A Framework for Practice-Based Teaching in Public Health

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ABSTRACT

Context: To prepare master of public health graduates for successful application of public health competencies in their careers, accredited schools of public health must identify the knowledge, technical and professional skills needed for practice, and provide opportunities for application of these skills in public health settings.

Program: Practice-based teaching (PBT) is a pedagogical approach where students learn through course instruction while working on a real problem and producing implementable deliverables for a public health agency. Currently, no framework exists for designing, implementing, and evaluating the pedagogy. This article defines PBT for public health and presents a novel 5-step framework, PBT STEPS, to guide faculty in development of a practice-based curriculum for public health education, including (1) securing partnerships, (2) training and technology, (3) engagement and implementation, (4) presenting deliverables, and (5) sizing up the results.

Implementation: PBT has been implemented using PBT STEPS in both domestic and global courses, teaching a variety of technical competencies. Collaborating agencies for PBT courses have ranged from small community-based organizations to large departments of public health, to international nongovernmental organizations and to private hospitals. Each step is described and illustrated through a practical example from a past PBT course.

Evaluation: The practical example was evaluated through a mixed-methods approach to assess outcomes for students and collaborating agencies. All students (n = 12) reported significant increases in ability with the technical and professional competencies addressed in the course, and all agencies (n = 3 representing 5 distinct projects) reported utility of the final deliverables to the agency and populations served.

Discussion: Evidence-informed, feasible, and innovative solutions created through PBT collaboration provide significant benefits to the agency and the communities they serve while successfully training students for the public health workforce. Utilizing the PBT STEPS framework allows for successful and productive academic and community collaborations.

KEY WORDS: academic and community collaborations, pedagogical framework, practice-based teaching, public health training

Accreditation standards related to achievement of foundational and skill-based competencies have accelerated the need for schools of public health (SPH) to ground professional public health education in the real world[1-3] and provide practice-based and applied educational opportunities to master of public health (MPH) students.[4,5] Given the shift of MPH students to younger and less experienced,[6] it is more important than ever for MPH programs to provide opportunities for students to gain practical public health skills by working with public health agencies (PHAs) on real public health problems during their training.[1,3,4,7]

A pedagogical approach providing this type of experience is practice-based teaching (PBT) and is recommended for the education of MPH students.[8] PBT engages students in a collaborative process employing teamwork, critical reflection, synthesis of knowledge, and application of skills resulting in achievement of both technical and professional competencies.[9] PBT integrates elements of traditional instructor-centered learning, student-centered learning, and project-based

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learning, and utilizes both course instruction and application with a real-life problem from a PHA. Successful use of PBT relies on a framework for designing, implementing, and evaluating the pedagogy.

In PBT courses, students reinforce classroom learning, build practical technical knowledge, and apply skills by working with PHAs and by extension to the communities the agencies serve. PBT enhances professional skills by providing opportunities to engage in real-life public health problems, create tangible end products and deliverables[10] that add to a portfolio of work for future employers, negotiate real-life work issues that contribute to gaining confidence in their ability to perform in a professional setting,[11] expand their professional networks, refine their career goals,[12] and secure practicums, internships, or part-time work.[13]

For a public health school, PBT can increase reputational capital, build interdisciplinary collaboration among faculty members, provide a means for public health activism, and potentially generate financial resources through fundable research and practice opportunities. PBT allows faculty members to expand and deepen their relationship with PHAs, connect to future professional opportunities, and integrate practice and research.[6] PHAs benefit by introducing an academic, evidence-based perspective into their organization; receiving high-quality, free, and tailored deliverables within a short time frame; establishing relationships with trained researchers and academics[6,10,14]; and learning new technologies and methodology to address their public health needs.[13]

