Providing Pedagogy Education for Aspiring Instructors at Institutions Without Formal Pedagogy Curriculum or Undergraduate Populations

By Kirsten E. Coffman, Gabriel Martínez-Gálvez, Ashley K. Brown, William E. Matchett, and Bruce F. Horazdovsky

Mayo Clinic annually trains over 1,000 predoctoral students and postdoctoral research fellows in medicine and biomedical sciences. However, training opportunities are limited for those interested in teaching and mentoring undergraduates. Predoctoral students sought to provide practical, trainee-led, pedagogical learning opportunities. A survey sent to trainees regarding preferred pedagogy education format guided development of the Twin Talk. A Twin Talk is two sessions; first, a content expert discusses a pedagogical technique (Take-in), and second, volunteers practice the technique (Try-out). The success of each Twin Talk was evaluated via survey. Trainees preferred workshop-style pedagogy opportunities (N = 141 of 198 responses). Eighty-seven trainees have attended a Twin Talk, and 75% of Take-in attendees had a satisfactory understanding of the material. Trainees favored in-person expert presenters over videoconferencing. Modeling of the teaching technique was well-received (N = 9 of 10). In conclusion, Twin Talks show promise for trainee-led pedagogy experiences; however, Try-out participation has been limited. In-person expert presentations that utilize the technique are preferred at Take-in sessions. The Twin Talk will be refined to increase trainee participation in the Try-out sessions.

Mayo Clinic and the Mayo Clinic College of Medicine and Science provide annual training to nearly 200 PhD students, over 200 medical students, and nearly 800 postdoctoral fellows. However, the absence of a permanent undergraduate population at Mayo Clinic has limited the opportunities for trainees to gain teaching and mentoring experience. Additionally, there is no formal pedagogy training program available to trainees.

The trainees and faculty recognized the importance of pedagogy training and sought to fill the need through trainee-led instruction. To introduce trainees to the realm of pedagogy, a graduate student group organized a standard pedagogy seminar series. The first seminar resulted in low attendance but useful feedback. In assessing the potential shortcomings of such seminars, three possible issues were identified: (a) the required time commitment in a trainee population that already has various seminar and journal club requirements, (b) the inherent difficulty in trainee-led teaching of a topic that is yet unfamiliar to the presenters, and (c) the inability to apply what might be learned to a real-life situation such as lecturing to an undergraduate population. As a result of this experience, a survey was distributed to all trainees to gauge both interest in, and the most desired format for, pedagogy-focused learning. Overwhelmingly, students preferred a workshop-style event in which they could apply and practice what had been learned on a mock undergraduate population.

Driven by these survey results, the Twin Talk Series (TTS) was developed. A Twin Talk is a pair of 1-hour sessions, requiring minimal time commitment from attendees. The TTS recognizes the need for expert knowledge while also providing trainees with space for hands-on, workshop-style practice of pedagogy techniques that are relevant to the instruction of an undergraduate population. To date, eight Twin Talks have been delivered, with varying success. We discuss the organization of the TTS, event attendance and trainee feedback, and suggestions for implementing a TTS for any student type at any institution.

Methods

The present methods were reviewed by the Mayo Clinic Institutional Review Board and deemed not to fall under the category of human research; as such, informed consent was not required.

Pedagogy Interest Group formation

The Mayo Clinic Pedagogy Interest Group was formed by two predoctoral students to provide pedagogy resources to all graduate students, medical students, and fellows (collectively referred to as *trainees* from here

onward) interested in undergraduate teaching careers or developing their pedagogical expertise. The inception of this group was a grassroots effort founded and currently led by trainees who volunteer their time and appoint new leadership as necessary.

Pedagogy seminar

The first method for developing pedagogy education for trainees at Mayo Clinic was a pedagogy seminar, which was intended to be the first session of a regularly scheduled seminar. During this seminar, a faculty member led a discussion regarding the role of educators in fostering student patterns of helpless- or mastery-oriented responses based on the book *Self-theories: Their Role in Motivation, Personality, and Development (Essays in Social Psychology)* (Dweck, 1999). The discussion implemented a think-pair-share dynamic (Allen & Tanner, 2002; Lyman, 1981).

