Frameworks for Faculty Development

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Abstract - Faculty development is pivotal to improvement in engineering education. Faculty perceptions of these efforts as well as their attitudes, beliefs, and assumptions about learning and teaching, in addition to their experience and operational confidence regarding implementation of innovative approaches all impact translation of innovative approaches to actual classroom practice. Improvement efforts can be derailed due to faculty mental models that result in misunderstanding and/or misapplication of new content and pedagogy. Therefore, more understanding about the nature of faculty development activities is a necessary co-requisite for efforts to improve engineering education.

The MESSAGE framework applies concepts from learning theory approaches to faculty development and offers structural factors to consider in developing learning activities for faculty members. The goal of this paper is to provide a framework for non-traditional approaches to faculty development as well as traditional approaches such as workshops and individual consultations and to explore these approaches within the MESSAGE framework.

Index Terms — faculty development, learning, teaching

INTRODUCTION

Success of innovation efforts in undergraduate science, technology, engineering, and mathematics (STEM) education requires that faculty members acquire and integrate new content and pedagogical strategies [1–4]. Therefore, faculty development is a core strategy for improvement in undergraduate STEM education. Formal and informal faculty development activities have the capacity to help participants reflect on their own beliefs and practices related to learning and teaching, acquire “new” information about learning and teaching, and, ultimately, alter beliefs and related practices. Presently, we have insufficient understanding of how these activities affect faculty teaching and learning [5].

For example, Menges states that we currently cannot answer “the following significant and practical question: Why do faculty fail to use demonstrably effective teaching methods and other data-based information about teaching, and how can that situation be changed?” [6]. Lack of reward for teaching and overemphasis on research is often offered as the answer [7]. That overly simplistic response does not address the question for the small number of campuses for which undergraduate education is the primary mission of the institution. In addition, the response may not paint the complete picture on larger, research-oriented campuses. The shift to learning-centered teaching [8] must be accompanied by a shift to learning-centered faculty development. However, a theoretical framework that might be used for development of more learning-centered faculty development activities does not currently exist. Therefore, this paper attempts to provide a theoretical framework and offers preliminary approaches that illustrate applications of the same. Although results of faculty development initiatives using the framework are not complete, it is hoped the framework and potential applications will provide inspiration and support for others working on faculty development.

If faculty development is viewed as faculty learning, then research on how people learn [9,10] and adult learning [11,12] can be applied to assessing and enhancing faculty development. Svinicki offers the following observation about faculty development as adult learning.

For years, I got upset with faculty who did not seem to want what I, as a colleague who'd specialized in understanding teaching, was trying to share with them through the faculty development center. Finally, I've learned to stop and ask myself: How can I, as a psychologist, forget that faculty members' learning about teaching is just as subject to the principles of learning as is their students' learning about content? And yet, that seems precisely what I do each time we initiate a wonderful new program on improving teaching only to find it greeted with a decided lack of enthusiasm by our intended audience, sometimes even by those who requested it in the first place. [13]

Svinicki has offered GAMES as a model for organizing elements of effective self-regulated learning [14]. The five elements of GAMES are Goal-oriented learning, Active learning, Meaningful learning, Explaining while learning, and Self-monitored learning. Each element in the model is supported by research on learning. If the GAMES model is applied to faculty development, then faculty development activities would incorporate each of the five elements. However, recognizing that faculty members practice the science and art of teaching in an intense academic environment, two other elements appear to be important. The first is social networks. Like all learners, faculty members need to find peer support for their efforts to improve student learning through teaching. The importance of social networks

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is underscored by NRC report on How People Learn that indicates that community-centeredness is one of four essential elements for effective learning environments. Another important element is helping faculty draw connections between their learning experiences in faculty development activities and their classroom and course practices or experiential learning. Faculty members need to recognize success in their improvement initiatives to prompt further efforts to explore learning and teaching. With the two additional elements: Social networks and Experiential learning, GAMES becomes MESSAGE.

The following section offers research to support each of the seven elements of the MESSAGE framework. Then, the paper how the seven-step approach developed for faculty learning communities at Indiana University fits within the MESSAGE framework and can be applied to a faculty workshop at Georgia Tech. Then, the paper describes how the appreciative inquiry [15] method of change management was used to develop a faculty development conference on teaching and learning. The description shows how catalysts in the MESSAGE framework appear throughout responses from conference participants.

