Nursing + Engineering: Lessons Learned in Interdisciplinary Facilitator Dynamics for Faculty Development

Dr. Amber F Young-Brice, Marquette University

Dr. Amber Young-Brice is the Associate Dean for Academic Affairs and an Assistant Professor in Nursing at Marquette University. She has a master's degree in nursing education, a PhD in nursing, and is a certified nurse educator with 15+ years of teaching experience. Dr. Young-Brice's program of pedagogical research explores the relationship between the influence of non-cognitive factors, such as grit and self-regulated learning, and the successful trajectory of students. Additionally, she studies ways to foster these factors through theoretically derived and evidence-based pedagogical innovations. Her research is grounded in her expertise as an educator and underpinned by theories from nursing, education, affective and social sciences.

Dr. Allison Murray, Marquette University

Dr. Allison K. Murray is an assistant professor of mechanical engineering at Marquette University. She holds a BS, MS, and PhD in mechanical engineering from Purdue University. Her research includes inclusive pedagogy and the effects of belonging on student success. She has a active research program in additive manufacturing.

Dr. Somesh Roy, Marquette University

Dr. Somesh Roy is an associate professor in Mechanical Engineering at Marquette University. His research focuses on thermal radiation modeling, combustion modeling, and fundamental exploration of combustion-generated pollutants, particularly soot. He also works on community outreach activities on air pollution and air quality in collaboration with art museums and local community organizations. Besides his research on soot, radiation, and combustion, he maintains an active interest in the research on effective and emerging practices for engineering education.

Lisa Chase, Marquette University

Mx. Lisa Chase is the assistant director for engineering education programs at Marquette University. They hold an MA in history and an MA in education, they are obtaining an EdD from Hamline University.

Nursing + Engineering:
Lessons Learned in Interdisciplinary Facilitator Dynamics for Faculty Development

Abstract

This paper presents lessons learned from the first year of an interdisciplinary faculty development team exploring the impact of a humanistic model for faculty development through a Community of Practice. We will share how our team dynamics would have improved had we gone through the Concerns-Based Adoption Model prior to implementing our programming to better gauge our own perceptions and what impact would look like among our participants.

Introduction

In many skilled professions, incoming faculty have hardly, if any, pedagogical preparation [1], especially on theoretical underpinnings of teaching and the science of how students learn. Paradigm shifts in engineering education have been focused on instructional behaviors, such as active learning where students are provided opportunity to learn the practice of engineering through "doing" [2]. Rarely do these opportunities include a focus on the relational or affective aspects of education, rather, they focus on design and building [2].

Learning through practice is not specific to engineering education. In nursing programs, similar approaches towards teaching and learning are utilized to engage students to learn the practice of nursing through "doing" [2]. Both nursing and engineering students share a common pathway in their respective educational programs, including science-heavy foundational knowledge, hands-on learning opportunities, learning the decision-making processes necessary for the profession, and then licensure [3].

What separates us is how we approach the element of empathy and care [2]. In the discipline of nursing, caring is an expected component of nursing practice. "Caring, which is when the one caring connects with and embraces the spirit of the other through authentic, full attention in the here and now, and conveys a concern for the inner life and personal meaning of another" [4], informs Human Caring Theory (Caring Science), which can help us go beyond care for patients towards cultivating a humanistic approach to educating students. This humanistic approach acknowledges the importance of the affective side of teaching and learning. Engineering, which shares many of the highly technical, decision-making aspects of nursing, could benefit from this approach for engineering education.

Our Program

Our team developed a Community of Practice (CoP) informed by a humanistic-educative caring framework, grounded in Caring Science, where the curriculum is about the process and intent to learn coming from the interactions and transactions between faculty and learners. This framework embraces openness, human discovery, and deep reflection [4]. It also includes awareness of how learning works and co-creating meaningful learning experiences that make connections between knowledge and theory. Instead of focusing on strategies (behaviors), our

proposed humanistic-educative caring framework hopes to help faculty shift their focus to learning occurring within an inclusive faculty-student relationship (affective domain) [5] and how students learn.

