

Board 14: Work in Progress: Co-creation of Teaching Team Competencies and Values

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Introduction

Biomedical engineering (BME) is a highly interdisciplinary field, combining traditional engineering disciplines with biology and medicine. Because of this interdisciplinary nature, a team teaching model, where expertise of multiple instructors is brought together, can be used to deepen student learning in BME courses. Team teaching in other disciplines has been shown to enhance student learning and can also benefit the instructors of a teaching team [1], [2]. To achieve these benefits, the instructors must work effectively as a team and consciously incorporate the strength of team teaching into the course design [3], [4]. However, evidence-based strategies that support the effective collaboration of teaching teams are lacking.

The goal of this work-in-progress is to establish methods that foster the development of effective teaching teams through the creation of upper-level senior/graduate BME courses. The authors developed a series of six virtual workshops to facilitate collaborative design of five BME courses and the co-creation of team competencies and values, with the goal of fostering effective learning and team teaching outcomes. By the end of the collaborative course design program, teaching teams submitted their course syllabi for college approval, drafted an orientation for new team members, and added a reflection of the team teaching to the post-delivery course evaluation process. The aim of sharing the process as well as the results of the workshop series evaluation, is to provide strategies for the BME community in adopting an effective team teaching model.

Methods

Collaborative course design program. The Ohio State University's Drake Institute for Teaching and Learning offers a Course Design Institute (CDI) [5] program based on Backward Design [6], which supports individual instructors in developing or redesigning a course. The authors adapted materials from the CDI to support collaborative course design and incorporated specific activities to encourage teaching teams to identify and build their own team teaching competencies and values. The content of this program was delivered through six virtual (Zoom), two-hour workshops over four months. The workshops were co-facilitated by the authors, one curriculum and instruction specialist and two BME teaching faculty. Participants included 12 BME faculty previously placed on one of four teams to teach advanced (senior undergraduate/graduate-level) courses. Microsoft Teams was used to disseminate workshop materials and as a platform for teams to collaborate on program deliverables and course development.

The process of modifying the CDI program was informed by Tuckman's model of small group formation [7], [8] in which teams evolve through five stages of development: forming, storming, norming, performing, and adjourning. To support the teams through the storming stage, in which there is often conflict and uncertainty on roles within the team, content was presented drawing parallels between successful collaborative research projects and team teaching, specifically the ideas of a shared theoretical framework and agreement on author roles. Each faculty participant was then prompted to identify their own core values regarding teaching and course goals, before joining their team to collaborate on a shared set of values and goals. Participants were also prompted to explicitly identify the role and responsibilities of each member of their teaching team. The shared values and course goals were further codified into a document with the goal of

orienting a new team member (Appendix A). The group was also challenged to develop a survey for evaluation of their team dynamics and achievement of their course goals, and to use it as a tool for self-reflection on the team teaching experience. This survey addresses the adjourning stage of Tuckman's model after the delivery of the course (Appendix B). Co-development of these survey questions further affirmed the teaching team's shared values and competencies.

Evaluation of faculty perceptions of the impact of the collaborative course design program

Kirkpatrick's Four-Level Model for evaluating training and learning programs [9] was used to assess the impact of this collaborative course design program. Kirkpatrick's model has previously been used to evaluate a wide variety of training programs, including faculty focused training [10]–[13]. Level 1 of the Kirkpatrick model, Reaction, measures how well received the training was by the participants and how applicable the training was to their work. Level 2: Learning focuses on how the training program helped participants develop skills and knowledge related to the learning objectives of the training program. In Level 3: Behavior, assessment is focused on application of the training and behavioral changes. Finally, Level 4: Results identify the actual outcomes and benefits of the training program to the organization.

In this initial work, we assessed Level 1: Reaction and 2: Learning with an anonymous survey administered at the conclusion of the workshops. A second survey on Level 3: Behavior was collected after the teams worked together for several months and completed their course design. Survey questions were adapted from [13] (Appendix C). The surveys were administered using Qualtrics, an online survey tool. All data were collected through an approved Institutional Review Board (IRB) protocol, and consent to participate was obtained from all participants.