Survey assessing trainee need for pedagogy resources

To determine next steps following the pedagogy seminar, a two-question survey (see below) was distributed to all Mayo Clinic trainees using the Google Forms platform to assess interest in pedagogy resources:

1. Pedagogy is the study of the method and practice of education, and is extremely important to understand and develop if you are interested in teaching one day. Would you be interested in utilizing resources related to pedagogy in the future?

   - I am interested
   - I am somewhat interested
   - I am not interested

2. If interested or somewhat interested, which of the following resources are of most interest? Check all that apply.

   - Journal club setting
   - Online module
   - Class for credit
   - Class not for credit
   - Workshops
   - Other (free response)

TTS

In response to survey results, the Twin Talk and resulting TTS was developed. A Twin Talk consists of two paired sessions: a *Take-in* session and a *Try-out* session. During the Take-in session, an expert in a particular teaching technique presents the technique. During the Try-out session, trainees practice the technique by engaging fellow trainees as classroom participants, thus mimick-

TABLE 1

General information on attendance and format of Twin Talks to date.

Pedagogy technique	Take-in attendance	Take-in survey responses*	Take-in lecture format	Try-out volunteers	Try-out attendance**
Process-oriented guided inquiry learning (POGIL)	18	9 (56%)	Skype	4	17
Course-based undergraduate research experiences (CURE)	28	9 (36%)	Videoconference	N/A†	N/A†
Problem-based learning	22	9 (47%)	Videoconference	0	—
Backwards design	15	10 (83%)	In person	1	N/A#
Flipped classroom	25	10 (43%)	In person	3	9
Teaching philosophy	21	4 (22%)	Live streaming/ In person	N/A$	N/A$
Think-pair-share	12	6 (67%)	In person	1	TBD
Active learning spaces	15	4 (33%)	In person	N/A°	N/A°

Note: To date, eight Twin Talks have been offered in the order presented here. Try-out volunteers are those trainees who volunteered to role-play as the instructor at the second session.

*The leadership of the Mayo Clinic Pedagogy Interest Group count toward the Take-in attendance but are removed from the total for calculation of Take-in survey responses, as we did not fill out our own surveys. **Includes Try-out teacher volunteers, as they also served as students for other teacher volunteers within a given Try-out session. †The Try-out component of CURE was preparation of a mock curriculum, such that volunteers and attendance do not apply. #The teacher volunteer for backwards design requested to combine this presentation with flipped classroom. $The Try-out session for writing a teaching philosophy was replaced by a second Take-in session due to expert seminar organization. °There was no Try-out session planned (by design).

ing an undergraduate class environment (if applicable to the particular technique). To date, the TTS has included (see Table 1):

1. Process-Oriented Guided Inquiry Learning (POGIL; Eberlein et al., 2008; Moog & Spencer, 2008)
2. Course-based undergraduate research experience (CURE; Auchincloss et al., 2014; Bell et al., 2017; Corwin, Graham, & Dolan, 2015)
3. Problem-based learning (Chang, 2016; Eberlein et al., 2008; White, 2007)
4. Backwards design (Wiggins & McTighe, 2005)
5. Flipped classroom (Fulton, 2012; Herreid & Schiller, 2013)
6. Writing a teaching philosophy
7. Think-pair-share (Allen & Tanner, 2002; Lyman, 1981)
8. Active learning spaces

Twin Talk Take-in session

Teaching technique experts for the Take-in sessions were recruited by the Pedagogy Interest Group leadership through professional and personal connections, social media, cold-calls, and networking. Teaching technique experts from institutions across the country were recruited and included faculty from community colleges, universities, and academic medical centers. In addition to in-person presentations, experts also presented the Take-in sessions using videoconferencing platforms (because of resource and geographical limitations).