While the benefits of PBT are extensive, inadequate faculty resources to develop and revise courses and secure partnerships, time constraints for students that make group work and collaboration with an agency difficult, lack of institutional resources to support interdisciplinary collaboration among faculty members, and agency bandwidth to provide active participation and feedback represent challenges for adoption and implementation of PBT. The purpose of this article is to outline a framework, PBT STEPS, and demonstrate application of the framework with a practical example to promote successful academic and community collaborations in public health education and practice.
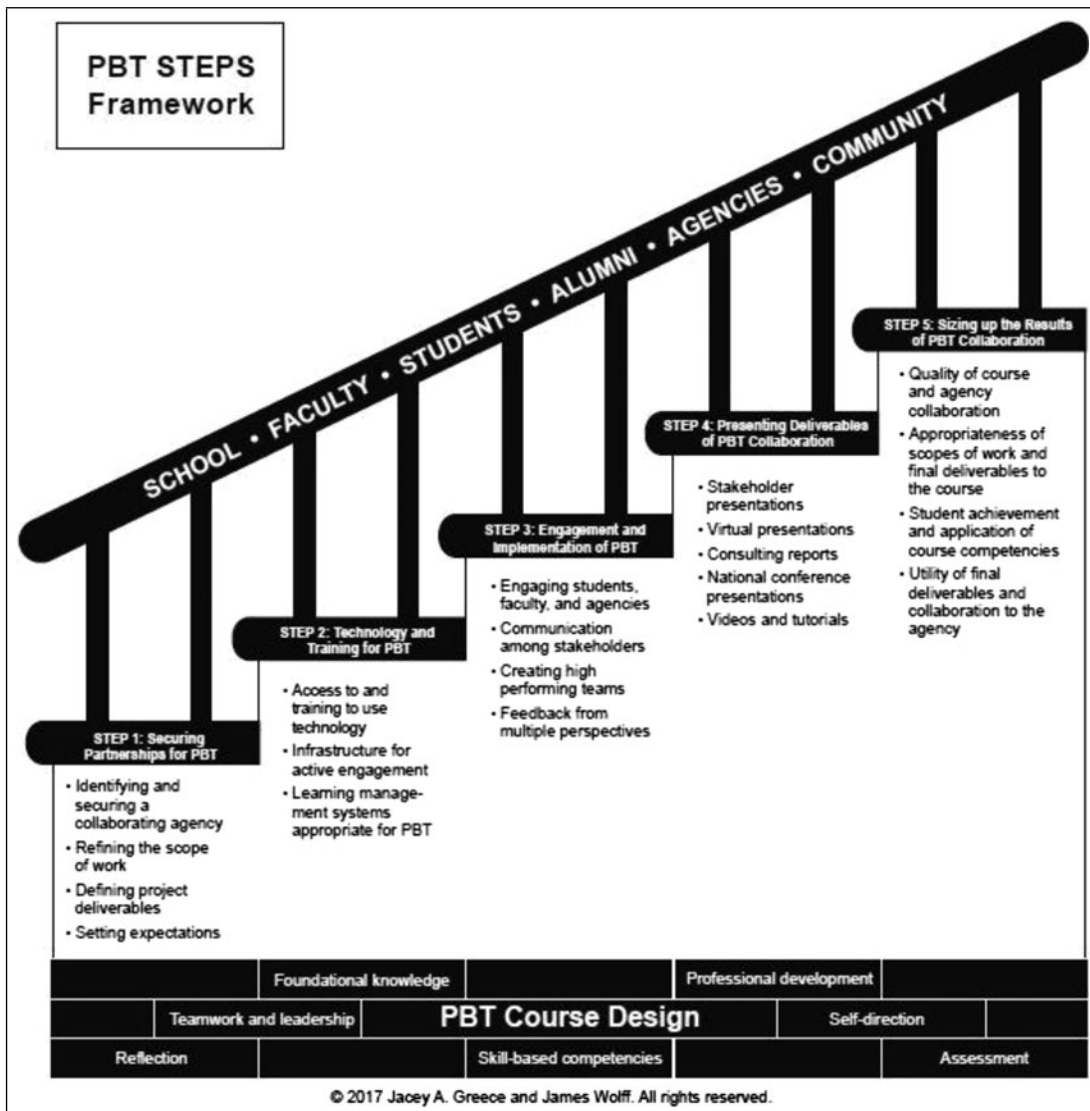
A Framework for PBT

Absent a user-friendly and logical roadmap for using PBT in public health education, teachers using traditional methods may be reluctant to use the pedagogy, thus depriving the benefits of PBT to students, PHAs, and the communities they serve. We created the PBT STEPS framework to help the faculty design and teach a PBT course through securing partnerships (S),

technology and training (T), engagement and implementation (E), presenting deliverables (P), and sizing up results (S) (Figure 1). This framework also provides a roadmap for PHAs to engage in successful collaborations that yield impactful deliverables. This framework is adaptable to the time allocated for development of a course as well as the time frame of course implementation. In addition, PBT STEPS is an iterative process. Each step builds on the previous step, but any step can be revisited to ensure successful application of the framework. We provide a practical example, which emerged from the course described later, to illustrate each component.

