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Interdisciplinary Workshop to Increase Collaboration Between Medical Students and Standardized Patient Instructors in Teaching Physical Diagnosis to Novices

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Abstract

Traditionally, full-time faculty members have assumed major responsibility for teaching physical examination skills to first- and second-year medical students. Problems with faculty recruitment and adhering to a standardized way of teaching have challenged educators to seek alternatives to teaching the physical examination to novices. To address these problems, we created and implemented a novel curriculum that has standardized the teaching of physical examination skills to novice students by using standardized patient instructors and fourth-year medical students working as an interdisciplinary team (known as a dyad). Feedback after the first iteration of this course revealed confusion about roles, goals, and responsibilities for feedback and evaluation amongst the dyads. To address these issues, an interdisciplinary workshop was created using the theoretical constructs of the GRPI (goals, roles and responsibilities, process, and interpersonal skills) model and Mezirow's transformative learning theory, both of which address gaps in the dyad relationship. Initial feedback from fourth-year students and standardized patient instructors was enthusiastically positive. Evidence showed the dyad could be strengthened by (1) providing time to learn the theoretical scaffolding underlying working together, (2) meeting and planning approaches to teaching efforts, and (3) enabling medical students and standardized patient instructors to apply the theoretical constructs as the foundation to reflect on their teaching roles in effectively instructing novices in physical exam skills.

Please see the end of the Educational Summary Report for author-supplied information and links to peer-reviewed digital content associated with this publication.

Introduction

Traditionally, in North America, full-time faculty members have assumed the major responsibility for teaching physical examination (PE) skills to first- and second-year medical students. This historic model has its barriers, as recruiting busy faculty without compensation is a problem, as is the lack of standardization of teaching physical diagnosis from one faculty member to another. To overcome these barriers, programs have experimented using standardized patients (SPs) and medical students as teachers of physical diagnosis.^{1,2} SPs have been successful in teaching physical diagnosis alone, although there is concern that they have no medical background and cannot provide a clinical context to their teaching. Concomitantly, there has been increasing recognition of the need to prepare medical students for their future teaching roles as interns/residents and physicians.^{3,4,5}

Whereas there are numerous publications addressing peer teaching in undergraduate education, there is sparse literature addressing how medical students coteach physical diagnosis to preclinical students in lieu of faculty. To address these issues, in 2010, we introduced the concept of SP instructors (SPIs) joining with fourth-year medical students (MS-4s) to teach PE skills to the first-year medical students (MS-1s). The SPIs were trained to teach PE maneuvers in a standardized fashion while the MS-4s were in charge of overseeing the MS-1s practicing these skills and providing relevant clinical context to the maneuvers. The George Washington University (GWU) School of Medicine and Health Sciences is the first reported school to have such an interdisciplinary program. It has been shown in the literature that with appropriately motivated and mentored senior students, successful teaching courses can be created to meet educational requirements at medical schools having available resources.⁶ We took advantage of the fact that at GWU there are MS-4s each year who elect to take a students-as-teachers course named TALKS (Teaching and Learning Knowledge and Skills) to learn educational theory and application. Our goal was to create

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a program utilizing motivated students in combination with SPIs (in pairings referred to as dyads) to provide a framework for teaching physical diagnosis to MS-1s that could be implemented in other institutions.

The multidisciplinary program was successfully implemented in the curriculum, but not without some unforeseen problems. After the first iteration of this course in the 2010-2011 academic year, feedback from the SPIs and MS-4s indicated there was confusion about what were the roles of each dyad, how the dyads were supposed to conduct physical diagnosis sessions, who assumed the leadership role in the group interaction, and how evaluation was to take place. It was from this feedback that theoretical constructs were examined to help improve the program, namely, the GRPI (goals, roles and responsibilities, process, and interpersonal skills) model and Mezirow's transformative learning theory. This workshop represents one workshop of six to teach adult learning theory and mentoring in the TALKS program.⁷

