

INSTRUCTIONAL DESIGN AND ASSESSMENT

Weekly Rotation of Facilitators to Improve Assessment of Group Participation in a Problem-based Learning Curriculum

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Objectives. To determine whether implementing a rotating facilitator structure provides a reliable method of assessing group participation and assigning grades to third-professional year pharmacy students in a problem-based learning curriculum.

Design. In the 2004-2005 school year, a “one block, one facilitator” structure was replaced by a “weekly rotating facilitator” structure. Each student received a grade from the assigned facilitator each week. The 8 weekly grades were then averaged for a final course grade. Student grades were reviewed weekly and at the end of each block. Facilitators and students completed survey instruments at the end of each of four 8-week blocks.

Assessment. Student grades were reviewed, and the class average was compared to the class averages from the 2 previous years. For example, in block I the class average was 86 which compared to averages of 88 and 87 for 2002-03 and 2003-04 respectively. Survey data revealed a 40% agreement by facilitators in block I that student performance was improved compared to student performance prior to this change. This agreement increased to 71%, 72%, and 71% respectively for blocks II - IV. Student survey data at the end of the academic year supported weekly facilitator rotation and revealed that a majority of students agreed that exposure to a variety of facilitators enhanced their group participation.

Conclusion. As confirmed by student grades and student and faculty members’ feedback, the change to a rotating facilitator structure resulted in a reliable method of assigning student grades for group participation.

Keywords: problem-based learning, curriculum, facilitators, assessment

INTRODUCTION

Problem-based learning (PBL) was first utilized in the 1960s by McMaster University in the instruction of medical students. Since that time, it has been successfully used as an educational tool for nursing, dentistry, pharmacy, veterinary medicine, and public health professional programs.¹ Knowles defined self-directed learning in 1975 as “a process in which individuals take the initiative, with or without the help of others, in diagnosing their needs, formulating learning goals, identifying human and material resources for learning, choosing, and implementing appropriate learning strategies and evaluating learning outcomes.”² Margetson described the link between problem-based learning and self-directed learning as problem identification, followed by students engaging in self-directed learning to solve the problem.³ The

use of problem-based learning in the training of health-care professionals incorporates goals for students that are much broader than the acquisition and application of content. PBL is expected to influence the “whole” student or at least most aspects of the students’ learning experience.² This educational tool utilizes facilitators rather than lecturers. The responsibility of facilitators in PBL may include: encouraging critical thinking; fostering self-directed learning; monitoring group progress; and creating a learning environment that stimulates group members, generates thorough understanding, and promotes teamwork.⁴ Pharmacists who cannot direct their own continued learning after graduation may not have the skills necessary to meet the challenges of the ever-changing healthcare environment.

Based on this philosophy, in 1997 the University of Mississippi School of Pharmacy adopted problem-based learning as the sole teaching method used during the third-professional year with all academic disciplines incorporated. This PBL process consisted of 3 distinct student

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evaluations: (1) group participation, (2) knowledge and comprehension, and (3) problem-solving. Knowledge and comprehension as well as problem-solving skills are evaluated through a series of examinations throughout the academic year. This article highlights the group participation environment and the evaluation of the student during the group process. The purpose of this curriculum evaluation project was to determine whether changing to a rotating facilitator structure provided a reliable method of assigning student grades for group participation.

