

A Case-Based, Problem-Based Learning Approach to Prepare Master of Public Health Candidates for the Complexities of Global Health

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Global health is a dynamic, emerging, and interdisciplinary field. To address current and emerging global health challenges, we need a public health workforce with adaptable and collaborative problem-solving skills.

In the 2013–2014 academic year, the Hubert Department of Global Health at the Rollins School of Public Health–Emory University launched an innovative required core course for its first-year Master of Public Health students in the global health track. The course uses a case-based, problem-based learning approach to develop global health competencies. Small teams of students propose solutions to these problems by identifying learning issues and critically analyzing and synthesizing new information.

We describe the course structure and logistics used to apply this approach in the context of a large class and share lessons learned. (*Am J Public Health*. 2015;105:S92–S96. doi:10.2105/AJPH.2014.302416)

RAPID GLOBALIZATION AND

unprecedented investment in global health research and programs over the past decade have generated demand for training in global health.¹ However, global health is a dynamic, emerging, and interdisciplinary field that presents challenges for curricular development.² The speed of technical, scientific, and programmatic developments in relation to HIV over the past decade³ provides an example of just how quickly content delivered via traditional didactic modes of instruction risks becoming outdated. In a rapidly changing world, instruction needs to focus on nurturing the systems-level thinking that is central to understanding the complexity of current and emerging global health challenges.⁴ It also needs to foster the critical thinking and respect for contextual specificity that are essential for effective and sustainable solutions.

Although global health competencies have been proposed by the Association of Schools and Programs of Public Health (ASPPH) to guide instruction,⁵ less attention has been given to the pedagogical approaches best suited to helping students develop these competencies. In research conducted by the University of Washington to inform the design of its curriculum, global health leaders recommended that training should focus on experiential learning and employ case studies and problem-based course work.⁶ Columbia University uses a case-based approach in components of its new curriculum (that seeks to bring together global

and local health).⁷ Emory University has run a successful Global Health Case Competition since 2009, inviting interdisciplinary teams of students to competitively seek feasible and sustainable solutions to real-life global health challenges⁸ and has developed a case-based introductory course directed to nonglobal health Master of Public Health (MPH) students.² We argue that a case-based, problem-based approach is particularly well-suited to the development of a workforce with adaptable and collaborative problem-solving skills⁹ that can address global health challenges, and we describe our approach in detail.

The Hubert Department of Global Health at the Rollins School of Public Health at Emory University has had an MPH track in global health since 1985. The demand for this program has grown over the past 12 years from 52 students enrolled in 2001 to 159 in 2013, and students in the global health tracks now represent 33% of all MPH students at Rollins. These students have an average of two years of global health experience. In addition, approximately 20% of the MPH student body at Rollins is from outside the United States with 27 different countries represented in the current cohort. Many of these international students are midcareer professionals with significant field experience.

In the 2011–2012 academic year, the Rollins School of Public Health added a required core course in global health for non–Global

Health Department students (GH500), to the traditional requirements of master's-level public health training.² This course is competency-driven, interdisciplinary, case-based, and incorporates new interactive technologies. It aims to enable students to integrate core public health disciplines into team-based problem solving around authentic global health challenges. In the 2013–2014 academic year, we applied lessons learned from this experience in the development of a new core course for students in the Global Health Department, named Global Challenges and Opportunities (GH501). The subsequent sections detail our development and execution of GH501.

COMPETENCIES AND PEDAGOGICAL APPROACH

To develop competencies for this core course, we reviewed the global health competencies developed by the ASPPH¹⁰ and the public health core competencies developed by the Council on Linkages Between Academia and Public Health Practice¹¹; a commissioned review of the Rollins Global Health Curriculum based on students, faculty, and employers; and additional interviews of students and faculty. On the basis of this material, we proposed four overarching competencies for this new core course (Table 1), along with skills-based subcompetencies.

