

Breaking Down Barriers: Multidisciplinary Education Model

Marvis J. Lary, Salme E. Lavigne, Richard D. Muma, Stephanie E. Jones, Heather J. Hoeft

ABSTRACT: A pilot project was implemented involving students from three disciplines: dental hygiene, physical therapy, and physician assistant. The purpose was to prepare students to work together in multidiscipline teams utilizing concepts of problem-based learning (PBL) on both simulated and real patients. The project was divided into three phases. Phase I introduced discipline specific information, team concepts, and PBL concepts. Phase II involved students working in multidisciplinary teams solving a simulated patient case in the PBL format. Phase III consisted of students working in small groups and on real patients, performing an extra oral/intraoral and periodontal examination, a problem oriented physical examination, and a neuromuscular assessment. Pre and posttest evaluation of Phase I revealed no difference in knowledge among the three disciplines. Of those students evaluating Phase II and III, 100% felt PBL was an effective means of presenting multidisciplinary material; 93% reported enhanced problem-solving; 98% indicated improvements in working in groups; and 98% felt they had learned more about each other's discipline. This model may provide a viable means to prepare interdisciplinary teams to work effectively together.

INTRODUCTION

To address today's rapidly changing health care environment, educational programs for students in the health professions must also change by exploring new and innovative ways to better prepare students for their future as members of the health care team. This demand for change in allied health and nursing educational programs comes at a time when institutions of higher education are faced with shrinking funds. Therefore, creative, efficient utilization of resources must be a prime consideration when implementing new educational models.

Based on the premise that students, regardless of the discipline they are preparing for, benefit personally and professionally from an awareness of and collaboration with students in other disciplines comprising the health care team, Wichita State University's College of Health Professions implemented a pilot study for a multidisciplinary project involving Dental Hygiene (DH), Physical Therapy (PT), and Physician Assistant (PA) students. The project was designed to provide comprehensive health assessment of medically underserved persons utilizing the skills inherent to each of the three disciplines. These skills included a periodontal examination by the dental hygiene students, an assessment of the neuro/musculoskeletal system by the physical therapy students, and a problem oriented physical examination by the physician assistant students.

A pilot study was implemented over the course of one semester to test a model of health assessment that could be taken to urban and rural medically underserved communities in Kansas.

PROJECT GOALS

1. Provide a learning experience that facilitates DH, PT, and PA students learning about each other's professional role while fostering respect and appreciation for each other as co-members of the health care team;
2. Provide students with didactic and clinical concepts of working together as an effective team in the health care setting;
3. Provide students with the basic concepts of problem-based learning (PBL);
4. Implement a pilot study utilizing a team comprised of students from all three disciplines working together on PBL activities which include simulated patient scenarios and active patient studies;
5. Provide a community service model that benefits medically underserved populations.

LITERATURE REVIEW

Health care today, and in the future, depends on accurate diagnosis and coordinated treatment. In today's high tech health care environment, there are critical requirements for health care providers to be able to communicate with each other and to integrate the many sources of patient information available. It is no longer possible, with all the demands placed on practitioners, to coordinate and implement entire treatment plans for all patients. One must rely on other members of the health care team and utilize their expertise to benefit the patient.¹

Communication between health care providers, and between health care providers and patients, is very important to the healing process. The need for effective communication is never more critical than when a patient is referred to another health care provider. There are many reasons why a patient is referred to another provider, but in all cases, there is a need for each side (referrer and consultant) to have expectations and goals² and a clear understanding of each other's role. Studies have pointed to the conclusion that professional conversations are dominated by fact gathering and opinion giving interactions with very little opportunity for the form of interaction that leads to true problem-solving behaviors.³⁻⁵ Communication problems have been found during consultations between physicians⁶⁻⁷, and between physicians and allied health professionals.⁸ The nature of these problems take the form of insufficient face-to-face contact; differences over judgment-based therapy choices; physician referrals that do not state the purpose of the referral; physician referrals that lack sufficient specific clinical data; lack of replies from the consultant; and lack of sufficient objective data from the consultant.¹

Programs in the allied health professions, with few exceptions⁹, have not incorporated multidisciplinary training into the curricula. This is not a criticism of current practices. However, because of the changing climate of health care and limited resources, allied health programs may be forced to incorporate multidisciplinary education into their curricula.