THEORETICAL FRAMEWORK FOR FACULTY DEVELOPMENT

Meaningful cognitive learning is an active, constructive, and cumulative process that occurs gradually over a period of time [16]. It is a goal-oriented process best characterized in terms of problem solving [17–19]. Learning is a complex process that is facilitated through the presence of several different catalysts, seven of which are contained within the MESSAGE framework.

Meaningful Learning

Research shows that learning that lasts requires that the learner connect new material to prior knowledge. In order to link new material to prior knowledge the learner must recognize how the new material relates to what he/she already knows and find ways to link the two. For example, an individual with little interest in foreign language study may suddenly become engaged during a trip abroad. Similarly, faculty members who attend a workshop on a topic like collaborative learning may not immediately see applications for the methodology unless they consider it in the context of a specific challenge or learning objective in their course.

With the recognition of the importance of prior knowledge comes the potential for prior conceptions that may or may not have any factual basis. In a discipline like physics – this involves misconceptions about the physical world. In learning and teaching, it involves misconceptions about how people learn and potential roles of teachers and students. If the observation by Halloun [20] “that student’s evolution from folk realism to scientific realism can take place, at any level, only when the structure of physics theory and physicists’ mental processes are presented explicitly [21,22]” were transferred from physics to learning and teaching, then it is necessary that faculty members articulate their mental pictures about learning and teaching before lasting changes could be made to these pictures.

Explaining while Learning

The oft-repeated phrase that you don’t really learn something until you teach it helps reinforce the importance of the second catalyst in the MESSAGE framework, Explaining while Learning. Chi et al. [23] and others have shown that prompting learners to explain to themselves what they are learning improves understanding [24,25]. To incorporate this element, faculty development activities would provide opportunities for faculty members to explain to themselves or others what they understand about learning, how what they have read or talked about has changed their portraits of the learning process, and how they might apply their comprehension of learning to their classroom activities.

Social Networks

Because, “learning can (and frequently does) occur when individuals and groups interact” [26] it is important to consider how social capital influences faculty development processes in higher education. Although each learner constructs her/his own mental pictures, peer interactions influence learning to such an extent that learning is often portrayed as social process [27,28]. Meaningful learning, active learning, and self-explaining are naturally incorporated into activities in which faculty members share conceptions of learning and different ideas for teaching. The importance of group interaction and social construction of knowledge is reflected in the recommendation by the National Research Council [6] that effective learning environments must be community-centered. The growing movement of faculty learning communities [29] provides one way in which community may be naturally incorporated into learning environments for faculty members.

Self-Monitoring

The significance of reflective practice in professional development is well established [30–32]. Although reflection appears to be a natural process that occurs without stimulation, studies of reflective practice have shown that reflection through which one makes changes to one’s own practice requires practice with feedback. Feedback can be provided through several mechanisms, e.g., engaging research on learning and teaching [33], acquiring data through classroom research [34], and exchanging experiences with peers [29]. This corresponds to Brookfield’s [31] suggestion that developing reflective practice in teaching requires that we view our assumptions through four different lenses: our autobiographies as learners and teachers, our students’ eyes, our colleagues’ experiences and the theoretical literature.

Active Participation

The role of active participation in the learning process is demonstrated by the wealth of literature on active and cooperative learning [35–37] as well as increased interest in the use of methodologies such as case studies, etc. Allowing
learners to remain passive in the learning process tends to promote surface learning as opposed to the more desirable deep learning. Providing faculty with opportunities to actively engage in new methodologies and/or actively pursue implementation plans with peers increases overall knowledge and comfort level and at the same time models a more effective approach to the teaching process.

**Goal-oriented Learning**

The influence of assessment on learning is clearly seen in the traditional question from students, “Will this be on the test?” A major challenge in faculty development has been a lack of effective assessment to demonstrate what the benefits of such activities are for faculty as well as give faculty participants feedback on their professional development progress [5]. College and university faculty are typically goal-oriented individuals interested in engaging in activities to increase effectiveness [38]—which makes providing them with some evidence that their investment of time and energy in professional development is useful of critical importance.

**Experiential Learning**

The concept known as “the illusion of comprehension” [39] results from “confusing familiarity with knowing” [40]. Learners often convince themselves that because a concept appears straightforward, it is. For example, students in a math course think they understand a process in class, but then cannot work homework problems. For faculty, information about learning and teaching may appear to make perfect sense and be user friendly in the context of a faculty development activity. When they try to adapt the information for their own course, it may seem more nebulous. They may become discouraged, drop the attempt to change, or revert to old approaches after unsuccessful implementation. Faculty need practical opportunities to move “I think I got it” to “I can make this work.”