Prior to the fall of 2004, the third-professional year at the University of Mississippi School of Pharmacy consisted of 4 “blocks,” each 8 weeks in length. The infrastructure of group participation consisted of the students’ random assignment to a “group” which was comprised of 8 students. Each “group” was then randomly assigned a “facilitator,” which was a School of Pharmacy faculty member. To include all students, establishing an average of 10 groups was required, each with an individual facilitator (“one block, one facilitator” structure). During each 8-week block, student groups were guided by the facilitator to discuss a case presentation of a disease state, progressively disclosing patient information in 3 weekly sessions. Facilitators did not need to be experts in the areas under consideration by the students.⁵ These PBL cases were previewed by the case author/expert at the weekly facilitator meeting. Each student was then evaluated by their facilitator on his/her performance in the group process in regards to knowledge acquisition, self-directed learning, clinical reasoning, and interpersonal and group skills using the Facilitator Evaluation of Student Assessment Tool. With an average of 10 groups in each block and 10 different facilitators assigning grades, inconsistencies in grading among facilitators were recognized. The grade distribution revealed “hard” and “easy” facilitators. This designation was determined by comparing the mean grades assigned by different facilitators for each group in the same block. For example, “hard” facilitators assigned mean grades of 69.9-74.4, while “easy” facilitators assigned mean grades of 91.3-91.7. To equalize this, a mathematical adjustment was created by calculating the class mean and standard deviation. Scores were adjusted within each group so that each group mean was equal to the class mean and each group’s standard deviation was equal to the class standard deviation. By using the mathematical adjustment as the final student grade, the grade the student received did not always reflect the grade the facilitator had assigned. Reviewing the grade data from the 2003-2004 academic year demonstrated this problem in that raw scores (those assigned by the facilitator) resulted in a letter grade distribution of 143 A’s, 148 B’s, 26 C’s, and 9 F’s. The distribution of letter grades after applying

the mathematical adjustment for group and class means were as follows: 123 A’s, 178 B’s, 25 C’s, and 0 F’s.

DESIGN

In the 2004-2005 academic year, the one block, one facilitator structure was replaced by a weekly rotating facilitator structure. The students were randomly assigned to a student group for an 8-week block as previously described. The facilitators rotated weekly between the 10 groups rather than being assigned to one specific group for the entire 8-week block. The 3-day progressive disclosure cases accommodated the weekly rotation so that students completed each case with 1 facilitator.

Each student received a grade from that group’s facilitator for that week. The 8 weekly grades were then averaged for a final course grade. Over the course of the block, each group was exposed to both “hard” and “easy” facilitators. However, because there were 10 groups and only 8 blocks, not every group had every facilitator. Interim changes were made to the Facilitator Evaluation of Student Assessment Tool during block I only, as facilitators identified items that were problematic to evaluate over 3 sessions. The revised tool from block I was then used throughout the rest of the 2004-2005 academic session. (Copies of the current and past Facilitator Evaluation of Student Assessment Tool are available from the author).

Absence by a facilitator presented a unique problem for this course. Previously with the one block, one facilitator process, any faculty member could substitute a single or several days for a facilitator without significant disruption. In the new process, since a facilitator was with a group only 3 days, and it would be difficult for him/her to evaluate the students if exposed to them for an even shorter time, it was decided that substitutes would be used for the entire week when a facilitator knew ahead of time that he/she would miss a group meeting (out of town meetings, etc).

When the pharmacy school faculty members decided to “rotate” facilitators each week, some logistical problems had to be worked out. There were 10 PBL-designated classrooms on the Jackson campus. Previously the student group and the facilitator had an assigned PBL-room for the entire block. It was decided that the student groups would continue to be assigned to a PBL room for an entire block and only the facilitators would rotate. To limit confusion, the facilitators proceeded in numerical order through the groups, for example, the facilitator who worked with group 3 would work with group 4 the next week, and so forth. Each facilitator was allowed to set his/her own group meeting time schedule within certain guidelines. Thus, the students’ schedules differed

from week to week within the block. The schedules were requested from the facilitators prior to the beginning of each block so that students could have a copy of their meeting times for the entire block.

Student grades were reviewed weekly and again at the end of each block by the course director. The class average was then compared to the average grade from previous years (Table 1). In addition to grade evaluations, facilitator and student survey instruments were administered at the end of each block. The facilitator survey focused on the rotating process (Table 2) but also included questions about student performance. The student survey instrument asked a variety of questions regarding the PBL process overall and was not limited to the topic of rotating facilitators.

ASSESSMENT

Grade comparisons for all blocks are presented in Table 1. The average grade for block I was 86 ± 5.3 , which compared to 88 ± 4.5 for 2002-2003 and 87 ± 4.5 for 2003-2004.