The target population for this workshop is MS-4s and SPIs. The creation of this workshop was based on feedback from SPIs and MS-4s after the first iteration of the program in which this dyad was involved. To address the gaps raised by the MS-4s and SPIs from the first iteration of this program—specifically, uncertainty about goals, roles, and interpersonal issues—we created a workshop that would provide an evidence-based foundation for an interdisciplinary collaboration in teaching. In creating a model for developing good educational methods, as well as management of leadership roles in a team, we identified educational constructs from Mezirow's transformational learning theory and from the business literature utilizing the GRPI model.^{8,9}

The GRPI model was initially developed by Richard Beckhard in 1972 and addresses team cooperation through identifying the goals for the team, clarifying the roles of each team member, discussing the processes and responsibilities needed for the team to run effectively, and working on the interpersonal skills of team members, hence, GRPI.⁹ It is a model that has seen some use in business, leadership, management, systems optimization, and health care.¹⁰

Mezirow is highly regarded for his contributions to continuing professional education and for his development of transformative learning. He discussed “transforming frames of reference through critical reflection of assumptions, validating contested beliefs through discourse, taking action on one's reflective insight, and critically

Educational Objectives

By the end of this flipped classroom workshop, participants will be able to:

1. Identify key roles each individual in the dyad plays in teaching physical diagnosis skills to first-year medical students.
2. Recognize the roles, responsibilities, and expectations of the dyad in the context of working with individuals from different disciplines.
3. Identify the expertise that each dyad member brings to the program and use Mezirow's transformational learning theory and the GRPI (goals, roles and responsibilities, process, and interpersonal skills) model to create an evidence-based foundation to work out any differences that may occur during facilitation of physical diagnosis courses.
4. Avoid assumptions about the qualities and expertise each individual of the dyad brings to the program.
5. Reflect on the Mezirow and GRPI models and apply them during teaching sessions.
6. Perform collaboratively as a team, using each other's strengths while having a mutual preset protocol to handle issues that may arise during teachings.

assessing it.”⁸ In his discussion of transformational learning theory, he took into account three dimensions: psychological (change in understanding of oneself), convictional (change in one's belief system), and behavioral (change in one's lifestyle). He discussed analyzing one's own beliefs and assumptions (premises), reflecting on the topics at hand (content), and working to change oneself (process), as well as how, by focusing on these key points, individuals will undergo transformative learning, redefine their worlds, and work better together towards a common goal.

The overlap between Mezirow's learning theories and the GRPI model of team cooperation convinced us to apply these constructs to develop a new workshop to help the MS-4s and SPIs understand the principles of effective team collaboration and teaching with the goal of creating a more cohesive dyad. We anticipated that using these constructs would provide scaffolding for the dyads as they planned and implemented their teaching of PE skills to MS-1s.

The workshop itself was modeled after the flipped classroom approach, which can be considered a variant of team-based learning (TBL). The flipped classroom approach is an instructional strategy that intentionally reverses the traditional model of the learning environment by

taking activities that would originally be viewed as being done in the classroom, such as lectures, and doing those activities outside the classroom.^{11,12} The flipped classroom represents the interface between what the learner does outside the classroom and what happens when the learner and teacher interact. This model activates learners by having them prepare for classroom work by first mastering basic knowledge. Then, in the classroom, the facilitator concentrates on having learners apply the knowledge/theory they have learned. The flipped classroom approach has some of the same attributes as TBL, such as activating learners, enabling learners to come into the workshop having read the same information, and establishing a learner-centered environment. Where it differs from TBL is that randomly assigned groups do not stay together for each session, they are not formally graded, and they do not stay together for future workshops. Our senior authors have been using a variant of the flipped classroom since the mid-1990s when we assigned TALKS students readings before each workshop, had them answer questions in groups, and then segued into discussions applying the theoretical principles they learned. Since 2010, we have formalized this process by adapting the flipped classroom approach, described in detail in the Methods section.

Methods

As an advanced preparation assignment, the MS-4s and SPIs electronically received two articles addressing the theories (Appendices A & B) 2 weeks before their assigned workshop date. They were instructed to read the articles and come prepared to discuss them. The articles were selected based on the assumption that they were understandable, not overwhelming regarding time needed to read them, and applicable to the work MS-4s and SPIs were doing in dyads. MS-4s and SPIs were also instructed to prospectively reflect on what their roles and responsibilities might be in teaching the physical diagnosis course to the MS-1s. Each session of the physical diagnosis course targets a specific area of the body and requires advanced reading of *Bates' Guide to Physical Examination and History-Taking*¹³ by both individuals comprising the teaching dyad. MS-4s and SPIs were encouraged to contemplate a plan on how the dyad would approach each PE session and how they would work as a team in which each individual has differing expertise and life experiences.