Results

Two surveys were administered, 1) to assess how the collaborative course design program impacted the faculty participants' perceived competencies within the teaching team and 2) to assess participants' abilities to achieve their personal teaching goals. The first survey evaluated the program's delivery and also included a focus on Kirkpatrick's Level 2: Learning. Overall, all survey participants (n=11) had favorable impressions of the program, including positive perceptions of the content, virtual format, and program facilitators (**Figure 1**). Participants were less positive about the use of Microsoft Teams for sharing material and as a collaborative tool. Results from the first survey also indicated over 80 % of participants strongly agreed or agreed that the workshop series "aided my role as an effective member of a teaching team" and "will help me to meet my teaching goals". The second survey evaluated Kirkpatrick's Level 3: Behavior (**Figure 2**). While this survey received fewer responses (n=6), most participants agreed that the program helped them to develop team teaching skills and succeed in their work, as well as motivated them to learn more. For the survey question "Some aspect of my teaching changed", most participants agreed with this statement, however none strongly agreed. Perhaps this could be attributed to the survey being conducted before the actual teaching of the course, making it difficult for participants to feel confident in this response.

Discussion and Future Work

This work-in-progress describes the initiation of a Backwards Design [6]-based collaborative course design workshop and preliminary evaluations of its impacts on participants' team teaching values and competencies. Initial results indicate positive participant perception of the program and perceived enhancement of team teaching skills. Future work will include the

evaluation of Kirkpatrick's Level 4: Results, and the impact on student learning, including gathering students' perceptions on how team taught courses support learning and assessing students' achievements of course learning outcomes. The authors are also interested in increasing the sample size for faculty participants. As this program was designed in a virtual format, it should be amenable to delivery across different disciplines and even different universities.

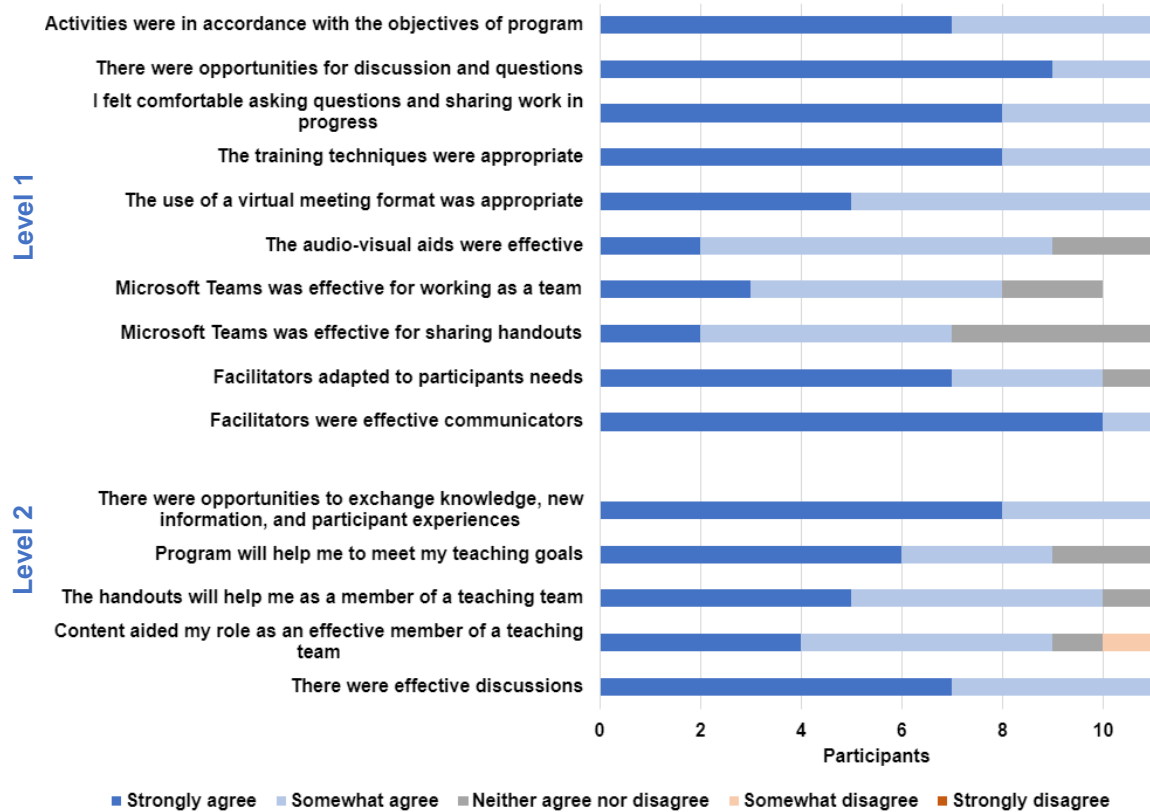


Figure 1. Survey 1, assessing participants' perceptions of the course design program at Kirkpatrick's Level 1: Reaction and Level 2: Learning. (n=11)