Invitations to Take-in sessions were sent to graduate students, medical students, and postdoctoral trainees via calendar invitation. Venues for the Twin Talks were coordinated through Mayo Clinic College of Medicine and Science because of the need for videoconferencing capabilities or special interfaces for educational tools, such as student response systems. Prior to each Take-in session, the expert provided any formal presentations, which were distributed during the Take-in session. Other classroom resources that may aid in successfully implementing a given teaching technique were also presented, including Immediate Feedback Assessment Technique (IF-AT) materials at the backwards design session and student response systems at the flipped classroom session. Furthermore, the flipped classroom Take-in session was conducted in the flipped classroom style in contrast to the didactic styles of all other Take-in sessions. The Take-in session on how to write a teaching philosophy was delivered via live online streaming as recommended by the expert presenters. This method allowed trainees to attend the session from their own laptops, participate in live polls, and communicate with the experts and other trainees via chat.

Following all Take-in sessions, attendees were also emailed a link to the following survey to assess various components of the session and their interest in practicing the teaching technique during the Try-out session:

- I understand what [*insert teaching technique*] is
- How did you feel about [*insert Take-in format—Skype, videoconferencing, or in-person*]
- Feedback on room where Take-in session took place [*e.g., sound quality, video quality, or room layout*]
- Are you interested in future meetings related to [*insert teaching technique*]
- Are you interested in practicing [*insert teaching technique*]

Twin Talk Try-out session

When applicable, trainees interested in practicing the technique after the Take-in session were contacted via e-mail to schedule as many Try-out sessions as needed. If no trainees were interested, then no Try-out session was scheduled (as was the case with problem-based learning). An online poll was used to determine availability and schedule Try-out sessions. After trainees presented to fellow trainees, assessment for the presenter was obtained from attendees immediately through individual feedback questionnaires. Of note, for CURE the attendees were invited to develop a mock curriculum to be reviewed by the content expert instead of the opportunity to implement the technique.

Results

Survey assessing trainee need for pedagogy resources

In response to an unsuccessful initial pedagogy seminar series, feedback was elicited from Mayo Clinic trainees regarding interest in, and the ideal format for, pedagogy education. Over 85% (141 out of 198 responses from approximately 1,200 survey recipients) of trainees were at least somewhat interested in pedagogy resources, with over half (N = 109) being genuinely interested. Regarding the preferred pedagogy resource, the practical experiences/workshops received the plurality (N = 141) relative to other proposed resources (Figure 1).

TTS

We developed the TTS to address the limitations behind our initial pedagogy seminar initiative and to satisfy the demand for workshop-style pedagogy training informed by our exploratory survey. Over the past 18 months, the Mayo Clinic Pedagogy Interest Group has supported the pedagogical training of 87 distinct students, postdoctoral research fellows, faculty, and employees through the TTS. Eight Twin Talks have been scheduled since July 2016 with varying attendance, and the majority of attendees

have been either graduate students or postdoctoral research fellows (an average of 47% and 39%, respectively, of total attendees; Table 1).