To fulfill these competencies, we chose a case-based, problem-based learning (PBL) approach to

TABLE 1—Overarching Competencies for Core Global Health Course GH501: “Global Challenges and Opportunities,” at Hubert Department of Global Health at the Rollins School of Public Health—Emory University, Atlanta, GA

Concept	Competency
Background in global health	Describe historical, economic, political, social, and cultural factors that influence the health of populations around the world.
Critical thinking	Critique and design global health approaches affecting the health status of individuals, communities, and populations around the world.
Public health ethics	Evaluate and apply public health ethical frameworks to design programs, policies, and interventions intended to improve health services and health status of individuals, communities, and populations.
Systems thinking	Assess and incorporate spheres of influence or systems that affect global health challenges into policies to improve the health status of individuals, communities, and populations.

foster the development of practical skills that future practitioners will need to address global health challenges. The self-learning pedagogical approach of PBL, which invites students to identify, research, and train others on learning issues,^{12–17} is ideally suited to foster critical synthesis and sharing of new information, team-based interdisciplinary collaboration, and problem solving. Whereas several studies suggest that PBL, compared with traditional didactic lectures, improves student retention several weeks, months, or years after the initial experience and has improved student satisfaction,^{18–26} other studies suggest that there is no difference^{27,28} in outcomes between the two approaches. Problem-based learning has been extensively used in medical curricula^{29–32} and a breadth of fields including the sciences^{19,33–35} and humanities,^{36–39} among others. In a review of the published literature, PBL has been used in some MPH curricula,^{40–51} but, outside of our published approaches^{2,8} we are not aware of PBL being applied to the global health training for MPH students.

A PBL approach has the advantage of engaging students collaboratively as active learners and allowing them to build on their previous training and experiences and their existing competencies.^{52,53} Based

on educational principles of constructivism, this experiential approach integrates knowledge across multiple domains and fosters flexible thinking and lifelong learning skills.^{54–56} It also allows students to learn from one another in an engaging, motivating, hands-on way.^{57,58} As such, we feel that a case-based PBL approach addressing real-world global health challenges is particularly appropriate for self-directed and self-motivated graduate learners.

COURSE STRUCTURE AND LOGISTICS

Each case, over a two- to four-week period, addressed a global health theme (e.g., infectious disease, nutrition) and was designed to address increasing conceptual levels of understanding within Bloom’s Taxonomy (reviewed in Wood⁵⁹). For example, case 1 (a norovirus outbreak in Jamaica) addressed Bloom’s Taxonomy levels 1 through 3: “remembering,” “understanding,” and “applying,” by developing information sheets on norovirus and identifying the agent and source of the norovirus outbreak from data provided. Case 2 (food fortification in Bangladesh) addressed Bloom’s Taxonomy levels 2 through 5: “understanding,” “applying,” “analyzing,” and “evaluating,” by proposing a food fortification program in Bangladesh that

included a monitoring and evaluation component and was pitched in a culturally competent manner to the Bangladeshi minister of health.

To ensure that all students had the necessary background, each case began with an introductory lecture (Table 2). The lecture was followed by teaching assistant (TA)–facilitated small-group sessions in which four to six students in a team identified new learning issues required to respond to the case and allocated the learning issues to individual team members. Individual team members then independently researched these learning issues over several

days and trained themselves and their team in this subject matter by individually writing a two-page report and orally presenting materials to their team. The team then received a final concluding lecture to ensure all learning objectives were met and completed a final graded student deliverable (e.g., program for a food fortification intervention).