Readiness Assurance Questions

As part of the flipped classroom approach, 10 multiple-choice questions (Appendix C) were created by our

senior authors to be administered as the individual readiness assurance test (IRAT) and the group readiness assurance test (GRAT). Workshop participants take the test on their own individually (lasting about 7-8 minutes) before discussing their answers in groups of five to seven people (lasting about 8-10 minutes). We purposefully assigned an even mix of SPIs and MS-4s in each group to assure that both groups expressed their opinions and concerns. Timing during this part of the workshop is critical; participants are encouraged not to perseverate on questions and instead to get into groups quickly to discuss their consensus for the best answers. What occurs in the groups is an environment where near-peer teaching takes place, as answers amongst group members might differ. Group members must decide on the best answers to questions as a team. The process calls for each group to hold up a letter card (A-E) to designate their consensus answer for each question. The facilitator notes when there are group differences in the answers and has the group with the best answer teach other groups its reasoning for making that choice, again an example of near-peer teaching. Following the GRAT, the facilitator encourages questions to further explain the readings and summarizes key points contextual to teaching PE skills (5 minutes).

Group Application Exercise

After the discussion for each answer occurs and further questions are answered, the application portion of the workshop begins. We chose a video clip from the documentary *Blue Angels: Around the World at the Speed of Sound*.¹⁴ This clip illustrates how a team of pilots, who fly wingtip to wingtip 18 inches apart, debrief before each and every flight in a simulated group activity. If this documentary is unavailable, substitute a video that demonstrates good team dynamics in a high-stakes setting and how a strong partnership involves preplanning and acceptance of each member's skill set. The video clip should encourage the dyads to apply the theories they learned to what is happening in this simulation (i.e., team dynamics that they witness in the clip). The workshop facilitator will then lead a general discussion about roles and expectations and how the evidence-based theories participants have learned will be applied throughout the year within teaching dyads.

Context

This workshop is one of six for the TALKS course, each of which aims to improve participants' abilities as future educators and collaborators. This workshop is offered early in the academic year, before the physical diagnosis

course begins for the MS-1s. The workshop is conducted twice to allow more flexibility and mandatory attendance by all MS-4s and SPIs. SPIs and MS-4s were informed prior to the workshop of their dyad pairings for teaching the physical course the rest of the academic year.

This workshop was first offered in the 2012-2013 school year and has been offered each year since, with this year being the third iteration. During the initial iterations of the workshop, there was a lot of positive feedback citing how the workshop improved dyad relationships, goals, and expectations. However, there were also issues involving some SPI and MS-4s struggling with the definition of roles, thereby creating tension as well as causing the dyads to experience conflict in terms of how to evaluate students. Moving forward into later iterations of the workshop, facilitators were better trained to define exactly what roles meant and thus lower confusion. More time was also given for the SPIs and MS-4s to discuss how they would work as a team and move forward as a dyad in teaching and evaluating MS-1s. This discussion was aided with a self-reflection questionnaire (Appendix D). The workshop continues to improve and evolve each year with further iterations.

Facilitation Schema

The overall breakdown of time for the workshop that we conducted is laid out below.

- Introduction: self-introductions, overview of objectives/plans for the workshop, discussion of previous experience in working with teams—10 minutes.
- What do you see as your role in the physical diagnosis course? What strengths (write these) do you bring to the course? Share with a person with whom you will be teaching—10 minutes.
- IRAT: Each individual takes the 10-question exercise about prior readings by himself/herself—5 minutes.
- GRAT: Each group consisting of four to six individuals takes the same 10-question exercise as a group. The facilitator will go over the answers near the end of the period—15 minutes.
- Discussion of the GRPI model and Mezirow's transformative learning. The facilitator will also discuss any questions individuals may have about readings or exercise questions—10 minutes.
- Video clip presentation and group discussion of team dynamics. Discuss what the group members saw in the video that helped them define their roles, expectations, and responsibilities in their teaching—15 minutes.
- Dyads split up into their assigned teams and fill out the self-reflection questionnaire (Appendix D) with each other while discussing how they will approach teaching the course as a team—30 minutes.
- Evaluation of the workshop (Appendix E)—5 minutes.
- Total estimated time—1 hour 40 minutes