The computerized medical record⁹ has been seen as a solution to many in cross-disciplinary communication. The high level of accountability and completeness that can be built into a computer information system has the potential to reduce some of the problems identified across disciplines. Another basic and more obvious method to facilitate multidisciplinary communication is to educate students from different disciplines together. This would be particularly beneficial for students enrolled in dental, medical, nursing, physical therapy, and physician assistant curricula.

Another approach that has been suggested as a replacement or supplement for teacher-centered, lecture-based instruction in medical, dental, and nursing curricula is problem-based learning (PBL). Proponents of PBL argue that students play a more active role in this approach, as opposed to the passive role associated with the lecture-based approach, and as a result have a better organized, more useful knowledge base.¹⁰⁻¹¹ Problem-based learning is presumed to encourage higher level thinking and improves the student's ability to apply classroom information in a clinical setting.

Albanese and Mitchell¹² define problem-based learning as an instructional method characterized by the use of patient problems as a context for students to learn problem-solving skills and acquire knowledge about the basic and clinical sciences. This approach requires students to support their opinions with reasoning based on facts, definitions, concepts, and principles. It fosters communication between students and allows them more active participation and feedback.¹³ This communication deems it appropriate as a method of instruction in multidisciplinary education.

The objective of multidisciplinary education is the preparation of health care providers who are capable of integrating basic sciences and clinical skills of the separate disciplines into the delivery of comprehensive, quality health care. Student-centered, problem-based learning has as primary objectives the development of clinical reasoning skills and enhancement of acquisition and transfer of knowledge. It is logical that use of problem-based learning in multidisciplinary education will improve the ability of health care providers to integrate basic sciences of the health care disciplines involved into the delivery

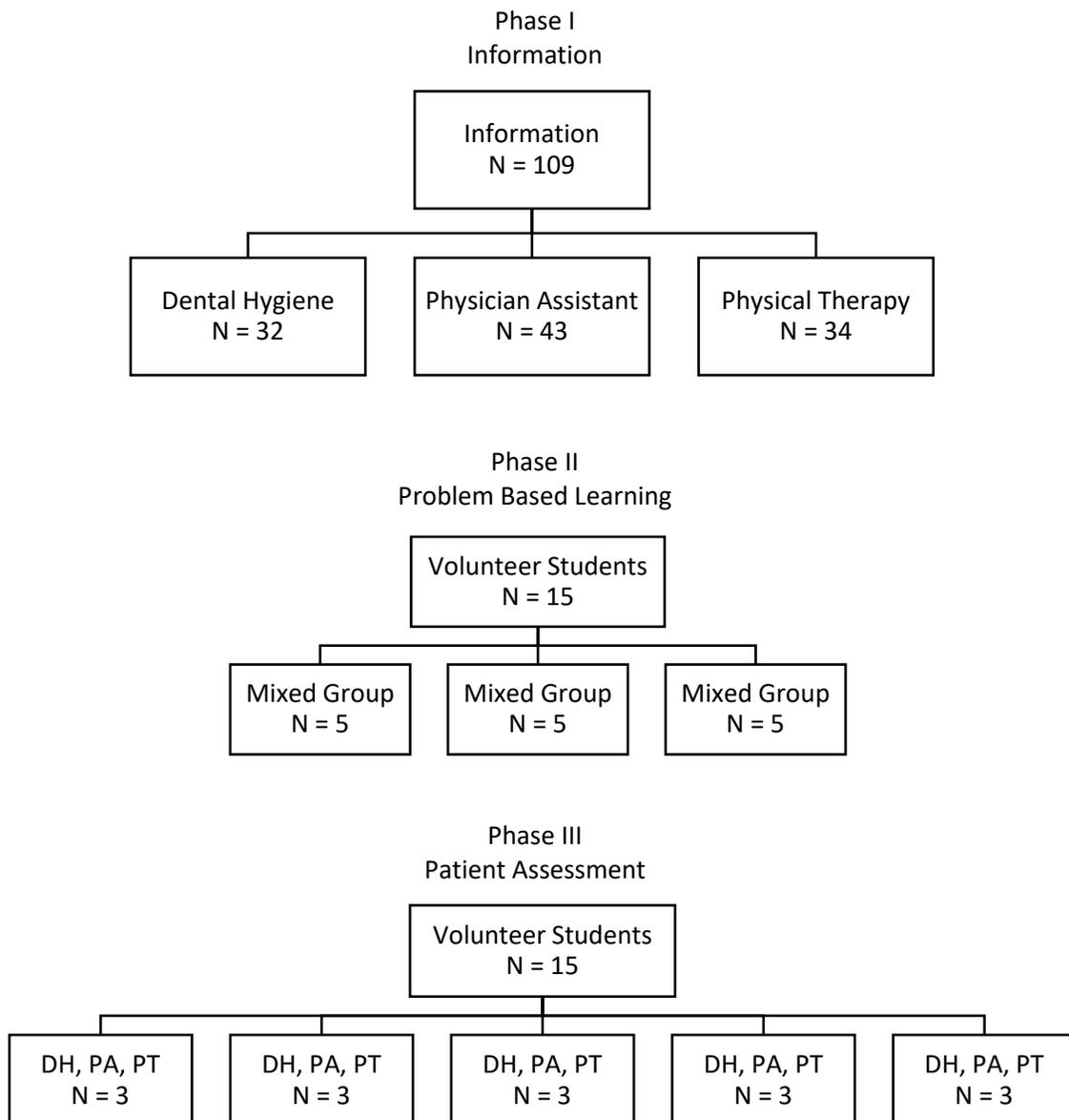
of comprehensive patient care. However, additional research is needed to assess multidisciplinary education and the use of problem-based learning in the curricula and the influence it has on the students.