PBT STEPS is based on our global and domestic public health consulting work and our 10 years of experience designing the 3 core aspects of PBT: (1) developing new or revising existing PBT courses for introductory and advanced MPH and doctoral courses; (2) implementing PBT courses with more than 100 domestic and global agencies on a myriad of different public health problems; and (3) evaluating the effectiveness of PBT courses through a rigorous mixed-methods evaluation of stakeholders.[13] The educational evaluation was approved as an exempt study by the institutional review board at Boston University.

PBT course design

At its core, PBT provides a classroom-based opportunity for experiential, active, student-centered learning. Students work with PHAs, often referred to as clients, on an assignment or project that meets a priority area of need for the PHA while allowing students achievement of skill-based competencies and professional development opportunities. PBT courses provide the foundational knowledge and analytical frameworks to directly support students as they apply their public health skills to address the public health problems of their agency. A well-designed PBT course integrates opportunities for student self-direction as well as provides opportunities to learn and apply principles of effective teamwork and leadership. A PBT course necessitates timely, regular, and frequent reflection and feedback from multiple perspectives through various assessments (ie, reflection papers, self-administered quizzes, dynamic feedback loops, tailored discussions, self-assessment) that can be used to evaluate the effectiveness of PBT, improve deliverables for the agency, and determine utility of deliverables to the agency and its constituents. Taken together, these attributes provide the foundation for the design, implementation, and evaluation of PBT, and courses that would benefit from an emphasis on these attributes are primed for PBT.

FIGURE 1 PBT STEPS Framework for Developing a Practice-Based Course
Abbreviation: PBT, practice-based teaching.

The strength of PBT lies in the combination of various student learning opportunities: (1) information dissemination through lectures, readings, and guest speakers; (2) active learning through in-class and outside of class exercises, case studies, and simulations; (3) just-in-time learning associated with meeting the needs of the client, the student group, and the class; and (4) professional interactions with key stakeholders including the agency and its constituents. This combination of varied student learning modalities, all of which are used in the practical example (Table), provides students multiple opportunities to build and improve foundational knowledge and apply professional and technical skills (Figure 2). The technical skills or course competencies are at the center of the design of a course. Lectures, classroom activities, and

assessments are designed and implemented to help students achieve course competencies. PBT allows an outer ring of professional and workplace skills to be addressed. Successful collaboration with an agency provides the opportunity for students to develop these other skills (Figure 2).

The course outlined in the practical example, Communication Strategies for Public Health, is an advanced intervention planning course. Through a sequence of written assignments, students develop an evidence-based, theory-driven, and practical intervention focused on changing a health behavior or environmental condition that addresses a priority area for a PHA. Students then prepare a strategic, creative, and feasible communication campaign to support the intervention, whether through promoting

