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Blended Faculty Training: Modeling Learner-centered Pedagogy in a New Faculty Teaching Seminar

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Introduction

Most college teachers start teaching with no prior formal training in the area of teaching and learning. They are considered content experts and are therefore expected to be excellent teachers. Unfortunately, these two do not necessarily correlate. The current widespread lack of professional pedagogical preparation of engineering faculty in the US has been voiced[1] and various workshops or one-week orientation packets have been used to equip new faculty members to become what Robert Boice describes as "quick starters".[2] The leaders of the Engineering and Professional Programs at Northern Arizona University recognized this disconnect and commissioned the development of a brief teaching seminar to help bridge this gap. The resulting training uses a blended format that requires participants to engage with pedagogical content online prior to a half-day in-person seminar. In this paper, we describe an exploratory study of a blended teaching seminar with the goal of assessing whether it helped the new faculty better prepare for their teaching. We describe the training content and format, identify challenges and successes, concluding with recommendations for future improvements to the seminar. Specifically, this work in progress aims to answer the following research questions: Was a brief, blended training seminar helpful to the new faculty, and if so, in what ways? And, has the new faculty's confidence in teaching changed as a result of this training? The broader appeal of this work is to serve as an example for other institutions who also experience similar challenges with new engineering faculty members.

Literature Review

The current widespread lack of professional pedagogical preparation of engineering faculty in the United States has been noted in the literature. Visco & Schaefer posit that the demands of a tenure-track position puts much more weight on research than on teaching[3]. The American Society for Engineering Education (ASEE) and its precursor the Society for the Promotion of Engineering Education (SPEE) have long called for engineering programs to cooperate with departments of education[4], select faculty trained to teach[5] and expect engineering teachers to know something about pedagogy and how people learn[6]. Unfortunately, new faculty members arriving on campus typically have little time to prepare for their new position, and much less time for pedagogical training.

Faculty development programs can help bridge this gap. Brent and Felder suggests that the most effective and sustainable engineering faculty training has a workshop/seminar format and lasts from 2 ½ days to 4 ½ days. They also recommend to keep faculty development practical by citing but not dwelling into the educational theories and cognitive psychology research related with pedagogy when it comes to developing the training for new engineering faculty[7].

One way to focus on practical content is to focus on what is considered "Good Practice" in higher education. Chickering and Gamson presented seven principles that rest on over fifty years

of research and together employ six powerful forces in education: activity, expectations, cooperation, interactions, diversity and responsibility. These principles assert that good practice encourages: contacts between students and faculty; develops reciprocity and cooperation among students; uses active learning techniques; gives prompt feedback; emphasizes time on task; communicates high expectations; and respects diverse talents and ways of learning[8]. These principles have stood the test of time and are widely cited in the pedagogical literature.

Training Development

Northern Arizona University (NAU) is a large Southwestern institution with a long standing tradition of high-quality teaching and has its roots as a teacher's college. Even as economic conditions have increased the pressures for faculty to engage in funded research, the institution has remained committed to its reputation in the arena of teaching and learning. An influx of new engineering teaching faculty in the fall semester of 2015 prompted the program leadership to commission the development of a seminar to help prepare these new faculty for a heavy teaching load. The seminar was intended to meet the following criteria: 1) be of short duration, 2) be based on methods supported by research, focusing on 'best practices in engineering education', and 3) be suitable for new faculty, graduate assistants and part-time faculty.

The authors (holding both engineering and education degrees) received an internal grant and collaborated with instructional designers from the university's E-learning center to develop and facilitate the training. The purpose of this seminar is to promote the best practices, to guide faculty and teaching assistants new to teaching in the engineering fields, to advance their confidence and satisfaction, while fostering student success.

The format of the seminar was chosen to model effective practices[9] given the 'expert' nature of the participants and the limited time available. After considering many options, the team saw the advantages of a blended (also known as flipped[10]) format, in which the participants were expected to engage in two to three hours of online self-study prior to a four-hour in-person structured seminar. The advantage of this format is to use precious face-to-face time engaging in higher level discussions on the content. By involving instructional designers in our team, we were able to benefit from the best aspects of this format, acknowledging that the flipped format is effective only with sound pedagogical design. The half-day in-person seminar was structured to provide activities that would reinforce the topics explored within the online modules and would provide a discussion forum and networking opportunity for the new instructors. The plan also included a follow-up session for the end of the semester to discuss the participant's experiences.