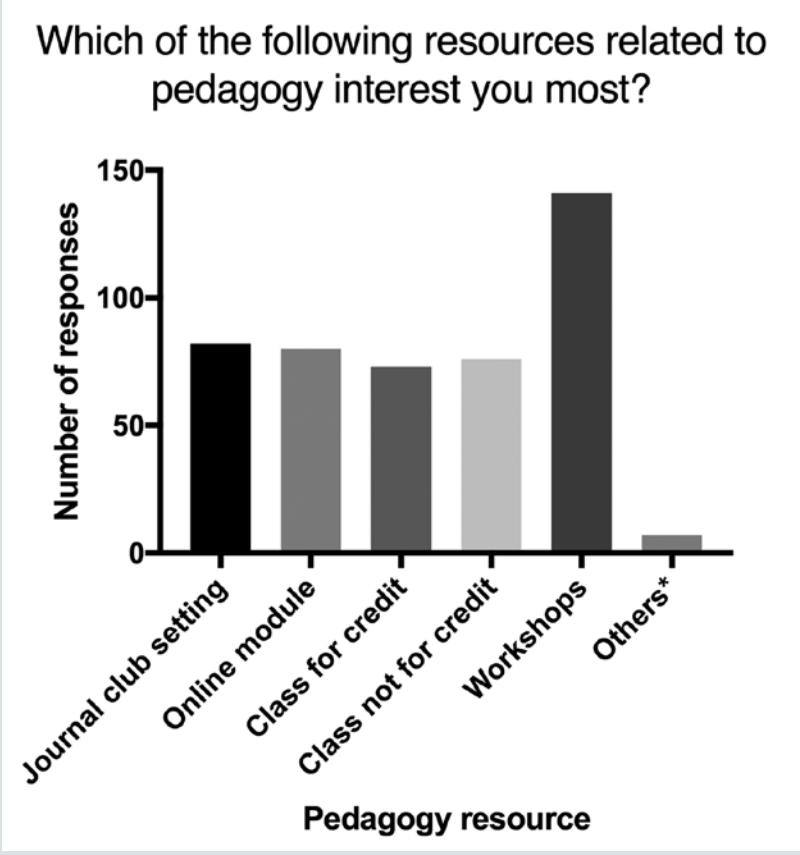
Take-in feedback

Short surveys were used after each Take-in session to assess its impact and to determine interest in the accompanying Try-out session. Survey respondents expressed, on average, a 75% satisfactory understanding of the pedagogy material delivered during the Take-in session. Interest levels for the Try-out session were variable between Twin Talks, with those on CURE and problem-based learning being the least attractive to trainees. In general, Take-in session attendees were moderately interested in practicing the teaching strategies during the Try-out sessions. However, this interest was sometimes not realized for certain Try-out sessions, where only a handful of trainees followed through with a practice presentation (see section on Try-out feedback).

The short surveys sent to attendees following the Take-in sessions also gathered opinions on other aspects of the event. The Take-in session from the first three Twin Talks involved learning the pedagogical technique from the expert virtually through videoconferencing platforms (Table 1). Over 50% of attendees expressed that videoconferencing decreased the value of the talk or made it uncomfortable. Bearing the negatives of videoconferencing in mind, funding was obtained for the fourth Twin Talk expert to visit in person to present backwards design. Feedback was positive, with 90% of respondents agreeing that in-person sessions were superior to previous methods (Figure 2A). Additionally, feedback from trainees and Take-in presenters alike highlighted the irony of using a didactic format to deliver information on nondidactic teaching techniques. In response, we worked together with a local educator to use a flipped classroom format to deliver the Twin Talk on the flipped classroom technique. Ninety percent of survey responses expressed that the change in format helped with their understanding and engagement (Figure 2B).

FIGURE 1

Preferred pedagogical resources assessed by trainees. Tallied answers to an online survey sent to trainees including graduate students, postdoctoral fellows, and other health professionals (*n* = 198). Workshops stand out as the most popular resource among survey respondents. *Aggregate of free response ideas.



Try-out feedback

To better understand the low Try-out session attendance, a survey of Take-in attendees to date was conducted. As expected, the time commitment was too large for many trainees, both if they were to attend as a mock student or a mock teacher (37.5 and 42.8%, respectively; Figure 3). To our surprise, survey results also showed that a substantial proportion of respondents did not understand what being a mock student and/or mock teacher at a Try-out session meant (50.0 and 28.6%, respectively; Figure 3).

Nevertheless, survey responses also suggested that overall the Twin Talk has proven valuable to attendees. Over 50% of attendees reported that they have already used what they learned at a Twin Talk, and over 85% reported that they think they will use what they have learned at a Twin Talk in the future ($N = 15$ survey respondents; data not shown).

FIGURE 2

Trainee assessment of changes in the Twin Talk format. A. Survey responses from attendees (*n* = 10) of the backwards design Take-in session after changing from a virtual format to an in-person format. Only 10% of respondents were agnostic to the change. B. Survey responses from attendees (*n* = 10) of the flipped classroom Take-in session. Ninety percent of respondents agreed that using the technique to explain the technique helped their understanding and engagement.