Our programming is ongoing and includes either the CoP or a self-paced learning group (SLG) using the humanistic-educative framework. Participants self-select into one of two groups. The first group, the treatment/intervention group participates in the CoP which consists of face-to-face interactions to build rapport among faculty and sharing of ideas. The second group, the control group, is a self-paced learning group (SLG) of engineering faculty that complete the CoP materials at their own pace and with optional interaction among peers in the cohort. We allow participants to self-select as individual faculty will engage more readily in their preferred environment, be it due to comfort or time constraints, hopefully improving the likelihood of training success.

All of our programming has been modeled from the lead author's learning theory course, which explores various educational and learning theories, and how the brain learns. This course assists faculty in developing learner-centered educational experiences to meet cognitive, affective, and psychomotor learning outcomes. CoP programming development occurred through weekly team meetings to discuss each module, including determining activities and facilitation techniques. The SLG programming followed the same outline of the lead author's learning theory course and therefore did not include much discussion regarding facilitation of this modality.

Lessons Learned

During the summer of 2023, we embarked on our first iteration of our CoP and SLG. We came into this project with a shared hypothesis that there is a missing focus on the science of learning, including the impact of interactions between faculty and students, in faculty development. We believe this is a key factor in why there is limited change in faculty beliefs and behaviors regarding teaching and learning as a result of faculty development programs.

Elements of our CoP programming that were successful as reported by our first cohort of participants included appreciation of informal lunch periods embedded within the session. Although the team questioned the time spent on lunch during the session, our participants felt it helped them to discuss the content and build community. Participants also reported in both the in-person CoP and online SLG that they were more likely to make changes to their pedagogy because we asked them to frame each session's content within one course and to not consider all their courses, which could lead to being overwhelmed and reduce chances of pedagogical change. As we plan for our next iteration of programming, these lessons learned will reinforce elements that went well.

We learned lessons from challenges the team encountered. Lessons learned regarding our disciplinary perspectives and interpersonal dynamics will ensure a solid grounding of our team moving forward. During initial planning, we missed a critical step of really understanding ourselves, an interdisciplinary group made up of faculty in nursing, engineering, and an instructional designer who have conducted prior pedagogical research together. The process of

developing the CoP programming involved many collaborative meetings where we shared our ideas and insights guided by the nurse on the team who is responsible for and teaches a series of teaching courses within her college. Although our planning was collaborative, in retrospect, the nurse leading the planning meetings should have gone a step further and ask the team members if they would themselves implement any of the strategies we planned to share with our participants thereby addressing specific engineering theory to practice gaps. This feedback may have helped us to adjust approaches, especially messaging, to guide our efforts in the CoP.

As the first summer of programming commenced, the following was a common occurrence during CoP debriefing:

> Engineer Facilitator: "Something is off"
> Nursing Facilitator: "What's off, I think everything is going fine"
> Engineering Facilitator: …
> Engineering Facilitator: "Something just doesn't feel right"

Engineers on our team, albeit interested in educational theory, would not have the background in the scholarship of teaching and learning to effectively execute programming on humanistic educational frameworks. Likewise, the nurse and instructional designer, experts in educational theory, would not have the disciplinary context to deliver programming that crossed the theory to practice divide. The interdisciplinary nature of this team produced challenges; however, the end product of the CoP benefited from the diverse experiences. We assert that the resultant whole is greater than the sum of its parts.

With this lesson learned, we could have engaged in a more structured approach to understanding the pedagogical changes we were expecting of our participants, but with ourselves first. A resource for reflecting on the change process could include using the Concerns-Based Adoption Model (CBAM), specifically using the Stages of Concern and Levels of Use elements of the model [6]. The CBAM has been in use to provide data regarding employee mindsets towards change and/or specific interventions, mostly in educational settings [6]. The CBAM was based on assumptions that,

> "change is a process, not an event. Change is accomplished by individuals. Change is a highly personal experience. Change involves development growth in feelings and skills. Change can be facilitated by interventions directed toward the individuals, the innovations, and the contexts involved." [7]