One challenge to implementing the small PBL groups (four to six students), ideal for fostering critical thinking and exchange,⁶⁰ was the class size of 150 students. For case discussions, we organized PBL groups of four to six students, grouped to ensure diversity in

TABLE 2—Schematic of Weekly Class Activities for Core Global Health Course GH501: “Global Challenges and Opportunities,” at Hubert Department of Global Health at the Rollins School of Public Health—Emory University, Atlanta, GA

Week	Activity	Description	Facilitator ^a	Sections ^b
1-3	Lectures	Introductory topics	Instructor	Combined
4-14	Cases 1-3 ^c	Introduction to case lecture	Instructor	Combined
		Case discussion ^d	TAs	Separate
		End to case lecture	Instructor	Combined
15-16	Lectures	Culminating topics	Instructor	Combined

Note. TAs = teaching assistants.
^aInstructors may be replaced by expert guest lecturers.
^bCombined means that all 150 students meet together in a lecture space. Separate means that each section of 75 students meets separately in problem-based learning groups of 4 to 6 students.
^cEach case followed a similar structure beginning with an introductory lecture, followed by case discussions, ending with a final lecture on the case.
^dDepending on the length of the case, there may be 1 to several days dedicated to case discussion.

training (e.g., doctor of medicine, bachelor of arts), previous global experience (e.g., midcareer professional, volunteer experience), and country of origin (domestic vs international). Three groups were assigned to one TA, five TAs were supervised by one instructor, and two instructors each managed a separate classroom. For lectures, all 150 students met in one classroom. Selection and training of TAs was crucial to the success of the course because TAs were responsible for group dynamics, case facilitation, and ensuring that students achieved the case learning objectives. In addition, the 10 TAs were divided into four groups (of two or three TAs each) and each TA group was tasked with an essential activity within the course. The four groups included communication (e.g., posting assignments, contacting speakers, weekly class emails), logistics (e.g., ensuring all the materials and resources were prepared for each class day including technology, rooms), sustainability (e.g., ensuring all processes, assignments, and meeting minutes of the course were documented for future semesters), and monitoring and evaluation (described in the next section).

In parallel, students completed a semester-long policy brief that simultaneously addressed all competencies and applied the critical thinking skills acquired by working through the cases. They prepared a one-sentence policy brief advocacy statement and corresponding annotated bibliography, the two-page brief for the intended audience, a formal peer-critique and ranking of a peer's policy brief (based on the National Institutes of Health grant-review process), and a formal response to reviewers and revised brief based on feedback.

COURSE MONITORING AND EVALUATION

The monitoring and evaluation TAs helped the coinstructors to monitor and evaluate the course through various metrics. These included monitoring, evaluation, and lessons learned to incorporate in the next iteration of the course.

Monitoring

Peer evaluation. At the conclusion of each case, data were collected from each team of four to six students on how each team member performed. Data were reviewed by the TA for professional language, made anonymous, compiled, and returned to the evaluated student.

Student questions and overall satisfaction. Teaching assistants informally synthesized their students' questions and satisfaction rating (e.g., from e-mails, during case discussion) and reported this information to the larger team through a weekly learning team meeting. They proposed responses to the student questions (e.g., created a compilation of frequently asked questions for each assignment) or expressions of students' dissatisfaction (e.g., reduced the number of weekly e-mails students received to one weekly digest).

Case learning objectives. During the case discussion and while students were identifying case learning issues, TAs facilitated the discussion to ensure that students at least achieved the minimum case learning objectives. Usually, the students exceeded the case learning objectives and developed several new objectives for themselves. At the conclusion of each case discussion, TAs monitored whether all intended case learning issues were covered in each group. Learning objectives that were not identified by the

students were discussed by the TA during the class period. Learning objectives that were not identified by several groups were flagged by the TAs during the weekly meetings and the instructor made sure to review these learning objectives in the final case lecture.

Teaching assistant activities. Every three weeks, data were collected from all TAs as to weekly hours worked, ability to complete tasks, and satisfaction with their work. These data were shared with the learning team at weekly meetings and were used to reallocate tasks and improve TA satisfaction.

Class resources used. Teaching assistants monitored the cost and quantity of class resources used including markers, paper, and photocopying, among other activities. This helped in planning resources and requesting funds for future iterations of the class.