Eighty-seven percent of facilitators experienced a workload increase after the implementation of rotating facilitators (Table 2). In block I, 44% of facilitators reported a 30% workload increase, but by the end of block IV, 80% of facilitators responded that they experienced only a 10% workload increase. In block I, 40% of facilitators agreed that students performed on a higher level than students who completed blocks prior to fall 2004, 30% were undecided, and 30% disagreed. In blocks II, III, and IV, 71%, 72%, and 71% of facilitators, respectively agreed that students performed on a higher level. When asked whether they attributed this improved performance to “rotating” facilitators, overall 65% of the facilitators agreed, 35% were undecided, and none disagreed.

The only item on the student survey instrument that specifically addressed the rotating facilitators structure was whether the students’ exposure to a variety of facilitators enhanced their group participation. In block I, only 26% of students agreed, 18% were undecided, and 56% disagreed. By the time the students completed the survey instrument again at the end of block II, 54% agreed, 19%

Table 1. Grades of Third-Year Pharmacy Students Enrolled in a Problem-based Learning Curriculum Before (2002-2003, 2003-2004) and After (2004-2005) Implementation of a Rotating Facilitator Structure for Assessing Group Participation

	Year	Class Avg, Mean (SD)	A's, No. (%)	B's, No. %	C's, No. %	F's, No. %
Block I	2004-2005	86 (5.3)	20 (28)	45 (63)	7 (9)	0
	2003-2004	87 (4.5)	29 (37)	47 (58)	4 (5)	0
	2002-2003	88 (4.5)	39 (46)	46 (53)	1 (1)	0
		*p = 0.21				
		†p = 0.15				
Block II	2004-2005	84 (4.2)	6 (9)	51 (74)	12 (17)	0
	2003-2004	86 (4.3)	17 (22)	56 (71)	6 (7)	0
	2002-2003	88 (4.7)	33 (38)	49 (57)	4 (5)	0
		*p = 0.005				
		†p = 0.005				
Block III	2004-2005	85 (4.1)	11 (16)	50 (75)	6 (9)	0
	2003-2004	88 (6.0)	36 (46)	34 (43)	9 (11)	0
	2002-2003	90 (4.3)	48 (57)	36 (43)	0	0
		*p = 7.0				
		†p = 0.015				
Block IV	2004-2005	87 (3.5)	17 (26)	47 (72)	1 (2)	0
	2003-2004	88 (5.3)	36 (46)	38 (49)	4 (5)	0
	2002-2003	90 (4.4)	53 (63)	29 (35)	2 (2)	0
		*p = 0.19				
		†p = 0.0096				

*Two-tailed t test comparison of 2004-2005 to 2003-2004

†Two-tailed t test comparison of 2003-2004 to 2002-2003

Table 2. Responses of Pharmacy Faculty Facilitators to Survey Items Regarding Implementation of a Rotating Facilitator Structure for Assessing Group Participation of Students Enrolled in a Problem-based Learning Curriculum (N = 31)

Facilitators Overall 2004-05	Agree, %	Undecided, %	Disagree, %
1. "Rotating facilitators" increased the workload for facilitators due to weekly evaluations.	87	3	10
2. I observed an elevated level of student performance in this block over previous blocks that I facilitated prior to fall 2004.	61.3	16.1	22.6
3. If answer to #2 is strongly agree or agree, then this elevated performance was due to facilitator rotation.	65	35	0
4. In my opinion, the grade a student receives for group performance more accurately reflects his/her actual performance in Group when facilitators are rotated.	51.6	16.1	32.3

were undecided, and only 27% disagreed. Results from blocks III and IV were similar to those from block II.

DISCUSSION

Change to any process that has been in existence for many years is always met with some resistance. The faculty members of the School of Pharmacy who were given the task of implementing this change from one block, one facilitator to weekly rotating facilitators tried to anticipate problems that would be encountered. Facilitator substitution was thought to be a major obstacle, but once ground rules were established to allow only substitution for the entire week, this perceived problem presented few interruptions. No disruption of groups occurred and the students were rarely aware that a substitution had been made. There were certainly occasions when emergencies occurred and 2 facilitators had to combine their grades for the week, but this was not a common occurrence.