METHODS

The educational model was designed to benefit students from three disciplines and to provide instructional methods that would maximize their interaction with each other (Figure 1). All students from the dental hygiene, physical therapy, and physician assistant programs were involved in Phase I of the project so that all students would benefit from the project and receive information regarding the three disciplines. Phases II and III involved five volunteers from each discipline who reported their experience to the original group of 109 students at the end of the project. The student demographics are displayed in Table 1.

Multidisciplinary Education Model

Figure 1



Discipline	Mean Age	Female	Male
Dental Hygiene	25	31	1
Physical Therapy	26	18	14
Physician Assistant	30	24	19

Phase I - Information

Week 1: Students were given a 25 question pretest prior to attending an information session on the three disciplines. Each department was responsible for providing an overview of the educational process and role description of their discipline.

Week 2: Students attended a presentation on team work provided by the director of human resources in a local hospital.

Week 3: Students attended a lecture presentation on the concepts of Problem-Based Learning.

Week 4: Students participated in working through examples of patient cases in the problem based learning format They were then administered a 25 question post-test identical to the pre-test given in week one.

At the conclusion of Phase I, five students from each discipline, for a total of 15, volunteered to participate in Phases II and III of the project. One discipline had more than five students who volunteered so a random selection process was used to select the five students who would proceed to Phases II and III. Phase II consisted of four weekly sessions of one hour each.

Phase II - Problem-Based Learning

Week 1: Each multidisciplinary team of five students with at least one student from each discipline was assigned to faculty who would serve as PBL facilitators. Teams were given information regarding a patient with HIV in the PBL format (the PBL case was developed by faculty members from each discipline). They discussed the case and identified the critical issues involved as they had learned in Phase I.

Week 2: Additional information was given to each team regarding the same case. Further development of the case was facilitated with participation from all team members.

Week 3: Student teams received additional information on the same patient case, building on information from the previous week.

Week 4: Teams brought the case to a close through discussion of all information they had been given in Phase II. Conclusions from the perspective of the three disciplines were shared and discussed.

At the end of Phase II, the same 15 students were randomly assigned to five teams of three consisting of one representative from each discipline. Phase III consisted of four weekly sessions of one hour each with the exception of week three which lasted for an hour and a half.

Phase III - Patient Assessment

Week 1: Multidisciplinary teams met for one hour to plan strategies for examining a real patient assigned to their group for assessment the following week. Five patients were recruited from the University dental hygiene clinic and a local hospital out-patient clinic. Each patient was paid a stipend for participating and was required to sign a consent form approved by the University's Institutional Review Board.