**SEVEN-STEP MODEL**

A significant element for faculty development that is not reflected in the MESSAGE framework is academic discipline. Middendorf and Pace [41] note the recent attention to “the importance of shaping instruction to match the specific conditions of each academic field,” (p. 1) as well as the fact that, “concern with the disciplinary nature of learning has been one of the primary motivations for the development of a scholarship of teaching and learning in which faculty from across universities make contributions to pedagogical literature” [42,43]. These observations may partially account for comments commonly heard in faculty development workshops similar to the following, “I think that might be a good idea in the presenter’s discipline, but I don’t see how that would work for the subjects that I teach.” When Middendorf and colleague directed their attention to the importance of discipline, they developed a seven-step model to assist faculty in overcoming obstacles to learning in their disciplines [41]. The model reflects learning that occurred in the process of offering faculty learning communities at Indiana University.

Each step in the model is presented below with connections to the seven catalysts in the MESSAGE framework.

The seven-step model will be used in June 2005 for a faculty development workshop focused on preparing first-time instructors for the freshman seminar taught at the Georgia Institute of Technology. Instructors come from varying backgrounds and disciplines, but are all expected to achieve the same learning outcomes in the course. Experienced instructors, who are members of the strategic planning committee, assist instructor development during the workshop. Workshop facilitators will solicit desired outcomes from participants to promote goal-oriented learning.

**Step 1: What is a bottleneck to learning in this class?**

Faculty members are first asked to identify a topic or process within their courses with which students struggle. This encourages reflection and linking insights that may come in later steps directly to area of great interest. Focusing on a difficult topic makes potential learning more meaningful and provides clearer goals for the next six steps.

**Georgia Tech:** In the workshop, the nine learning outcomes for the course will be shared with the first-time instructors. Because instructors do not set their own learning outcomes, it will be important to gather their input and create personal meaning throughout the sessions. To accomplish this, each participant will be asked to select the most challenging three learning outcomes. From these, a whole-group list will be compiled, prioritized and the top three selected for follow-through.

**MESSAGE framework:** Goal-oriented learning, meaningful learning

**Step 2: How does an expert do these things?** Instead of focusing first on difficulties that students are having, faculty members are encouraged to first reflect on their own learning and problem-solving processes. “How do I do this?” Faculty members explore their own understanding of the topic with which students struggle and how they would approach the topic. They remember how they felt when they did not initially grasp what was being presented to them and empathize with the mindset of their students. They also reflect, engaging the nature of their understanding of their own discipline. If faculty members are exchanging results from step 2 in a group, then self-explanation is built in and a basis for social networks is being formed as faculty from different disciplines share the nature of different disciplines.

**MESSAGE framework:** Active learning; self-monitored learning; social networks

**Georgia Tech:** Members of the strategic committee, as expert instructors, will present on each of the three learning outcomes identified in Step 1. Each expert will have an open dialogue with the group as they share how they currently teach the topic as well as address concerns from the small discussion groups.

**Step 3: How can these tasks be explicitly modeled?** Once faculty members understand how they would approach the difficult topic, they are encouraged to articulate their newly gained understanding in ways that others might gain insight. “How might novices grasp this step?” When faculty members
then share how they would model their approach in an interdisciplinary group, peers may require clarification, since faculty members from different disciplines are less likely to be familiar with disciplinary conventions and they would ask questions that prompt the explainer for discipline-independent accounts.

**MESSAGE framework: Explaining while learning; social networks**

- **Georgia Tech:** Workshop participants will be asked to discuss how they will know that the student has successfully completed the learning outcome. As part of the exercise, they will be asked to define what they will use as a measure to determine that the outcome has been fulfilled. Examples might be journal response questions, etc.

**Step 7:** How can the resulting knowledge about learning be shared? The expansion of the scholarship of teaching and learning reflects all components of the MESSAGE model as faculty members extend their scholarly practice from their disciplinary specialties to practice in the area of teaching. The act of articulating and sharing their challenges and discoveries is crucial to making their learning meaningful [44] and to the continued development of self-monitoring skills. Further comments relevant to this action are provided in comments on step four in the following section.