TABLE	
Practical Application of PBT STEPS: Communication Strategies in Public Health Course	
PBT STEPS	**Course: Communication Strategies in Public Health**
PBT course design	The purpose of this course is to give students an opportunity to work on a consulting team and to acquire skills for developing an intervention and accompanying strategic communications plan for a PHA. Students are matched with a PHA and work with the agency to develop an intervention and strategic communications plan for the agency. In-class lectures, guest speakers, skill-building exercises, readings, videos, and stakeholder meetings are the activities used to accomplish the course learning objectives and result in high-quality deliverables for the PHA.
Step 1: Securing partnerships	*Finding a collaborating PHA*: Using school and personal networks, course faculty identified a local government agency serving a large city. *Scope of work*: The PHA developed a problem statement with assistance from course faculty—HPV infection is a sexually transmitted infection prevalent in the United States. There is no cure, but vaccination may prevent HPV infection; it is recommended for youth around 11 years old. The target of an intervention could be youth, providers, or parents. The public health goal is to increase overall rates of HPV vaccinations among youth in the PHA's target area with a focus on minority youth. *Project deliverables*: **A needs assessment and literature review** on previous interventions for this public health problem, target group, behavior and/or environmental condition to change, and intervention goals. An evidence-based, innovative, and feasible **intervention plan** that includes a budget, timeline, and logic model. A **communication strategy** including a press release, infographic, editorial, and other media executions to support the intervention.
Step 2: Technology and training	*Technologies for collaboration*: Stakeholders use Skype, Zoom, e-mail, Google Hangouts, Adobe Connect, LMS, and phone. Prior to the semester, communications preferences are confirmed with the PHA. *Physical space*: The faculty obtains collaborative classroom and final presentation space for 24 students.
Step 3: Engagement and implementation	*Stakeholder engagement*: The faculty reviews roles, responsibilities, and expectations in the orientation document. The PHA has access to class materials and guest lecturers for professional development. The faculty obtains informal feedback from the PHA on project status and team dynamics for course correction and from periodic surveys on client-student interaction and satisfaction to identify any problems or issues. Teaching assistant support. *Communication*: Students conduct youth focus group with coordination assistance from the PHA and conduct interviews with the PHA staff involved in youth programming. The faculty conducts weekly check-ins with the PHA and regular updates. *Teamwork*: The faculty provides opportunities for sharing issues or questions and personalized feedback from peer reviews of individual performance. *Feedback*: The faculty provides specific feedback and the PHA provides general feedback on deliverables. Students have opportunity to revise all deliverables based on feedback. Grades assigned according to rubrics; feedback organized by sections on the rubric.
Step 4: Presenting deliverables from the collaboration	*In-person presentations and meetings*: After deliverable 1, the student groups pitch 3 options for intervention to the PHA and together arrive at a mutually agreeable solution. The students conducted a site visit to the PHA mid-semester. Final presentations occur during the last class to the PHA and its stakeholders. *Communication technologies*: When not feasible in-person, occasional meetings occurred via Skype or phone. *Written submissions*: These were achieved as outlined in the SOW in step 1. *National dissemination*: The student group presented the outcomes of their work at a national public health conference annual meeting. *Prerecorded videos*: The student group recorded a tutorial on the app they developed for the PHA to show other stakeholders.
Step 5: Sizing up results of the collaboration	*Quality of collaboration*: The students and the PHA reported a mutually beneficial collaboration through end-of-semester surveys, interviews, and a focus group. Two of the students continued with the PHA as a practicum to further the work they had developed. *Appropriateness of SOW*: Given the collaborations that resulted, the SOW was appropriate and the deliverables were implemented the next summer. *Student competency achievement*: Evaluation results showed an increase in student knowledge and skills from precourse to postcourse on all competencies. *Utility of deliverables*: The deliverables were further developed by students after the semester and were implemented with the youth and included a summer curriculum, focus group testing for an app on HPV vaccinations, and a poster contest for youth to further develop messaging.

Abbreviations: HPV, human papillomavirus; LMS, learning management systems; PBT, practice-based teaching; PHA, public health agency; SOW, scopes of work.
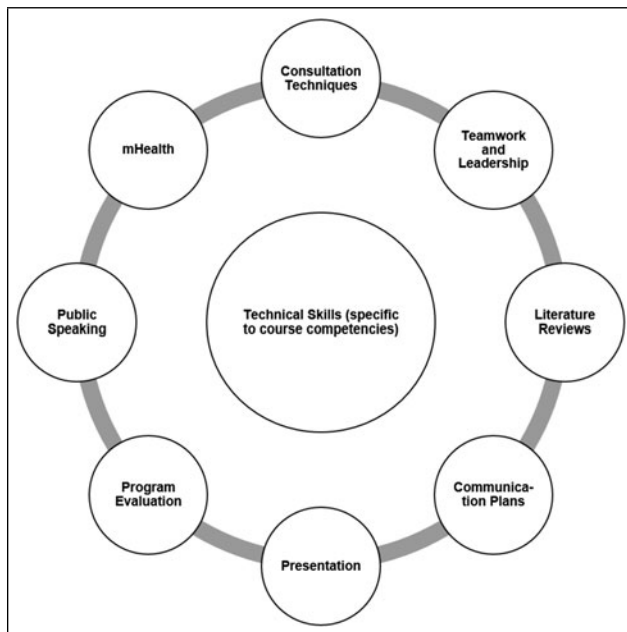
FIGURE 2 Practice-Based Teaching Skill Development

the intervention to key stakeholders and participants, raising awareness of the problem and need for intervention, advocating for support or resources to ensure successful intervention implementation, or other communication objective resulting in adoption, implementation, or sustainability of the intervention.[13]

Throughout the 14-week course, students learn about needs assessment, intervention design and frameworks, and communication concepts through lectures, assigned readings, and case studies. There are several skill-building exercises that allow students to apply technical and professional skills in the classroom and to their projects (Figure 2). The specific activities and exercises of the course are described elsewhere.[13] Class time is dedicated to active learning activities such as team problem solving, meetings with the teaching team, and in-person consultations with the agency.