Week 2: Teams were introduced to their volunteer patient. The first half hour involved an extra oral/intraoral examination and periodontal assessment performed in the dental clinic by the dental hygiene student with the assistance of the other team members. During the second half hour, patients were moved to the physician assistant exam room and were given a problem-oriented physical examination by the physician assistant student, assisted by the other team members. The last half hour

involved a neuromusculoskeletal assessment performed by the physical therapy student assisted by the other team members.

Week 3: Each team met to compile and summarize their assessments in preparation for their presentation to the original group of 109 students the following week.

Week 4: Teams presented a summary of their patient findings to their classmates from all three disciplines. The 15 volunteer students were asked to evaluate the problem-based method of teaching through a questionnaire administered at the end of the project.

RESULTS

When comparing the results of the pre and posttest administered during Phase I, the data revealed no difference in the group's knowledge about the three disciplines or problem based learning before and after the intervention (table 2).

Pretest	Discipline	Post Test	# of Students
Dental Hygiene	n = 14	n = 17	32
Physical Therapy	n = 17	n = 19	34
Physician Assistant	n = 17	n = 19	43

	Strongly Agree	Agree	Neutral/ Don't Know	Disagree	Strongly Disagree
The teaching method used in this project:	Response Total (%)	Response Total (%)	Response Total (%)	Response Total (%)	Response Total (%)
1. was an effective way of presenting the material.	5 (36)	9 (64)			
2. held my interest during group meetings	6 (43)	7 (50)	1 (7)		
3. enabled me to ask questions and make comments.	10 (71)	4 (29)			
4. was appropriate for the subject matter discussed.	6 (43)	7 (50)	1 (7)		
5. helped me learn to solve problems.	6 (43)	7 (50)	1 (7)		
6. was enjoyable.	6 (43)	7 (50)	1 (7)		
7. was beneficial to my professional development.	8 (57)	6 (43)			
8. helped me understand the material.	5 (36)	9 (64)			
9. helped me learn to analyze a clinical case.	8 (57)	6 (43)			
10. helped me find and evaluate information.	6 (43)	7 (50)			

11. improved my ability to work with others in a group setting.	10 (71)	4 (29)			
12. helped me learn new study habits.	2 (14)	3 (21.5)	5 (36)	3 (21.5)	1 (7)
13. helped me learn about disciplines other than mine.	10 (71)	4 (29)			
14. helped me know faculty better*	5 (36)	6 (43)	2 (14)		
*only 13 responded to this item.	n = 14				

Evaluation of PBL as a method of instruction was much more interesting and is displayed in Table 3. Overall, the participants in Phases II and III felt that PBL was an effective way of presenting multidisciplinary material (100%). Students reported that PBL helped with solving problems (93%) and improved their ability to work with others in group settings (98%). Most importantly, students reported that PBL helped them learn about the roles of other disciplines (98%).

Debriefing comments received from students included such statements as "promote PBL, it's a great learning experience," ... "make PBL available for all students in each discipline,"... "the best part about PBL was getting to know the other health profession students," ... "PBL helped make our college seem less divided," ... "multidisciplinary PBL is great, but needed more time."

SUMMARY

It is recognized that the multidisciplinary project was not a highly scientific study, however, the pilot exercise did provide the necessary information required for refinement and continuation of a similar model on a larger scale. The combination of the three disciplines participating in the project was unique, requiring innovative, creative planning as professional barriers were challenged.

Elements of progressive thought are found in the writings of all major theorists in the field of adult education including Knowles, Rogers, Houle, Tyler, Lindeman, Bergevin, and Freire.¹⁴ Consistent with that philosophy, the project design was progressive, going from simple to more complex activities for students. The process first involved students in a passive role receiving information, progressing to small group dialog and problem solving, then actually performing professional skills on real patients, and finally, reporting outcomes to peers. The variety of instructional methods used in the project served to address the diversity of learning styles among students in addition to adding interest for both students and faculty. The project design first engaged all DH, PA, and PT students in each of the professional programs. This guaranteed that all students received information on the professional role and educational process (Phase I) for each of the three disciplines. The 15 students who progressed to Phase II and Phase III did so on a voluntary basis and were therefore interested in and committed to completion of the project. The relatively small number of students who participated in the PBL and patient assessment components of the project (Phase II and III) enabled faculty to provide close supervision and guidance to individual students and small groups of students as they developed team skills and progressed through the project. All phases of the project facilitated interaction among faculty participants, strengthening and enriching collegiality across disciplines. The positive experience enjoyed by faculty and students will increase the probability of future multidiscipline projects.

