

Observations, reflection, and goal setting, support development of evidence-supported pedagogy in engineering peer educators

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Abstract

In higher education, the role of undergraduate educators is growing. Teaching teams in large courses often have a mix of graduate and undergraduate teaching assistants (TAs). We employ and train undergraduate 'Academic Excellence Workshop (AEW) Facilitators' who, in pairs, lead weekly collaborative learning sessions that parallel challenging core courses. In training sessions, we introduce and model evidence-supported pedagogies, and facilitators reflect on and share the successes and challenges in their workshops. At mid-semester, peer and staff observations occur and facilitators are evaluated by their students. Subsequently, facilitators submit a reflection and goal-setting document that asks them to respond to feedback, identify their strengths and challenges, and articulate changes they will enact to address the challenges and improve their teaching practice. We used data from end-of-semester surveys, student mid-term evaluations, and facilitators' reflections on those observations and evaluations, to show that a training sequence including observation, reflection, and goal setting can guide undergraduate education leaders to inclusive and student-centered practices that can positively impact student learning.

Introduction

The growth in the employment of undergraduate educators in higher education is driven, to some degree, by financial efficiency, and many studies that report overwhelmingly positive effects of peer TAs on student learning (Luckie et al, 2020). We employ and train undergraduate 'Academic Excellence Workshop (AEW) Facilitators' who, in pairs, develop and lead weekly, one credit, 2-hour sessions that parallel challenging core courses taken primarily by first and second-year engineering students.

In written applications and interviews, most facilitators profess a passion for explaining things in different ways, breaking down problems into pieces, gleaning any comprehension issues, and putting the information into terms that make sense to fellow students. With these teacher-centered skills alone, they can be excellent resources for their peers. However, training these talented students in evidence-supported, student-centered pedagogy is worthwhile (Sana et al, 2011). An examination of student retention in subsequent STEM courses after working with trained undergraduate teaching assistants, revealed that these students were 3X more likely to advance into a second semester in a challenging chemistry series as compared to those who did not have the benefit of the trained undergraduate TAs (Philipps et al, 2016). In addition, peer educators enrolled in a training that includes collaborative learning and reflection (among other student-centered practices) have been shown to receive higher teaching assistant evaluations than those with no additional training (Sana et al, 2011). Harvey et al, (2016, pg 9) defined reflection as "... a deliberate and conscientious process that employs a person's cognitive, emotional and somatic capacities to mindfully contemplate on past, present or future (intended or planned) actions in order to learn, better understand and potentially improve future actions." This key practice supports transformation of experience into understanding (Veine et al, 2019).

The goals of the AEW facilitator training program are to 1) develop undergraduate students as effective facilitators of inclusive student-centered learning techniques to improve learning outcomes, and 2) to enhance facilitation, teamwork, communication, and leadership skills among undergraduate peer educators. To do this effectively, our training includes having facilitators build community, model and practice evidence-supported strategies, and share ideas within disciplinary cohorts and across the facilitator community. We employ several forms of feedback through the semester so that peer educators collectively and independently reflect on practices and implement improvements within a semester.

Feedback to facilitators - from program staff, peers, and enrolled students – is intended to alert facilitators to whether, and how well, their facilitation strategies are contributing to achieving program objectives. After receiving the feedback, facilitators are asked to submit a written reflection, and to engage in an additional goal-setting exercises, to articulate future intentions for adjusting their approaches. The key outcomes for these undergraduate educators are an enhanced understanding of their strengths and challenges, and greater ownership and motivation to improve their teaching and facilitation practices. We show that feedback (from observations and student evaluations), reflection, and goal setting can guide undergraduate educators toward inclusive, student-centered practices that can positively impact the perception of student learning.

Methods

Workshop structure and development

Training workshops occur 7 times per semester for 1.5 hours each (except for a longer ‘new facilitator training’ initially). Workshops introduce and model creating inclusive structure and facilitating evidence-supported collaborative learning. Trainings are developed by professional staff in collaboration with two, experienced “Co-lead” facilitators. These student program leaders are integral in communication and support for the team of peer educators, and in exemplifying the key practices, as they develop their own leadership skill through this role. Topics and learning outcomes objectives for each training workshop derive from the goals of the AEW program. In all trainings, facilitators engage in and reflect on specific pedagogical strategies and share ideas, successes, and challenges of their own workshops.

Peer observations and student mid-term evaluation surveys

At mid-semester (typically weeks 5 or 6), facilitators conduct one peer observation and are observed by 2 peers and at least one professional staff leader. Concurrent with peer observations, mid-term evaluation surveys are completed by students in the AEW sessions. In mid-term evaluations, students are asked sets of Likert-scale questions about the workshop climate, specific individual facilitator practices, and the way in which small group collaboration is structured and guided. Additional narrative responses are encouraged and analyzed. Questions in the mid-term evaluation are specifically aligned with the goals of the program and the specific objectives for facilitator training. In this way, we can analyze four sets of perception data: Peer and staff perceptions from observations, the perceptions of facilitator practices by their students through mid-term evaluations, and the facilitators’ own perceptions through the feedback reflection in the end-of-semester survey. These linked analyses are important for program design and improvement as the findings inform the ongoing development of facilitator training and mentoring practices for upcoming semesters and years. However, most important for the development of individual peer educators and peer educator teams is their own review and reflection on the observations and evaluations that apply to their personal practice and workshops. Once peer observations and student mid-term evaluations are closed, Facilitators submit a guided reflection and goal-setting document that asks them to respond to the combined feedback,

identify their strengths and challenges, and articulate changes they will enact to address the challenges and improve their teaching practice. The data used for this work is from the Fall 2021 semester.