The workshop format is divided into numerous sections, the first of which is an introduction led by the workshop facilitator. The facilitator introduces him- or herself and gives an overview of the workshop. The SPIs and MS-4s are seated in tables of five to seven individuals. They are instructed to sit with their preassigned teaching dyad pairings and to keep the SPI and MS-4 numbers relatively equal. The first activity is an icebreaker for everyone to introduce themselves and get to know those with whom they are sitting. The workshop leader then proceeds to ask the dyad pairings to write down and discuss what they believe would be each person's role and strengths in teaching the physical diagnosis course. The dyad members are given a few minutes with each other to work out how they see themselves as team members over the course of the year. Then, they share these visions and beliefs with one another in an attempt to recognize what each party member will have to offer and how these attributes complement one another. The facilitator next initiates a discussion with the overall groups about what their experience in working with teams has been and what each individual sees as his or her role, encouraging comments based on previous life experiences and creating a dialogue to promote the value of team teaching.

After the brief introduction, participants individually complete the IRAT (Appendix C). The facilitator's main responsibility at this time is to be a timekeeper and to move individuals along in completing their test. After participants complete the 10 questions, they reconvene in their previous groups consisting of MS-4s and SPIs and discuss their best answer to each question, providing their thought processes and near-peer teaching when answers differ. Again, the facilitator monitors the time to keep the activity moving at an appropriate pace.

Following this exercise, the facilitator has an opportunity to clarify any questions and make general teaching comments about the GRPI model and Mezirow's transformational learning theory. The facilitator then focuses on how these overlap, specifically around roles, content, and process portions of each theory. Since the group members

have already read the references on GRPI and Mezirow, they are encouraged to ask questions during this segment. The facilitator can demonstrate how these evidence-based constructs support effective teaching collaboration while asking the group its opinions on how these theories can be applied. The facilitator can also emphasize how referring to these theories can be effective in addressing problems that arise while teaching the physical diagnosis sessions.

The next portion of the workshop involves application and higher order thinking, namely, watching a content-neutral video clip and applying information participants have learned so as to evaluate what process is occurring in the video. The video can be played for 4-7 minutes, and then, the participants are encouraged to evaluate it using the theoretical models taught in the workshop.

The SPIs and MS-4s are next divided into their teaching dyad pairings, with the intent of having them get acquainted and discuss the physical diagnosis course content. They are also encouraged to discuss how teaching PE skills should be divided, roles each would be assuming, boundaries, opinions on student evaluation, and other aspects of conducting the physical diagnosis sessions using our self-reflection questionnaire (Appendix D) as a guide based on the GRPI and Mezirow models.

Lastly, a brief questionnaire (Appendix E) that was created and piloted at GWU among peers involved in medical education is given to assess whether the workshop has been an effective vehicle for improving process, content, and interpersonal issues.

Results

All MS-4s and SPIs teaching the physical diagnosis course in 2013 completed a questionnaire. The results, displayed in the Table, are from that questionnaire given to MS-4s and SPIs at the end of the TALKS course. Note that this is

not the same questionnaire attached as Appendix E. The results are included here to show improvement in SPI and MS-4 satisfaction when compared to prior iterations of the TALKS course. Statements were rated on a 5-point scale from strongly disagree (1) to strongly agree (5). All of the SPIs and 77% of the MS-4s (44 out of a total of 57 student participants) responded to the questionnaire. There were two responses of disagree for statements 3 and 4, with no responses of strongly disagree for any of the statements amongst the student peer instructors.