The pilot study provided data and experience that clearly identified not only strengths, but also challenges that must be overcome before implementation can take place on a broader scale. Taking into consideration those challenges experienced in the pilot study, the following suggestions are made for future use of this education model: 1) Schedule time for faculty and student participation far in advance

to accommodate vastly different curriculum schedules. 2) Provide student volunteers with some sort of incentive or recognition to increase the likelihood of a sufficient number of participants; academic compensation is ideal, such as releasing the student from another assignment. 3) Seek voluntary faculty who are committed to the multidisciplinary concept and who are willing to contribute time and energy beyond their normal work load. Involve them in all phases of planning to increase their investment in the project and provide some sort of recognition for them. 4) Provide faculty with training for facilitation of Problem Based Learning (or any "different" type of instructional method) beyond a brief introduction to the concept 5) Identify funds to provide a stipend for voluntary patients and possibly for students who voluntarily participate. 6) Remember that facilities and equipment to accommodate students from various disciplines must be available on site if students are performing their clinical skills, i.e. dental chair and equipment, exam rooms, and medical equipment. 7) Identify data needs and design instruments in advance of project.

RECOMMENDATION FOR FUTURE MULTIDISCIPLINE PROJECTS

Collaboration of dental hygiene, physician assistant, and physical therapy students in a patient assessment model has never been documented in literature. This pilot study demonstrates an effective model that can be used to enhance the education of students and enrich faculty development while providing a service to the community. It is recommended that this model be replicated on a larger scale for the three participating professions and possibly expanded to include other disciplines such as nursing, medical technology, and respiratory therapy.

REFERENCES

1. Marion R. *Allied health project grant: a simulated health information system for training allied health professionals to use computer-based communication technologies with underserved patients.* Bureau of Health Professions, Public Health Service, Department of Health and Human Services, 1994.
2. Florian V, Sacks D. Reasons for patient referral to occupational therapy units by health care professionals. *Journal of Allied Health.* 1985; 14:317-326.
3. MacKinnon JR. Health professional's patterns of communication: cross purpose or problem solving? *Journal of Allied Health.* 1984; 13:3-12.
4. Rintala DH, Hamover D, Alexander JL, Sanson Fisher RW, Willems EP, Halstead LS. Team care: an analysis of verbal behavior during patient rounds in a rehabilitation hospital. *Archives of Physical Medicine and Rehabilitation.* 1986; 67:118-122.
5. Robinson EJ, Whitfield MJ. Participation of patients during general practice consultations: comparison between trainees and experienced doctors. *Family Practice* 1987;4:5-10.
6. McPhee SJ, Lo B, Saika GY, Meltzer R. How good is communication between primary care physicians and subspecialty consultants? *Archives of Internal Medicine.* 1984; 144:1265-1268. .
7. Byrd JC, Moskowitz MA. Outpatient consultation: interaction between the general internist and the specialist. *Journal of General Internal Medicine.* 1987; 2:93-98.
8. Hulme JB, Bach BW, Lewis JW. Communication between physicians and physical therapists. *Physical Therapy.* 1988; 68:26-31.
9. Marion R, Niebuhr BR, Fike ML, Muma RD. Evaluation of interdisciplinary computer-based clinical simulations in allied health. *Collegiate Microcomputer.* 1992; 10: 123-128.
10. McKeachie WJ. *Teaching tips: A guidebook for the beginning teacher.* 8th edition: Health and Company, 1986.
11. Chiodo GT, Bullock WW, Creamer HR, et al. An application of the Patient-Oriented Problem-Solving (POPS) system. *Journal of Dental Education.* 1991; 55:327-331.

12. Albanese MA, Mitchell S. Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic Medicine*. 1993; 68:52-81.
13. Barrows HS, Problem-based, self-directed learning. *Journal of the American Medical Association*. 1983; 250:3077-3080.
14. Elias JL. Merriam S. *Philosophical Foundations of Adult Education*. Malabar, FL: Robert Krieger Publishing Co, Inc., 1980.