Results and Discussion

Reflection surveys begin with asking facilitators their 'level of agreement' regarding the fairness of the feedback on both observation and evaluation feedback, and whether the feedback is 'actionable'. Responses suggest that between 93 and 95% of facilitators agreed to some degree that the feedback was fair and representative and 95% agree that the feedback was actionable (Table 1). Because only one or two sessions were observed, some level of disagreement with the questions about fair representation from peer observations was expected. Student mid-term evaluation feedback is based on multiple experiences in the workshops. 'Actionable feedback' is critically important to making change.

Table 1. Summary of Facilitator end of semester survey. Perception of meeting our training objectives (n=56)

Question	%Strongly agree	%Somewhat agree	%Neither agree nor disagree	%Somewhat disagree	%Strongly disagree
I feel that that the feedback I received from my students is a fair representation of my teaching practices.	66	29	4	0	1
I feel that that the feedback I received from my peers is a fair representation of my teaching practices.	63	30	7	0	0
The feedback that I received from my peer observers is 'actionable'	66	30	4	0	0

Subsequent to identifying strengths and challenges from the combined feedback, the action items that facilitators articulated were encouraging. The strategies most mentioned by students during goal setting were those most emphasized in trainings, in observation rubrics, and in student mid-term evaluation questions. The following are representative actions that facilitators said they would take in their goal-setting process following feedback reflections – underlined are the key components that relate to our training emphases, ***bold and italic*** are associated themes:

*I will work on engaging more to seek out students who aren't proactively asking questions because it's likely they are the ones most in need of help. (***inclusion***)*

*I will work on facilitating collaborative learning rather than using the traditional model of learning. I have completely eliminated the lecture portion of our AEW and opted for a 30 min "warm up" section with somewhat "easy" examples at the beginning of class. (***Collaborative learning, student-centered***)*

*I will work on mixing up groups more and getting my students out of their comfort zones so they get an experience to work with everyone in the class ... I will implement the change by using the grouping activities that were taught in trainings. (***intentional grouping***)*

*... I will do this by putting more interactive examples in the lecture where students can work together to apply any material ... I should put an emphasis on students recalling what they already learned in lecture. (***retrieval practice***)*

*Another thing that I will work on is adding written objectives to every lecture, either in a slide deck or at the top of the chalkboard." (***Sharing learning objectives***)*

Approximately 90% of facilitators surveyed at the end of the semester broadly agreed that structured training workshops and accompanying feedback allowed them to experience student-centered learning,

implement changes throughout the semester, and learn and practice student-centered facilitation (Table 2). Data in Table 3 is extracted from student mid-term evaluations and suggests that facilitators are implementing these practices in their workshops. Ideally, we would be able to compare mid-semester student evaluations to end-of-semester student evaluations. However, due to the number of evaluations students are currently asked to complete, we choose to focus on the formative feedback rather than the summative so that there is time for reflection and goal setting. Moving forward, we can follow multi-semester facilitators and examine trends in paired mid-term evaluations.

Table 2. Summary of Facilitator end of semester survey. Perception of meeting training objectives (n=56)

Question on AEW Facilitator end-of-semester survey regarding training objectives	%Strongly agree	%Somewhat agree	%Neither agree nor disagree	%Somewhat disagree	%Strongly disagree
Experience what it is like to create and maintain a student-centered learning environment.	54	36	5	4	1
Implement improvements and reflect on practices throughout the semester in which they are facilitating learning.	57	32	5	2	4
Continue to gain and apply skills with active and student-centered learning facilitation.	54	36	7	2	1

Table 3. Summary data from AEW student mid-term evaluations regarding the role of facilitators in key pedagogies for evidence-based practices

Question on student mid-term evaluation	Mean	Mode	StDev.
Does your facilitator show concern for the students' learning?	4.6	5	0.6
Does your facilitator promote group interaction?	4.6	5	0.5
How often does your facilitator interact with your group(s)?	4.5	5	0.7

Conclusions

This paper emphasizes the value of mid-semester peer and staff observations and student mid-term evaluations (which align with the program objectives and the observation rubric). When reflection and the articulation of future actions follow feedback from peers and enrolled students, undergraduate educators gain an enhanced understanding of their strengths and challenges and greater ownership and motivation to improve their educational practices. In summary, we show that feedback, reflection, and goal setting can guide undergraduate leaders to inclusive, student-centered practices that can positively impact the perception of student learning.

Literature Cited

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