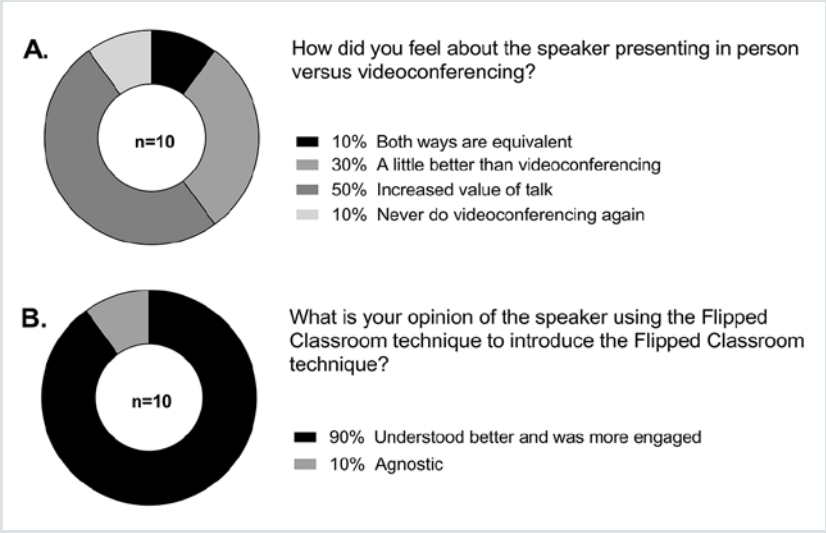
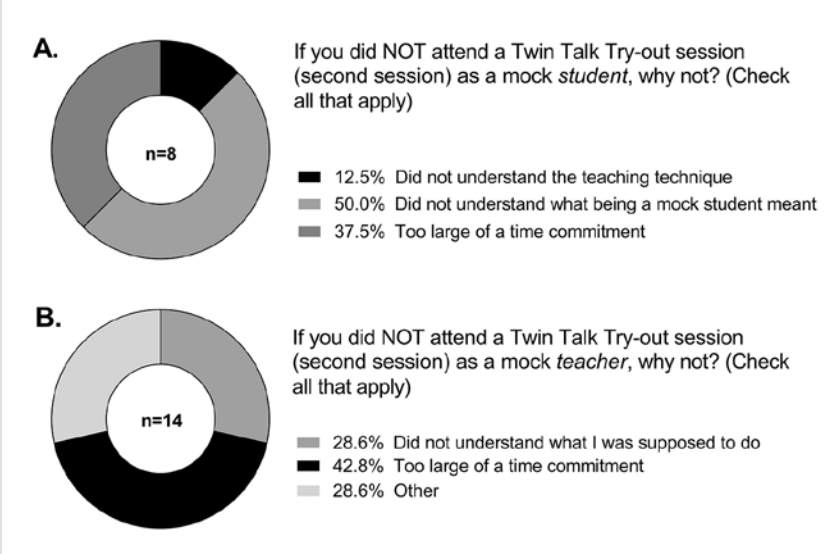


FIGURE 3

Trainee assessment of reasons for not attending the Twin Talk Try-out session, either as a mock student (A) or a mock teacher (B). As expected, many trainees reported that attending was too large of a time commitment. Surprisingly, many trainees reported that they did not understand the purpose of the Try-out session.



Discussion

Many Mayo Clinic trainees are interested in understanding and developing pedagogical skills, particularly those relevant to teaching in an undergraduate environment. However, the lack of an undergraduate population and limited pedagogy resources presented a challenge to trainees. In response, the TTS was developed to meet the expressed interest of trainees for practical experiences/workshops to learn these skills. The Take-in sessions were well attended by trainees and have resulted in the majority reporting an understanding of the pedagogical technique discussed. The Try-out sessions were less well attended, both by those interested in practicing the technique as well as fellow trainees.