**MESSAGE Framework:** Self-monitored learning; social network; goal-oriented learning

- **Georgia Tech:** Instructors will be asked to participate in social networks of three instructors that will continue following the workshop. Groups are asked to meet every 3-4 weeks and one member of the team will be identified as “organizer.” The organizer will be responsible for setting the schedule and location for each meeting. The group will be expected to share updates regarding their classes and provide feedback to the Georgia Tech freshman seminar coordinator regarding any issues or activities that are going well.

**Learning Through Appreciative Inquiry**

Appreciative inquiry (AI) [15] offers a very different approach than the seven-step, problem-based approach presented in the previous section. Unlike a problem-based approach that focuses on removing a problem, AI concentrates first on what is working well in order to provide a foundation for future efforts. AI was used as the basis for the three-day 2005 Wakonse South Conference where participants are both learners and teachers. In 2005, there were 57 participants from seven different institutions. The AI approach used at Wakonse South was presented in four steps: discovery, dream, design, and destiny. As in the previous section, each of the four steps will be presented with connections to the MESSAGE framework. In addition, responses from participants will be presented to illustrate outcomes for this approach to faculty development.

**Step 1 (Discovery): What is going well in my approach to teaching?** Like the first step in the 7-step model described previously, faculty members focus first on their courses. Connections to the individual’s classroom experience increases likelihood of a meaningful learning experience. Conference participants organized into small groups (active learning, social networks) and addressed questions such as “Describe a classroom session in which things clicked. You were on top of your game and the students were enthusiastic learners.”
Responding to this question requires that faculty members reflect on their teaching, focus on what is working well, and explicitly articulate what the class is intended to achieve.

The shift to a focus on what is working and building from there was noticed by a number of participants. Several remarked that they thought the AI approach was one of the aspects of the conference that worked well for them. One participant noted that she/he “heard very little complaining about students.” Lack of complaints about students was also noted by the planning committee who had organized past Wakonse South Conferences.

MESSAGE framework: Active learning; goal-oriented learning; self-monitored learning.

Step 2 (Dream): What is my ultimate dream for my classes? Here conference participants were challenged to focus on their ultimate visions (goal-oriented learning) for their classes and were encouraged to ignore resource constraints in formulating and articulating their dreams. Planning committee members who facilitate the small groups for this step noted that participants had difficulties in stepping back from their current classes and envisioning what they really wanted. Initial dreams that were shared were often only incremental changes to what they were currently doing. However, as the conversations continued, participants became more expansive in their visions. Building on each other’s dreams reinforces the importance of social networks in learning.

MESSAGE framework: Goal-oriented learning; explaining while learning; social networks.

Step 3 (Design): How do I make my vision a reality? For step three, participants were invited to learn about new ideas in small resource groups. Topics for the resource sessions were generated from expressions of interest from participants during the conference. Participants could pick their topic of interest and explore, with others, how they could apply the new idea to their course. To encourage application of the material to participants’ courses, participants were encouraged to bring the syllabus of at least one class and modify as they learned during the conference.

MESSAGE framework: Meaningful learning; goal-oriented learning.

Step 4 (Destiny): How do I sustain change? Without support for the innovations developed in step three, energy to implement and sustain new learning environments and activities may disappear. To promote sustained actions, institutional small groups were formed to brainstorm ideas. Then, jigsaw groups with representatives from the different institutions were formed to exchange the ideas that had been generated. Finally, institutional groups were reformed to generate action plans that could be implemented after the conference. Several participants commented on the value of meeting other participants from their institution and the importance of developing institutional action plans.

MESSAGE framework: Social networks; goal-oriented learning.

In reviewing post-conference comments from participants, several points stand out. First, participants valued the emphasis on social networks (networking, meeting people, small groups, contacts). There were at least 35 positive comments on the importance of establishing, renewing, or participating in social networks. Second, at least 15 people indicated that active participation (small group discussions or dialogue, informal discussions) was one of the strengths of the conference and its format. At least fourteen mentioned the value of connecting what they learned in the conference to their teaching in the future (meaningful learning). They picked up ideas that they will use and/or developed ways to improve their courses. Only two mentioned the value of reflection upon what they were teaching (self-regulated learning), and no participant mentioned experiential or goal-oriented learning or explaining. This indicates that these aspects of the learning opportunity provided by the conference did not stand out in the participants’ minds and gives conference planner opportunities for improving next year’s conference.

CONCLUSIONS

Seven catalysts for effective faculty development programs are described and findings from research on learning and faculty development are offered to support each. Then, two innovative approaches to faculty development are described, showing how the catalysts have been incorporated.

REFERENCES


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