A theme of 'learner centered pedagogy' was chosen for the seminar because of the strong research supporting its transformative ability to promote deep, self-regulated and lifelong learning[11]. Learner centered teaching is defined as "teaching focused on learning - what the students are doing is the central concern of the teacher"[11(p15)]. The team agreed that the

participants would be able to make this philosophical shift in perspective because most of them had recently been students themselves. Because of the mandate to concentrate on so-called best practices, we organized around Chickering and Gamson's seven principles for good practice in undergraduate education.

The limited scope of this seminar precluded an in-depth treatment of the current research from cognitive science, a blossoming field that can move practitioners from “speculation to science” [12]. Since most faculty are unacquainted with the research on how humans actually learn, two topics were chosen as highlights: the role of both memory and motivation in the learning process. Memory was chosen because "learning and memory are closely related concepts. Learning is the acquisition of skill or knowledge, while memory is the expression of what you’ve acquired"[13]. Like memory, motivation is fundamental and holding students attention is critical to the learning process[14]. Fundamentally, these two concepts can be related to the seven principles above, making them a good foundation for seminar development.

Upon establishing a format and theme, the following learning outcomes emerged. At the end of the seminar, the participants were expected to be able to gauge self-confidence level and identify potential area(s) of personal improvement; explain the role that motivation and memory play in learning; compare and contrast the role of the teacher and students in a 'teacher centered' environment with that in a 'learner centered' environment; explore so-called 'best practices and analyze them through the lens of motivation, memory and the role of the teacher and student.

As the development team has been commissioned to repeat this training for a second year, we were motivated to conduct this evaluation of the seminar’s effectiveness. The team obtained Institutional Review Board approval (project 794984-1) to collect participant data and present the results found in this work-in-progress study. We will continue to refine the seminar and collect additional data to address our research questions.

Method

This study draws from an evaluative research methodology[15] that aims to gauge the merit of a program. In order to assess the effectiveness of the seminar, the team crafted the following specific research questions:

RQ1: Was a brief, blended training seminar helpful to the new faculty, and if so, in what ways?

RQ2: Has the new faculty's confidence in teaching changed as a result of this training?

Data collected for this study include researcher notes from the seminar and follow-up session, artifacts produced during the sessions and responses to an online questionnaire that asks the participants to answer the following questions before engaging with the online module (pre-assessment) and then repeated after the training seminar (post-assessment):

1. *What is your image of what the best college engineering educator does in class?*
2. *How confident are you regarding your ability to help students learn?*
3. *Describe your source of confidence*
4. *In the courses that you teach, how do you rank [Chickering and Gamson's] 7 principles as having impact on student learning?*

In addition, the participant answered the following open-ended question after the seminar:

> *Did you learn anything new in this training that you believe help you become a better educator? If so, what were these things?*

Fifteen people completed at least part of the online modules and attended the seminar, and five completed the post-assessment and five attended the follow-up discussion. Eleven participants consented to the use of their data for this study. Post-assessment data presented in the results section below summarizes the data collected from the five participants who completed all of the seminar components.

Results

The participants were given an on-line survey (pre-assessment) which, upon completion, allowed access to the online content. The same survey, with one additional question, was administered online after the seminar (post-assessment). The survey questions are shown below with summary and indicative responses from participants who completed both assessments.

> *What is your image of what the best college engineering educator does in class?*

The following themes emerged from the responses to these questions, with recurring responses appearing higher on the lists:

Table 1: Image of what the best college engineering educator does

Pre-Assessment	**Post-Assessment**
Concepts related to real world Challenging Engaging Essential knowledge Clear and concise Active and fun Material matches assessment Encourages communication	Engaging *Uses non-lecture activities Challenging Concepts related to real world *Adjusts approach *Positive learning environment *Facilitator of learning

*indicates new themes in post-assessment

In general, the responses in the post-assessment were shorter and incorporated many of the themes that the participants identified in their pre-assessment. New themes that arose in the post-assessment are indicated with an * in the Table 1 above.

How confident are you regarding your ability to help students learn? Describe your source of confidence.

Of the five participants who completed the post-assessment, only one of them changed their response from "somewhat" to "to a great extent" on confidence scale (see Table 2).