We have several ideas to improve attendance, both by "instructors" and "students," at the Try-out session. First, we plan to assess participation interest in-person immediately following the conclusion of the Take-in session. In this way, we can reach attendees that may otherwise not complete the online survey. Another effort to improve Try-out attendance includes partnerships with local undergraduate universities to give interested instructors the opportunity to teach actual undergraduates as teaching assistants or as invited lecturers. Additionally, the possibility of having instructors try out techniques online with partner institutions abroad is being discussed. Finally, because survey results showed that many Take-in session attendees did not understand the Try-out session, we plan to present a better description of the Try-out session, including example material, during the Take-in session.

Another hypothesis for the limited interest in Try-out sessions is the nature of certain teaching strategies. For example, whereas POGIL is a standalone technique that can be implemented for one concept during

one session, CURE requires multilecture integration to be successful and is therefore difficult to implement as a Try-out session. In recognizing this feature of CURE, the Try-out session instead involved a meeting where one trainee presented on their past experience as a teaching assistant for a CURE curriculum. Attendees were then invited to directly contact the CURE expert (with the expert's encouragement) for critique of an individually prepared mock CURE curriculum. Although focusing attention on standalone techniques may limit the scope of pedagogical skills we can offer, we feel that this is a necessary trade-off in developing a TTS that elicits volunteer interest in the Try-out session.

We also acknowledge the difficulty of translating novel pedagogy theory into proper enactment by trainees who have been exposed to traditional teaching methods the majority of their lives. Theoretically, the challenge of consistently attracting trainees to Try-out sessions may be evidence that trainees themselves lack awareness of this issue. Nevertheless, Try-out sessions are arguably equally as important—or perhaps even more important—than Take-in sessions. Thus, we plan to include enactment simulations at Try-out sessions on the learning technique presented during the Take-in session; we hope that this will be a useful, albeit imperfect, step in the right direction (Kennedy, 1999).

We have also learned several positive aspects that improved the TTS. Transitioning from a videoconferencing format to an in-person format was preferred by trainees. Furthermore, at our flipped classroom Take-in session, the expert presenter used the flipped classroom to teach the technique. Attendees felt that demonstrating the technique being taught improved their learning. As a result, we plan to encourage presenters to incorporate the use of the given technique during future Take-in sessions.

Implementing a TTS

There are several other aspects to consider when implementing a Twin Talk at your institution, including logistical details, funding, and survey response rates. First, logistical details can affect attendance, including the time of day and room location. Specifically, we have observed that when sessions are held within the research building over the lunch hour, attendance is greater. Funding can also become an important determinant of success. Although we have discussed the superiority of in-person presenters, this often requires travel reimbursement and honoraria. Thus, an institutional funding commitment is required to implement the most effective version of the TTS presented here. Finally, we have observed a lower than ideal response rate to trainee surveys, both regarding Take-in feedback as well as interest in follow-up Try-out sessions. Up to this point, we have e-mailed surveys to attendees following the Take-in sessions. In the future, we plan to offer paper surveys immediately following the Take-in sessions.

Conclusion

In conclusion, we are confident that the TTS can enable trainee-led groups to acquire specific knowledge, such as pedagogy for undergraduate teaching/mentoring, and put it into practice. In general, the TTS requires minimal funding and a low trainee and expert time commitment while also fulfilling the need for practical, workshop-style events. To implement a TTS, we recommend a committee of 2–4 trainees to recruit expert presenters, schedule and advertise events, and collect attendee feedback. We believe that the TTS can be especially advantageous at institutions where there is no (or limited) undergraduate population and/or no formal pedagogy courses, such that actual teaching opportunities are limited. Although we continue to further address the weaknesses of both sessions of a Twin Talk, the TTS at present still provides useful advantages that we feel are worth refining. All in all, the TTS appears to be a promising educational format for practical pedagogical training of graduate students, medical students, postdoctoral fellows, and faculty. ■

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