Evaluation

Attainment of course competencies. Assignments were developed to address individual subcompetencies, mapped to all relevant subcompetencies, and reviewed to ensure all subcompetencies, and therefore, competencies were addressed. In general, one subcompetency mapped to two or more assignments. Satisfactory completion of all assignments represented successful attainment of course competencies. Grading rubrics for each assignment were designed to assess satisfactory attainment of subcompetencies.

Student satisfaction with the course and workload, and perception of attainment of course competencies. Two anonymous online evaluations were developed for the class based on satisfaction with the course (e.g., pedagogical approach,

assignments, activities, TA and instructor interaction), workload (e.g., workload per assignment and overall course workload), and perception of attainment of course competencies. One online evaluation was delivered midcourse and the second online evaluation was delivered at course end. The midcourse evaluation data were synthesized by TAs, presented to the students, and additional oral feedback requested from the students. These data were used by the learning team to improve the course in the second half of the semester. Course improvements were communicated to the students, rationale explained, and data from evaluation presented. The end-of-course evaluation was similarly synthesized by TAs and used by the learning team to propose improvements for future semesters. For example, according to the final evaluation, 75% of students felt this workload was appropriate, therefore the workload was slightly, but not substantially, reduced in a future iteration of the course. In a final course evaluation, only 10% of the students self-reported that they felt competencies were not attained.

Lessons Learned for Future Course Iterations

Peer learning. Students generally appreciated learning from instructors (through lectures), TAs, and peers (PBL, cases). Students particularly appreciated the intimate setting of their groups, the opportunity to learn from the diversity of experience of their peers, and dedicated class time for group work. They also benefitted from the formal feedback from their peers on their group work and training skills. In a midcourse evaluation, only seven percent of students felt that peer learning was not

helpful in mastering the course competencies.

Workload of instructor. Because the class was student-driven, instructor work burden was heavy on the front-end (setting up the cases) and satisfactory during the semester. Each instructor, of two instructors, divided responsibility for lectures and managing the 10 TAs and each graded two major assignments of 15 groups each.

Management of student expectations. Several students expressed confusion with the competencies because they did not understand the purpose of the competencies and instead sought skills that were more easily documentable in their resumes. Because the policy brief activity was a tangible skill, most students expressed particular satisfaction with this part of the class.

Personal ethics. Students preferred discussion of personal ethics that may have an impact on their careers (e.g., how to ethically navigate being an outsider in a new community or project and potential tensions between their goals and those of the community) over discussion and application of theoretical ethical frameworks (e.g., libertarians vs collectivists⁶¹).

Review of global health concepts. Though previous global health experience is a criterion for admission to the Global Health Department at the Rollins School of Public Health, many students came from focused global health projects and desired a broader review of key global health terminology, acronyms, or actors through lectures.

Course monitoring and evaluation. The midcourse and final-course evaluations were long and tedious for the students to complete and suffered from recall bias (e.g., “how long did assignment 1 take you to complete” one to two months after assignment 1).

In future semesters of the class, the mid- and end-course evaluations will be reduced by introducing frequent mini student evaluations of specific class activities (e.g., satisfaction and workload of assignments for case 2 upon completion of case 2).

Personalized student instruction. Because of the class structure, and despite the large class size, students received personalized feedback from TAs on attainment of case learning objectives, feedback on the quality of their case assignments, and synthesized comments from their peers on their team performance. Students commented positively on their TAs (74% felt their interactions with TAs were very helpful). Instructors complemented TA facilitation, assisted TAs with difficult group dynamics, and were available for one-on-one student meetings. Of those students who interacted with instructors, 72% felt they were very helpful and 28% felt they were somewhat helpful.

CONCLUSIONS

In conclusion, we feel that this course has the structure and logistics necessary to successfully implement this pedagogical approach in a large class of approximately 150 students. This pedagogical approach (i.e., PBL) is particularly well suited to foster the development of the adaptable and collaborative problem-solving skills that are needed to allow the global health workforce to address complex and dynamic challenges. ■

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