Step 1: Securing partnerships for PBT

The first step in creating a PBT course involves (1) identifying and securing a collaborating agency; (2) refining a scope of work that aligns with the course objectives and is of importance to the agency; (3) defining project deliverables that benefit all stakeholders; and (4) setting expectations of time engagement, communication, and collaboration.

Advance planning with potential agency partners to discuss benefits of collaboration, design of the course, course objectives and schedule, types of deliverables required by the course to meet the objectives, and

specific roles and responsibilities of the agency during the course should begin 6 months before the course starts. This allows adequate time to identify a suitable partner and secure its collaboration for the semester. Faculty members can use their own or colleagues' networks, past collaborators, the school's career services department, and alumni to identify prospective partners. Partnership guidelines, memorandum of understanding, or a simple contract can help define the agency's role and responsibilities, set expectations for a mutually beneficial collaboration, and provide a process for conflict resolution.

Once the partnership is established, the faculty can work with the agency to develop clear, specific, and feasible scopes of work (SOW) with challenging, educational deliverables. The final document should be a professional SOW that provides enough information to guide students in the development of the deliverables. A well-designed SOW will result in achievement of course objectives for students as well as guide development of deliverables that benefit the collaborating agency and the community it serves.

Project deliverables are the outputs of the collaboration between the students and the agency and are the basis for students' assessments. Rubrics created for these deliverables can be used by the faculty to uniformly assess student performance and assign a grade; by students to understand expectations for the quality and content of project deliverables; and by the agency to provide standardized feedback to the students.

The course faculty for Communication Strategies for Public Health contacted the PHA approximately 4 months before the start of the semester. The connection with the PHA was preexisting due to a previous course collaboration, which acted as a catalyst for this semester's work with a new division within the PHA. The PHA, with the course faculty, identified 2 priority areas for the agency that would be appropriate for the learning objectives of the course (Table). The course faculty consulted with the PHA to refine the SOW and subsequently shared the course syllabus with the agency to solidify meeting dates, processes for communication between the class and the agency, and expectations for engagement. Within this semester, there were 3 different collaborating PHAs representing 5 distinct projects; this practical example focuses on 1 project from 1 agency. All collaborating agencies had input to the SOW and course syllabus, both of which provided the foundation for the collaboration.

Step 2: Technology and training for PBT

PBT courses require various technology and training for seamless collaboration between stakeholders including (1) access to and training for technologies

that streamline communication; (2) infrastructure within the classroom that promotes active engagement of students and agencies; and (3) learning management systems (LMS) software applications that are comprehensive and flexible enough to support the different stakeholder needs and communication approaches.

PBT courses require communication technologies or project management software not typically needed in traditional courses to ensure high-quality deliverables are produced on time. While freely available, many of these technologies are unknown to the students and/or agencies and require some level of training and support to be used effectively. Physical classroom space and resources are important in creating a structural environment that promotes active engagement, facilitates group work, and allows easy access to online resources, project management software, and communication with clients.

Effective LMS for PBT courses support student and client interaction, brainstorming sessions, feedback on the performance of the team, data on student experience through surveys and evaluations, and structured assessment of student deliverables. Sustainability and scalability of PBT rely on LMS that can integrate multiple modes of technology.

The collaborating agency for Communication Strategies for Public Health was conveniently located within minutes of the Boston University School of Public Health (BUSPH), which made in-person meetings possible and negated the need for remote attendance. Space was secured for these meetings, which occurred at 4 designated time points throughout the semester—introductory meeting, final presentation, and 2 consultations between and at pivotal points in the planning process. While in this practical example the collaborating agency was local to the course, this is often not the case in PBT. If not local, meetings could occur using communication technologies as described previously and include virtual meeting spaces, sending prerecorded videos and presentations, and creating online brainstorming and discussion forums. The collaborating agency did not have access to the LMS used by the students, so methods of document sharing (class materials and deliverables) and communication were established via e-mail and Dropbox before the start of the semester.