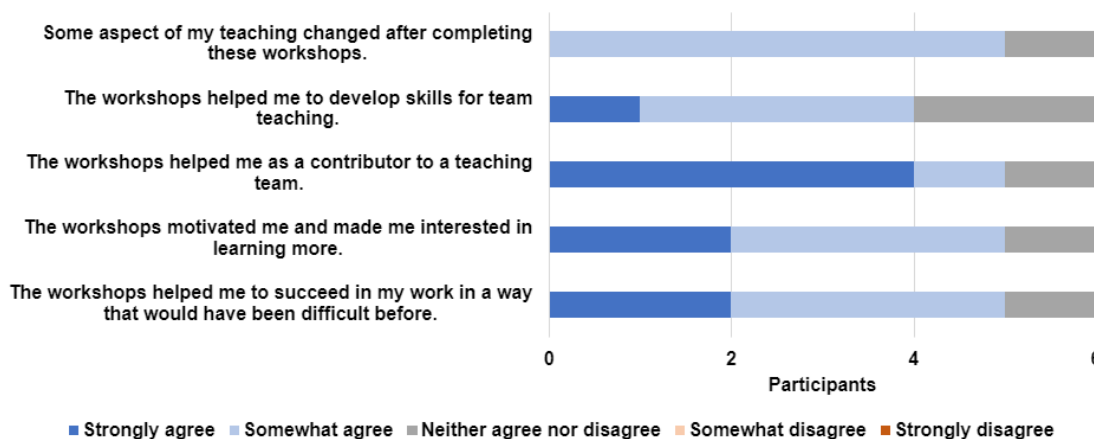


Figure 2. Survey 2 assessing the impact of the course design program on Kirkpatrick's Level 3: Behavior of the participants (n=6).

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Appendix A

Integrating a new member to a teaching team

Orienting a new teaching team member

- 1) Reviewing and updating “Big Rocks” of the course.
 - a) Have new team member identify their “Big Rocks”
 - b) Meet as a team to share and revise “Big Rocks”
- 2) Share team values, organization, and processes
- 3) Have new team member shadow classes
- 4) Share material repository
 - a) Course development documentation
 - b) Syllabi, lectures, assignments, exams, activities
 - c) Material from related courses
- 5) Share logistical information
 - a) Learning management site (e.g. Canvas, Blackboard)
 - b) Consistency in grading between instructors, previous rubrics
- 6) Help make connections with industry, guest speakers, university services (e.g., Student Advocacy and Disability Services, Technology Transfer Office, Career Services)
- 7) Facilitate social events with new faculty

Appendix B

Assessing the adjourning stage of team development after course delivery

Teaching Team reflections:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1) The team made progress with regards to the “Big Rocks” for the course and program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Team organization facilitated teaching and learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Team communication was effective.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) What went well?					
2) What would you improve next time?					
3) What is one thing you would do to improve the team process?					

Appendix C

Survey Questions

Survey 1 – Kirkpatrick Level 1: Reaction and Level 2: Learning

1. The facilitator(s) prepared activities appropriately and in accordance with the objectives of the program.
2. The facilitator(s) adapted to participants needs.
3. The facilitator(s) was an effective communicator.
4. The facilitator(s) aided effective discussions.
5. The facilitator(s) gave trainees an opportunity to discuss and ask questions.
6. The subject content in the workshops aided my role as an effective member of a teaching team.
7. The audio-visual aids were effective.
8. The handouts provided will help me in my role as a member of a teaching team.
9. I feel that the program will help me to meet my teaching goals.
10. The use of a virtual meeting format in Zoom was appropriate for the nature of the workshops.
11. The training techniques (open discussion, breakout rooms, handouts) were appropriate for the training situation.
12. I felt comfortable asking questions and sharing work in progress.
13. The use of Microsoft Teams was effective for sharing handouts.
14. The use of Microsoft Teams was useful when working on activities within small groups.
15. The workshops provided an opportunity for the exchange of new information, knowledge, and experiences among participants.

Survey 2: Kirkpatrick Level 3: Behavior

1. The workshops helped me to succeed in my work in a way that would have been difficult before.
2. The workshops motivated me and made me interested in learning more.
3. The workshops helped me as a contributor to a teaching team.

4. The workshops helped me to develop skills for team teaching.
5. Some aspects of my teaching changed after completing these workshops.

Responses were on a five point Likert Scale:

Strongly disagree, Disagree, Neutral, Agree, Strongly agree