Table 2: Confidence in ability to help students learn

Response	To a great extent	Somewhat	Little	Not at all	Total # participants
Pre-assessment	4	6	1	0	11
Post-assessment	2	3	0	0	5

Participants reported their source of confidence as: previous teaching experience, subject expertise and understanding, previous positive student evaluations, their willingness to work with students and try new things, in addition to being approachable. Previous teaching experience was the most common source cited (8 participants), with the next most prevalent source being subject matter expertise.

In the courses that you teach, how do you rank [Chickering and Gamson's] 7 principles as having impact on student learning?

Of the five participants who completed all seminar components, there was a re-ranking of six of the principles. These can be seen in Table 3 below in which overall rankings were calculated by ranking the sum of the individual responses weighted by individual ranks. Most notably, 'encouraging active learning' was originally ranked highest in the pre-assessment and slipped to third in the post-assessment. Conversely, 'Emphasizing time on task' was ranked lowest in the pre-assessment and rose to the highest rank in the post-assessment. It is worth noting that 'Communicates high expectations' ranked high in both pre- and post-assessments and that all of the principles were ranked more closely together in the post-assessment, as is evidenced by the tie scores shown in Table 3.

Table 3: Ranking of Practices

Practice*	**Rank** 1 = most impact 7 = least impact	
	Pre-	**Post -**
Encourages student-faculty contact.	**3**	**4**
Encourages cooperation among students.	6	6
Encourages active learning.	**1**	**3**
Gives prompt feedback.	**4**	**7**

Practice*	Rank 1 = most impact 7 = least impact	
	Pre-	**Post -**
Emphasizes time on task.	**7**	**1**
Communicates high expectations.	**2**	**1**
Respects diverse talents and ways of learning.	**5**	**4**

**order of practices is as presented in Chickering & Gamson and as presented to participants in survey. Bold indicates a change from pre- to post-assessment.*

Did you learn anything new in this training that you believe help you become a better educator? If so, what were these things?

The responses to this question are presented throughout the following section to illustrate specific discussion points.

Discussion

This research aims to find out if this brief, blended training seminar was helpful to the new faculty, and if so, in what ways. In order to evaluate the response data to address the first research question (was the seminar 'helpful'), it is important to identify what constitutes being helpful. In this context 'helpful' is taken to mean that the participants recognized the benefit of learner centered methods and expressed an intention of incorporating them into their practice.

Analyzing the responses to the first assessment question (What is your image of what the best college engineering educator does in class?), three of the five respondents made subtle shifts from what the instructor does, to what the student does (even though the question explicitly asks about the educator's actions). For instance, one participant first responded: "Engages students during class time - asks questions, examines potential answers, and uses technology to scale-up (or down) learning to larger class sizes" and followed up with "creates a positive learning environment that is fun and relevant, is clear about expectations and assignments, asks questions, and challenges students to make connections between the course content and the larger (or smaller) picture." Another responded to the pre-assessment "A great college educator moves and has fun while in class to keep the students involved and awake in class" and to the post-assessment "I feel that the best engineering educator lets the students participate as much as possible." This shift is expressed by one participant responding to the final open-ended question:

Before the semester started, I had simply planned to teach the class based mostly on a very lecture-centered focus. That is, I planned to be talking during most of the lecture time. However, the training made me realize the importance of getting students to participate in the learning process. I was able to brainstorm ideas about how to get the students involved. This led to the creation of worksheets that I used during the latter half of the course.

The results of ranking the seven practices indicate that participants shifted priorities among the options presented. For instance, one participant responded, “Although I was aware of most of these concepts to some extent, I thought reviewing the 7 best practices in teaching was helpful.” It is difficult to make conclusions based on these numerical rankings, but a few inferences are suggested. Participants clearly reconsidered the importance of emphasizing time on task, re-ranking it from last to first. This is consistent with a learner centered philosophy in which *what the student is doing* is paramount. One participant who had relied on summative final examinations decided to “incorporate more frequent short quizzes throughout the semester to ensure students are keeping up and understanding the material.”

When asked, participants in the post-seminar discussion responded that the seminar was especially helpful in exposing them to engagement and active learning related ideas. One participant said: “This seminar made me think about teaching, I never got deeper about teaching [before]”. Participants did acknowledge that instructors are not necessarily taught how to teach so the seminar was seen as “an opportunity to learn with other faculty how to teach.” The seminar was viewed as an “investment in teaching” in which “brainstorming ideas to get students engaged during seminar was powerful”. One reported that “the seminar did a good job and made me pursue the whole idea of active learning”. Another participant said “after attending this seminar I was able to put a label on stuff…This semester, after my classes I felt like a millionaire.”