Step 3: Engagement and implementation of PBT

Successful implementation of PBT requires (1) exceptional engagement from students, faculty, and agencies; (2) robust communication among stakeholders; (3) high-performing teams; and (4) feedback from multiple perspectives on many aspects of the course.

Positive engagement in PBT is based on a shared vision of PBT culture, course goals, and objectives between the faculty and the agency and the collaborative development of SOW and deliverable descriptions that align with both agency and course goals. Flexibility and accessibility of the agency and willingness to respond to student needs and questions create ongoing, positive engagement between the students and the agency. Creating opportunities for the agency staff to attend lectures and access course materials for their own professional development can strengthen agency engagement. Learning how to work effectively in a team is an essential activity for a PBT course. Ongoing, open, effective, and regular communication and feedback on team performance, leadership, and team deliverables are critical to actively engaging all stakeholders. In particular, the faculty can use the ongoing feedback for course correction, especially if agency resources shift, to troubleshoot agency and student interactions, to update the flow and/or sequence of the course to allow ample time for agency feedback, and to provide more support or learning opportunities to students and the agency to ensure tailored deliverables.

The faculty, the agency, the students, and the outside experts can all contribute to assessment. Multiple formative assessments can provide information to students to assess and improve their own performance as a team leader or team member, improve their deliverables, and enrich and deepen their ability to reflect on and learn from their experience. Summative assessments based on issues, problems, or decisions that are similar to those required in the client SOW are effective in assessing competencies gained during the course.

During the first Communication Strategies for Public Health class, the PHA presented the problem statement and met the student team where roles and expectations were discussed. The PHA expressed its interest in having the course faculty moderate the communication between the student teams and the PHA staff to minimize burden of communication. The course faculty discussed the process of the agency, providing feedback on the course to the teaching team (faculty and teaching assistant) through regular communication and on the deliverables to the students through completion of grading rubrics.

At 2 designated time points throughout the semester, the student teams assessed their work and collaboration through a peer-review form. Results were aggregated for each group and feedback from the teaching team included team perceptions, areas of strength, and opportunities for improvement. The teaching team also observed agency and student

consultations and provided feedback on content and professionalism to the student teams.

Additional agency stakeholders helped inform the final deliverables through student-led focus groups and interviews, which were coordinated by the PHA. All final deliverables reflected 2 rounds of feedback from the teaching team, information from agency consultations (in-person at scheduled times or ad hoc via e-mail or phone), and results from stakeholder focus groups and interviews. Deliverables were e-mailed to the agency contact and shared more broadly within the agency.

Step 4: Presenting deliverables from the collaboration

Students can disseminate their work and deliverables through a variety of modalities including (1) in-person oral presentations or meetings; (2) Web-based presentations or meetings via use of communication technologies; (3) written submission; (4) national dissemination opportunities such as webinars and conferences; and (5) prerecorded videos. Conducting these varied dissemination activities, each of which can result in a grade, enhances students' professional skills including oral presentation skills, responding to questions in real-time, group collaboration and cohesion, and public speaking. For all of these modalities, the goal is to share the deliverables with the agency so that they can be implemented for the benefit of their stakeholders and constituents.

National dissemination opportunities enhance presentation skills and raise recognition and awareness of the agency and its work. PBT collaborations can generate practicum or part-time opportunities for students, additional PBT course collaborations, student presentations, and dissemination opportunities to the agency's stakeholders even after the course.

Communication Strategies for Public Health students presented to the agency at 2 time points. First, within the first several weeks of the semester, the student team pitched 3 options for intervention based on research and information learned to date. The agency, the students, and the teaching team discussed the options and arrived at one option that was feasible and would address the problem. Second, at the end of the semester, the student team presented the designed intervention and communication plan to support the intervention. The PHA brought program and agency stakeholders to this presentation to garner interest in implementing the program and engaging students after the semester (ie, practicum, volunteer, job) to further develop the project. The presentation was filmed to show other PHA stakeholders.

In the time between these 2 formal presentations, students had ample opportunity to present informally ideas and suggestions to agency stakeholders—program adopters, implementers, and participants—to gain insight to ensure an intervention and communication strategy that was tailored and successful. This resulted in deliverables, both written and oral, that were useful and well received.