The Stages of Concern, which is one of three components of the CBAM, addresses concerns of the people who will be implementing the planned change to identify those concerns and then targeted interventions to support people past those concerns [8]. There are seven stages, with 0 being unconcerned, to 6 being refocusing where the participant would have ideas and want to build on them through the planned change process [8]. In our context, the "people" would be our participants; however, because the programming is targeting engineering faculty, two of our team members are engineers and were navigating having one foot in their disciplinary world and trying to step into the education world. Analyzing our team mindset using the Stages of Concern would have revealed dynamics helpful to our overall facilitation of programming and helped the nurse get past any blind spots or assumptions and assisted in understanding better how to spark change in the engineering faculty.

The other area of the CBAM that would have been helpful for our team dynamics, Levels of Use, assesses the extent people are implementing a program/change and their level of understanding or expertise associated with the program/change [8]. In our case, it wasn't an issue regarding our programming ideas, but more so the level of implementation. For example, it was revealed that team members were supportive of the strategies we were planning to share with our participants but were less willing to consider those strategies for their own teaching, which was a bit of a reality check for the nurse facilitator and navigating buy-in from engineering faculty. Knowing the extent to which her own team members were willing to use the strategies would have allowed for more team debriefing and discussion about barriers or facilitators to use. One aspect that was revealed through team debriefing was an element of messaging and perception around how much change was expected. Some team members revealed that it felt as though all their teaching had to change, when that was never the intention. Using the CBAM, specifically comparing how we all approached Stages of Concern combined with Level of Use would enable the team to identify each of our attitudes towards our programming and plan appropriate strategies for overcoming any barriers in enhancing engineering faculty pedagogy through our CoP. The same can be said for using the CBAM with our participants and ensuring success in their own journey and implementation of a humanistic approach to teaching and learning.

Moving Forward

This lessons learned paper explores how essential it is to take a step back to gain a thorough understanding of team dynamics, attitudes, perceptions, and intentions prior to program implementation. This step of team analysis should occur early to ensure there are no assumptions made while planning. Critical reflection periods should be a regular part of building a cross-disciplinary team. The CBAM is one process a team can participate in and gain a better understanding of their own mindsets towards the programming goals and determining the desired change in themselves and their participants, especially when facilitators are also part of the population that is being targeted for intervention.

This material is based upon work supported by the National Science Foundation under Grant No. (2236075). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

References

[1] R. R. Baiduc, R. A. Linsenmeier, and N. Ruggeri, "Mentored Discussions of Teaching: An Introductory Teaching Development Program for Future STEM Faculty," *Innov High Educ*, vol. 41, no. 3, pp. 237–254, Jun. 2016, doi: 10.1007/s10755-015-9348-1.

[2] D. Oerther, "Using nursing theory to improve the teaching of engineering practice.," in *American Society for Engineering Education*, 2017.

[3] D. B. Oerther, P. Yoder-Wise, and B. Malone, "Identifying opportunities for educators to pursue collaboration at the interface of nursing and engineering – and a word of caution," *J Adv Nurs*, vol. 76, no. 4, pp. 920–923, Apr. 2020, doi: 10.1111/jan.14291.

[4] K. Sitzman and J. Watson, *Caring Science, Mindful Practice: Implementing Watson's Human Caring Theory.*, 2nd ed. Springer Publishing, 2018.

[5] C. Cara, M. Hills, and J. Watson, *An Educators Guide to Humanizing Nursing Education.* Springer Publishing, 2020.

[6] B. Trapani and A. Annunziato, "Crossing the bridge of change: measuring instructional change using the concerns based adoption model.," *Journal of Leadership and Instruction*, vol. Spring, pp. 12–16, 2019.

[7] G. Hall and S. Hord, *Change in Schools: Facilitating the Process.* State University of New York Press, 1987.

[8] A. T. Roach, T. R. Kratochwill, and J. L. Frank, "School-based consultants as change facilitators: adaptation of the concerns-based adoption model (CBAM) to support the implementation of research-based practices.," *Journal of Educational and Psychological Consultation*, vol. 19, pp. 300–320, 2009.