At the follow-up meeting, participants said they utilized some of the strategies they learned in the seminar. The responses included strategies pertaining to active learning such as "mixture of reading and online- reading quizzes", "field trips", relevant teaching activities like "work[ing] through problems… actually write out in the command line [when teaching programing] with the students, received positive feedback". More than one participant mentioned they felt that they created active learning environments by using tablets. Using ONENOTE® as a virtual whiteboard and making the notes available right after class was useful for some instructors. One participant reported that he went down the aisle to successfully engage the students. To increase student motivation, another participant said fun, relevant, in-class activities with points awarded worked the best. Participants were all in agreement that being able to sense the room was highly important, and that there has to be humor in the class, therefore it all starts with the instructor in the room.

While not directly assessed, the blended format did address the time constraint imposed on this seminar. It allowed the participants to engage in the material at their own pace so that the in-person seminar could be focused on discussion instead of content delivery. It demonstrated a learner-centered engagement technique that the participants could implement in their own classes.

The second research question asked if there was any change in the new faculty's confidence in teaching as a result of this training. When pre- and post- assessments were compared for five participants, the confidence levels remained unchanged for all except one. Three stayed as

somewhat and one stayed at *to a great extent* confidence level, one moved from *somewhat* to *a great extent.* Perhaps more insightful are some responses to the question asking if the seminar helped the participant become a better educator:

> *Yes. This is my first time teaching a class completely on my own. The freedom is liberating but also intimidating. This seminar guided me in creating my own style of teaching in which I can infuse my own personality into my teaching. I think this will help me relax and give a better experience for my students.*

Another responded that

> *As a new professor, it would have been really easy to create classes like I was accustomed to taking during my own education. By defining a better baseline and approach, this seminar allowed me to start my teaching career on a better path prior to getting used to the status-quo.*

In general, however, the seminar did not seem to have an effect on instructor confidence. Perhaps it is too much to expect from such a short seminar or maybe the expectation that the participants would come in with low confidence was not valid.

Challenges

The challenges experienced in this seminar can be grouped into two categories: those related to its development, and those experienced by the participants. The vast number of potential topics coupled with the short duration made the initial seminar development difficult. Engaging the participants in follow-up activities after the in-person seminar, most notably the post-assessment, made seminar effectiveness difficult to gauge.

Participants commented that timing was a problem and that they would have preferred to not have it during the first week of the semester. They also mentioned that online modules took longer than expected. Although in general the articles in the online modules were seen as relevant and engaging, new engineering faculty mentioned that the content on memory did not stick with them. They would have preferred learning about practical ways of applying the memory related research findings in the classroom.

On the other hand, all four participants who attended the follow-up meeting agreed that "getting students motivated" was the biggest challenge they faced during the semester. In addition, they also all agreed that "preparing relevant class material is not that easy, real life connection matters."

Future Work

Responding to the feedback received, future seminar sessions will be offered during the week prior to the beginning of new faculty contracts. Participants will receive a stipend to encourage

participation. Noticing the drop in response rate for the post-assessment, it is imperative to collect the post-assessment data at the end of the seminar while participants are still present. Follow-up meeting comments also suggested that sharing specific examples of best practices (e.g. how to use ONE NOTE® for live class notes) could be a part of the future training. The learning outcome that aims to improve new instructor confidence needs to be evaluated and addressed. Finally, the addition of a simple teaching practice inventory[16] will provide an additional metric that faculty can baseline during the seminar and track throughout their career.

Conclusions

The best practices in the seminar helped participants to identify potential area(s) of personal improvement, exposed them to ways in which motivation and memory play a role in learning in the context of a 'learner centered' environment. The findings suggest that the seminar was helpful to the new faculty. The participants shifted their perspective slightly toward a learner-centered philosophy. The best practices presented in the seminar helped them with strategies for improving their teaching. Participants reported that they did indeed implement new methods from this seminar into their practice. The blended format addressed the issue of limited time available for the in-person part of the seminar. Teaching confidence did not seem to be a concern to participants and there was no evidence that the seminar improved new faculty's teaching confidence.

New engineering faculty bring in discipline-specific expertise into their classrooms. A teaching seminar can support them with the necessary tools to help convey that expertise to novice students.

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