Presentation opportunities occurred after the semester, with 2 students continuing with the agency to complete their practicum. The student team also worked with an outside group to develop the app they had designed during the semester. Finally, the agency, the teaching team, and the student team collaborated on a national presentation on the developed intervention.

Step 5: Sizing up the results of collaboration

Evaluation for PBT should focus on (1) quality of course and agency collaboration; (2) appropriateness of SOW and final deliverables to the course; (3) student achievement and application of course competencies; and (4) utility of final deliverables and collaboration to the agency.

Evaluation is important both during the semester for course correction, troubleshooting, and refining deliverables and after the semester to reflect on the entire experience of collaboration. Aspects of PBT that are essential to its success such as frequency and modes of communication from the faculty and students, access and ease of use of technology, and resources and support available during the semester can be assessed through debriefing discussions, interviews, focus groups, and identified or anonymous surveys.

Cross-checking the deliverables with the course objectives to ensure each objective was met through the development of the deliverables provides an opportunity to assess the competencies and the learning outcomes of the students. Evidence of application of competencies after the semester often provides the justification for the resource-intensive work of a PBT course. Evaluation of competency achievement in a PBT course includes surveys to assess students' level of knowledge and skills (both professional and technical) at baseline, postcourse, and at a follow-up time point (ie, 3 months postcourse, at graduation, 6 months postgraduation). Surveys should be complemented with more qualitative forms of assessment to explore the specific activities that led to competency achievement and application or to identify gaps.

Long-term follow-up with the agency and its constituents allows for a deeper understanding of availability of resources proposed, utility of the deliverables, and the impact of the collaboration on the agency and the community. This long-term point of contact also helps refine the deliverables through

continued faculty engagement with the agency, student volunteer opportunities, and/or continued collaboration with a PBT course.

Student and agency outcomes were assessed through an evaluation of the Communication Strategies for Public Health course that is part of a larger PBT evaluation effort. Students (18 enrolled, 12 completed assessments) completed a pre- and postcourse survey to assess changes in technical and professional skills addressed through the course. Students also participated in a voluntary focus group to give more depth to survey responses (n = 6). Students reported improvements in all skills addressed in the course (Figure 2). All students reported that working with a client enhanced their leadership, teamwork, and professional skills in addition to helping clarify their career plans and prepare them for the workforce attributing PBT for the enhanced classroom experience and quality of their work.

The agency reported high satisfaction with the deliverables and anticipated utility of them in practice. This was further evidenced by the continued collaboration after the semester between the agency and students to implement the deliverables and ongoing time investment in working with the teaching team and students to develop the mobile health app and prepare national conference presentations for further dissemination of the project.

Institutionalizing PBT

Making PBT a continuous and sustainable teaching methodology requires institutional support, a well-trained and engaged faculty, and an internal structure that results in a network of collaborating agencies. While PBT is most successfully implemented with enhanced resources such as support (ie, time) for PBT faculty, investment in adequate communication technologies and LMS that are flexible, and promotion of PBT to potential collaborators and alumni, it is worth the effort. Evidence-informed, feasible, and innovative solutions created through PBT collaboration that are implemented by the agency in a time-efficient and cost-effective way can provide significant benefits to the agency and the communities they serve. In addition, PBT provides the training that students need to acquire the skills to be effective public health practitioners and researchers. PBT collaborations also establish linkages between academia and the communities the students are being trained to serve.

Conclusion

SPH must prepare graduates by identifying the knowledge and skills needed for future employment and by

ensuring that graduates are adequately trained to successfully utilize these skills in the public health workforce. PBT offers SPH the opportunity to foster student learning through both course instruction and the opportunity to work on a current public health problem for a real PHA. Innovative, evidence-informed, and feasible solutions developed in PBT courses are based on the needs of PHAs and their constituents and are intended to be implemented quickly. It can be challenging for PHAs that have limited resources and are understaffed to implement the products and ideas developed in a PBT course. Following a successful PBT course, students from the class can help these agencies implement the solutions by extending the work with the agency through student practicum and internships. Another way to address this is for the faculty to further develop the solution with the agency and apply for grant or foundation funding to support the implementation and evaluation of the solution.

The 5-step framework, PBT STEPS, can be used by the faculty to design and teach PBT courses and ultimately to expand PBT more broadly within SPH and across public health disciplines. The PBT STEPS framework can extend beyond graduate SPH to other disciplines and professional degree programs interested in incorporating PBT into the curriculum.

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