Through this analysis, some themes evolved. Teaching was a rewarding experience for both MS-4s and SPIs. There was an obvious conflict between MS-4s and SPIs over MS-1s' summative evaluations. A few conflicts in teaching roles between the MS-4s and SPIs remained. There was noted improvement in satisfaction with the program and in the MS-4 and SPI relationship since the implementation of the interdisciplinary workshop. There was a definite positive correlation between clear instructor expectations and resultant MS-1 preparation for the physical diagnosis sessions. There was also a positive correlation between ease of learning and value of physical diagnosis instruction and pre-session preparation by MS-1s.

Discussion

The purpose of this workshop was to utilize two theoretical constructs to increase cohesion between SPIs and MS-4s working together to effectively teach physical diagnosis skills to novices. We created a workshop that was designed to use underlying theories of collaboration (Mezirow's transformational learning theories and the GRPI model) to enhance the collaboration of the SPI and MS-4 dyads in teaching MS-1s physical diagnosis. Feedback on the questionnaires from the TALKS course constructed to assess how dyads were functioning revealed that many of the problems identified in 2010-2011 had been resolved based on the workshop experience. This workshop strengthened

Table. Questionnaire Results

Statement	Percentage Agreeing or Strongly Agreeing	
	SPIs (N = 16)	MS-4s (N = 44)
1. My overall reaction to my experience as a teacher in physical diagnosis was positive.	100	100
2. My experience working with an SPI or peer instructor was positive.	91	93
3. My teaching role in physical diagnosis was what I expected.	93	90
4. The SPI/peer instructor partnership was an effective way to maximize learning for first-year medical students.	86	84

Abbreviations: MS-4, fourth-year medical student; SPI, standardized patient instructor.

the core curriculum of TALKS,¹⁵ and results suggest that the theoretical constructs that were used effectively drew the SPIs and MS-4s together and created a sense of respect and recognition of the value each member brought to the team. We feel that giving time for these dyads to meet prior to the start of the physical diagnosis course, providing an opportunity for them to get to know each other, and allowing them to create plans on how they wanted to teach and handle potential problems in future teaching sessions helped with team cohesion and satisfaction overall.

An outcome measure to evaluate the effectiveness of dyad performance as compared to faculty teaching is to assess student scores on the end-of-third-year practice-based exams. These scores have actually improved after implementation of the dyad model, validating our innovation in using this model in place of faculty teaching physical diagnosis.

Limitations

There were some limitations identified, the most prominent one being disparities between MS-4s and SPIs on the summative evaluation of the MS-1s' performance in the physical diagnosis course. The course directors have not yet resolved that issue as there are no national norms or milestones to assess performance at this level. The course directors were also open to differing opinions on student performance.

An ongoing issue potentially affecting the dyad collaborative teaching is the MS-4s' absence during residency interviewing season for postgraduate year one positions. In most instances, MS-4s are able to get peer coverage when they are away, but there are times when SPIs teach alone due to lack of cross-coverage. Frequent absences of MS-4s can be disruptive to their relationships with the SPIs and to the MS-1s they are teaching, but stringent ground rules about this teaching elective are publicized by course directors to end-of-third-year students who are considering this course as part of their fourth-year course choices.

Relevance

A key learning point in creating this program of MS-4s and SPIs teaching physical diagnosis skills is that making assumptions about the process and outcomes of a new curriculum is ill advised. Once MS-4s and SPIs had an academic year to work together, their honest feedback allowed us to revisit the dyad and develop a theoretical construct to be the scaffolding for a new workshop, melding the strengths of the two groups. For those schools

interested in implementing such a program, the materials outlined in this publication can help to provide a foundation for successful collaborations between two potentially disparate groups.

Keywords

Peer Teaching, Collaboration, Standardized Patients, Quality Improvement, Mezirow, GRPI Model, Physical Diagnosis, Interdisciplinary, Workshop

Appendices

- A. Advanced Preparation Mezirow.pdf
- B. Advanced Preparation GRPI Model.pdf
- C. Interdisciplinary Workshop Questions and Answer Key.docx
- D. Self-Reflection Questionnaire for Dyads.docx
- E. Workshop Evaluation.doc

All appendices are considered an integral part of the peer-reviewed MedEdPORTAL publication. Please visit www.mededportal.org/publication/10411 to download these files.

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IRB/Human Subjects: This publication does not contain data obtained from human subjects research.

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