



Lessons Learned: Collaborative Faculty Development in Civil Engineering—Moving from an Individual Practice of Teaching to a Community of Scholars of Teaching and Learning

Dr. Elizabeth G. Jones, University of Nebraska, Lincoln

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Introduction

Teaching practices falling under the general area of active learning have been shown likely to improve student learning outcomes in undergraduate STEM courses (Freeman, Eddy et al. 2014). At the University of Nebraska-Lincoln (UNL), an NSF funded project has sought to raise awareness of and support proficiency in active learning in STEM. Several UNL civil engineering faculty have participated in the activities of this program and individually they have implemented teaching practices such as peer instruction in their classes. To better support efforts of individual civil engineering faculty (both those participating in the NSF funded program and those not) in the use of active learning teaching practices, a group of civil engineering faculty have formed a collaborative group that seeks not only to instill excellence in their individual teaching but also to move their teaching from the private and informal practice of teaching to the more systematic and public scholarship of teaching and learning (SoTL) (Kern, Mettetal et al. 2015).

The collaborative faculty group is similar to a Faculty Learning Community (FLC). FLCs are defined by Layne, Froyd et al. (2002) as sustained models for professional development that are designed “to facilitate and support collaborative learning environments in which faculty first explore and broaden their understanding of learning and then investigate alternative approaches to teaching.” Cox (2004) adds to the definition in terms of size (six to fifteen members) and focus on yearlong projects undertaken in a structured process of biweekly seminars. Another structure similar to our collaborative faculty group is a teaching circle. Quinlan (1996) describes teaching circles as less formal structures than FLCs. Teaching circles, as described by Quinlan, are a structured group collaboration developed to assist faculty participants with their own personal objectives, agendas or concerns in a seminar type of setting. We have defined our collaborative faculty group as a teaching and learning circle (TLC) as we have structured it to be more of a seminar format, like FLCs and teaching circles, but with less formality and less structure than FLCs. Even though our TLC is less structured than FLCs, our TLC is committed to grounding our work in the scholarly literature and using “evidence-informed approaches” (Vajoczki, Savage et al. 2011) to produce peer-reviewed publications/ presentations. Our TLC also differs from FLCs and teaching circles as our TLC resides in one department, Civil Engineering.

Our TLC is an outgrowth of curriculum reform where we recognized that without changes in how we teach, we were likely to not make the curricular changes we were envisioning. The goal of the group is to establish a robust culture of SoTL in the department. The specific objectives are to 1) identify active learning teaching practices of interest to the group through collective reading and discussion of books like “Small Teaching” (Lang 2016), 2) become familiar with the larger scholarly literature for the practices identified, 3) develop class material incorporating the identified practices with fidelity, 4) work with discipline-based educational researchers to develop systematic research to test hypotheses about the teaching practices, and 5) present the results of the research in peer-reviewed publications/ presentations.

Metrics of Success for the TLC

We started our TLC in late April 2017. In this short time, we've had to quickly adapt to keep the group meaningful to the participants and have learned several lessons along the way. The first was that while we had initial support from our department chair, we would need to demonstrate our effectiveness if we were to have credibility with most of the department, including those participating in the TLC. Thus, we defined metrics to track our progress that include metrics that we expect to change in one to two years and metrics that may take longer to see effects of the TLC work. The shorter-term metrics chosen are the Teaching Practices Inventory (Wieman and Gilbert 2014) and student evaluation scores. The longer-term metrics include student attitudes and student success. Student success for us will be defined by retention rates, diversity, and graduation rates (van den Bogaard 2012). Only baseline information for the one shorter-term metric is presented in this paper. In addition, we also track the number of faculty attending the TLC. Our attendance has ranged from 3 to 11 with a total of 14 different faculty attending at least one meeting. There is a total of 30 faculty in the department where faculty are defined as tenured and tenured track faculty and non-tenure track faculty (professors of practice and research faculty). We define faculty participating in the TLC as those attending at least two meetings of the TLC from May through December 2017. As of December 2017 we have 11 faculty regularly attending TLC meetings.

The short-term metric reported in this paper is that of student course evaluations. The student evaluations are on a scale of 1 to 5 with 5 being the best score. The scores averages reported are those use by the department as part of the annual evaluation process. For the Fall 2017 semester, the student evaluation average for the department as a whole was 3.88/5.0. The average for those participating in the TLC was 4.34/5.0. Note that the department average includes those participating and not participating in the TLC. These data are routinely collected and were reported for use in this paper as aggregate information (department wide average) or through voluntary anonymous reporting (TLC average).

At the beginning of the Fall 2017 semester, the department chair approved collection of information on teaching practices in department courses using Wieman and Gilberts' (2014) Teaching Practices Inventory (TPI). This inventory characterizes teaching practices used in science and mathematics courses. Hsieh (2016) has shown its usefulness to also characterize teaching practices in engineering courses. In our use of the TPI, we have used the original TPI of Wieman and Gilbert (2014) and have used it for non-lab courses. We have collected TPI data for Fall 2017 courses. The data were initially collected without the intent of using it for purposes other than seeing what type of information might be collected. We had not considered using it to assess the TLC. We are in the process of obtaining consent from faculty to use the Fall 2017 TPI data for the purpose of assessing the TLC. We expect that consent will be given from the faculty but as we do not have this consent at this time, we are not reporting the initial TPI data. To date, the TPI has only been collected for Fall 2017.