Resolution of the logistical problems was accomplished by allowing the students to remain in the same room for the entire block and having the facilitators move through the groups in numerical order. Having a different group meeting schedule each week also proved to be a good exercise in flexible time management for our students, preparing them for changing schedules in the workplace.

Prior to implementation of the rotating facilitator structure, there was concern that the weekly student evaluations would increase facilitator workload. The survey results did find this to be true. However, the perceived workload increase was not as noticeable as the year progressed. Once facilitators were familiar with the system, they reported a different distribution of their time commitment, but not a significant increase in their workload. Changes were also made to the evaluation tool to allow facilitators to make a clearer assessment of the student over 3 sessions. This resulted in a shorter evaluation form that involved a greater emphasis on quality rather than quantity in the areas assessed.

Although there were differences in the mean scores (some of which achieved statistical significance), the consensus of the faculty members was that these changes were not inconsistent with the year-to-year changes normally seen due to changes in class composition, faculty staffing, and minor changes in the evaluation tool. The faculty members felt that the differences seen in scores were inconsequential. Facilitators were also pleased to know that the grade they assigned a student was not adjusted by a mathematical factor, but used along with the other facilitators' assessments to arrive at a grade for the student for the course. This was reflected by a comment on a faculty member's survey: "While rotating facilitators gives me more work, I think that the student's grades are more accurate." Most facilitators also reported that they felt more comfortable giving lower grades when deserved than previously because their grade would not be the only grade that student would receive for the course.

The course director monitored the weekly student evaluations by the facilitators in order to identify students at risk for failure. The weekly evaluations provided the opportunity to identify these students early in the block, when there was still adequate time for improvement. When these students were identified, individual counseling was provided and monitoring continued through the block. Five students were identified through this process and 3 were able to bring up their scores to a passing grade.

Overall the faculty members agreed that more students performed at a higher level every week than in the previous group structure. Based on previous performance, many students had the mindset of "I did really well last week so my facilitator won't grade me harshly if I slide a little this week." This was found to be true by facilitator comments such as "With the new system, if a student happens to have a bad day it can affect their weekly grade, whereas with the previous system I graded more on average of performance over several weeks." Rotation of facilitators therefore created an environment for

elevated student performance every week. Facilitators did voice concerns that “weekly rotation does not enable the development of mentoring relationships with students,” but this was also countered by “weekly rotation exposed me to a greater cross section of the class.” Facilitators were also provided with photographs of the students in their group at facilitators’ meetings to enhance student recognition during the initial group meeting each week.

The fact that the students disagreed with the idea of rotating facilitators in block I may have been because the approach was so different from what they had expected. Prior to their third-professional year, they had many opportunities to meet with students in the year ahead of them and certainly had established in their minds what problem-based learning and group meeting would be like, therefore any changes were met with resistance. In blocks II-IV their approval of the process exceeded 50%. From student comments on the survey instruments, inconsistency in evaluation between facilitators was identified as a negative aspect of having multiple facilitators, and these student concerns have been presented to the faculty members. The course director of each block now emphasizes the need for consistency with the facilitators for the block in weekly facilitator meetings. This provides facilitators the opportunity to discuss any difficulties they may have in assessing specific items. In contrast, the students reported exposure to more than one facilitator as a positive feature in the new process. The student survey contained comments such as “It is good to change because some facilitators and students/groups may not ‘mix’ well,” and “It is good to get to know and experience different facilitators.”

CONCLUSION

The changes to the group process and evaluations through rotating facilitators used in a problem-based learning course for pharmacy students were implemented

in the 2004-2005 academic year. Subsequent faculty survey results indicated that these changes achieved the primary objective of providing a reliable method of assigning student grades. Students now receive the grade assigned by the facilitator and mathematical adjustment is not necessary. An unexpected outcome from implementing the rotating facilitator structure is the ability to identify students at risk of failure early in the block due to the weekly assignment of grades. The course director can identify these students and contact them for counseling which has proven successful for some of these students. Facilitators and students have both enjoyed the exposure to a greater number of students and faculty members, respectively. As the second year of this change is underway, the Course Director Committee will continue to monitor grades as well as facilitator and student comments to ensure continued success.

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