191-193.

Pre-publication history

The pre-publication history for this paper can be accessed here:

http://www.biomedcentral.com/1472-6920/4/9/prepub