What we did learn from the initial exploration of the Fall 2017 TPI results is that not all faculty understood terms and phrases used in the TPI to describe teaching practices. We also learned that some faculty did not believe that this would not be used to evaluate their teaching as part of

their annual review. This is why we sought and have gained IRB approval so that the participant consent form makes it clear that the TPI data will not be used as part of the faculty annual evaluation. We are also working to better explain terms and phrases used in the TPI. We expect that a clear consent form and better understanding of the TPI will result in more accurate reporting on future uses of the TPI.

Lessons Learned

In addition to realizing we needed metrics for success as an early lesson learned and pursuing IRB approval, the TLC has learned several other lessons that are described in this section.

Initially the TLC meetings were scheduled based on allowing as many interested faculty to attend as possible. This worked well for the monthly meetings during Summer 2017. It did not work as well for Fall 2017 meetings. Based on feedback from those desiring to participate and to have the TLC be successful, we now schedule our TLC meetings on the same day as our monthly department faculty meetings. The attendance at Spring 2018 TLC meetings (two meetings so far in Spring 2018) is averaging 6 faculty per meeting which is higher than any TLC meeting in Fall 2017. The four Fall 2017 TLC meetings averaged 4 faculty per meeting.

Public support from the department chair is important for faculty participation, although having the chair at the TLC meetings can stifle conversation, as we learned in the one TLC meeting that the department chair attended. We have learned that it is important to keep the TLC a “safe” environment that is separate from perceived formal job evaluation, especially for the non-tenured and non-tenure track faculty. This lesson learned is supported by Cox (2004) and Felten, Bauman et al (2013). The department chair understands his effect on the meeting and has graciously agreed to attend just the first part of the first TLC meeting each semester to provide his support of the TLC.

Another lesson learned is the importance of a clear focus each semester. Our initial focus in Summer 2017 was to begin exploring research-based teaching practices based on faculty interest. This resulted in four white papers made available to the department as a whole. The concern after the white papers were produced was what the next focus would be for the entire group. Without a clear focus, most TLC participants agreed that they would not find participation valuable. Two focuses emerged in first Fall 2017 meeting, both outcomes of the initial white papers. One focus was on Peer Instruction (PI) and the other was on collectively reading and discussing “Small Teaching” by Lang (2016).

The PI focus resulted in a SoTL project that three of the TLC participants are working on in collaboration with two discipline-based education researchers (DBER) from the chemistry department. The chemistry DBER faculty have been generous in helping us structure our SoTL efforts and in assessment strategies. The “Small Teaching” by Lang (2016) focus resulted in the TLC agreeing that we would read through this book as a group. At the same time the TLC made this decision, the instructional technology group at UNL announced a UNL-wide book club would be reading the same book in the same semester (Fall 2017). Two of the TLC members participated in the UNL-wide book club and then led the TLC book discussions. The TLC met jointly with the UNL-wide book club for a video conversation with the author, James Lang.

Three focus topics have been proposed for Spring 2018. One emerged out of a concern about cheating by students and how this might be addressed through different teaching pedagogies. Two faculty are currently doing a literature review on this and will be reporting what they learn to the TLC and to the department. A second focus emerged out of a desire to start a new SoTL project by others not involved in the PI SoTL project. The new SoTL project proposed is taking all four white papers and turning them into “7-Minutes for Teaching” presentations for department faculty meetings beginning Spring 2018. This idea comes from a lightning round of 5-minute presentations at UNL’s Teaching and Learning Symposiums held each semester. We are currently investigating how to assess the effectiveness of this effort. The third emerged from the success of the book discussions in Fall 2017. The book that we are reading together for Spring 2018 is “How Learning Works” by Ambrose, Bridges et al (2010).

In discussing what has gone well so far, the TLC has realized that collaboration with other teaching practices/pedagogy work allows the TLC participants to leverage their interests with interests of others on campus while still retaining a focus on the civil engineering department. The collaboration also results in initial interdisciplinary SoTL research projects that strengthen the efforts of all participants.

We have also realized that we need to assess the impact on the participants of the TLC in terms of how attitudes may have shifted in regards to active learning and teaching in general. There may be other impacts beyond teaching practices as well. We are currently working on how we will assess impacts to the participants attitudes and any other impacts. We are currently exploring options for a mixed methods survey to assess the impact on the faculty, both those participating and those not.

A final lesson learned is that SoTL research is an important part of the TLC. The majority of the TLC participants are untenured, tenure-track faculty. They have a passion for teaching and a need to produce publications. Being able to combine both provides a strong motivation to sustain the TLC. To date, including this paper, the TLC has generated two papers currently under review, and two presentations at the UNL’s Teaching and Learning Symposium. Being able to turn a passion for teaching into a peer-reviewed publication is proving powerful for the TLC participants.

Conclusion – Barriers and Benefits

While our department is finding the TLC to be a valuable voluntary group, there are still barriers to its sustained success. Our department has not had a group focused on teaching pedagogy in the past. As a department in an R1 institution, there is a perceived need to focus almost exclusively on research with much less perceived need to focus on teaching. With a minimal reward structure for excellence in teaching, as the saying goes what you reward is what you value.

Our hope is that the benefits of our TLC allow us to overcome these barriers. A major benefit that was not initially anticipated was the provision of a safe space to discuss teaching, especially for untenured, tenure-track faculty who have expectations for being able to share passions for not

only research but also teaching. The TLC is supporting our professors of practice as they transition from industry to academia and teaching. The support by the department chair reduces perceived risk of trying new teaching pedagogies. Finally, we are building a diverse community of faculty dedicated to teaching in a department that has not has a strong teaching community in the past.

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