

Work in Progress: Empowering Teaching Assistants to Become Agents of Education Reform

Geoffrey L. Herman, Kathryn Trenshaw

Illinois Foundry for Innovation in Engineering Education
University of Illinois at Urbana-Champaign
Urbana, IL, USA
gtherman@illinois.edu, trensha1@illinois.edu

Luisa-Maria Rosu

I-STEM Education Initiative
University of Illinois at Urbana-Champaign
Champaign, IL, USA
rosu@illinois.edu

Abstract— In an effort to create education reform by promoting students' intrinsic motivation (IM) to learn, we are developing a program to train IM-supportive teaching assistants (TAs). We present our preliminary analysis of the first two TAs' reflective teaching journals and discuss what IM-supportive instruction looks like and how we can improve our training program.

Keywords- *motivation; intrinsic motivation, teaching assistants; training; reform*

I. INTRODUCTION

Although traditional efforts to improve engineering education focus on changing faculty's pedagogies [1], we believe that these efforts need to be complemented or even preceded by efforts that focus on improving instructors' support for students' intrinsic motivation (IM) to learn [2]. To test our beliefs, we created a pilot IM course conversion initiative to convert existing, large enrollment courses at a research-intensive university with minimal effort from the faculty instructor. The IM converted course looks like a traditional course: lecture taught by the faculty followed by discussion sections taught by teaching assistants (TAs). However, the IM TAs help the students learn how to direct their own learning rather than lead specific active-learning exercises. We have previously shown that this emphasis on IM rather than active learning can improve students' understanding of the course content and their learning experience [2].

In this work-in-progress, we discuss how we trained the first two IM TAs to be IM-supportive. We plan to continue developing this TA training program. This analysis will identify the habits of effective TAs, provide insights into the effectiveness of our training, and support recommendations for improvements in TA training. As TAs develop IM-supportive behaviors and have opportunities to transform their classrooms, they can become powerful agents of change.

II. CONTEXT AND TA TRAINING

We recruited TAs from a large-enrollment (more than 250 students), sophomore-level, computer architecture course. Two TAs volunteered to lead these IM discussion sections and attend a weekly one-hour training meeting on IM-supportive pedagogies and for peer support. IM is supported by increasing the students' sense of *autonomy, competence, relatedness*, and

purpose [3]. For example, IM-supportive teachers spend more time listening, articulate fewer directives, ask more questions about student needs, give fewer solutions to problems, make more empathetic statements, and offer greater support for students' internalization of learning goals (e.g., providing more rationale for why an assignment should be accomplished or for the value of the learning goals) [4].

In addition to training the IM TAs on these skills, we empowered the TAs to create course structures that reinforced students' senses of autonomy, competence, relatedness, and purpose [2]. For example, the TAs were given permission to let student learning teams create their own design project in place of an exam. Further, the TAs focused their attention on guiding these teams rather than presenting content or example problems during class time.

III. RESEARCH DESIGN

Each week, the two TAs wrote about 300 words in response to journaling prompts about their experiences. These prompts guided the TAs to identify challenges and successes as well as outcomes related to students' IM.

Based on a grounded theory approach, we started the analysis with by describing and conceptually organizing the TAs' journal reflections [5]. We used an open coding scheme to categorize the TAs' statements and actions to describe when and how the TAs used IM-supportive or controlling strategies in their interaction with students. A more detailed account of this analysis can be found in the I-STEM report [6].

IV. FINDINGS

Analysis of the TAs' journals revealed two contrasting behaviors: IM-supportive behaviors and controlling behaviors. Adoption of an IM-supportive mindset was challenged and revealed in two particular situations: identification of success as an instructor and responses to unwanted behaviors.

A. Identification of success as an instructor

An IM-supportive TA defines success in instruction by continual improvement. He has the mentality that all students can become intrinsically motivated to learn and aims to see that growth. This improvement orientation leads to constant reflection on himself as a teacher and how his actions impacted

the students. He explores and questions the sometimes competing demands of supporting students' learning while needing to promote specific behaviors to certify that the students have learned the required material.

"One of the hardest things to do while teaching is to find balance points. The balance comes between giving students autonomy and directing them explicitly, and between being open and friendly with them and having to chastise them if they screw up."

Similarly, IM-supportive behaviors were linked to critical reflection, a constant goal for improvement, and concrete plans of actions to create improvement. He evaluates his policies based on how those policies might affect his students (emphasis added):

*"I think it's a trait of a good teacher to have a set of relatively clear policies in place at the beginning of the semester; during the semester the teacher should not modify these policies. **This can allow students to focus their attentions on learning rather than policies.**"*

In contrast, controlling TAs define success by achievement of pre-determined goals. For example, since a controlling TA's goal is to evaluate students' IM to learn, he focuses on categorizing students as intrinsically motivated or unmotivated rather than critically reflecting on his actions.

"When I was a sophomore, I wasn't particularly concerned with grades, I was more interested in learning and understanding the material. I think the focus on grades is what separates the intrinsically-motivated students from the unmotivated/disinterested."

For example, one TA, after labeling his students, was slow to notice when students' motivations changed. When a "bad" group asked him to attend their group meeting on a Sunday, he failed to notice this auxiliary meeting or extra effort as a motivational change. Perhaps more telling, when a "bad" student approached him to get help with managing a project, his actions indicated an unwillingness to help and a lack of reflection on how to improve the situation:

"I told him that it wasn't my responsibility to make sure his group meets outside of class and distributes the project workload evenly, and that he should try to explain to his group that they should contribute more."

B. Responses to unwanted student behavior

IM-supportive TAs respond to unwanted student behavior with reflection on students' needs in addition to discipline. For example, in response to students' cheating, an IM-supportive TA identified the students' lack of a sense of competence (trust in their own ideas and freedom to fail) and relatedness (trust in the instructor) as barriers to motivation:

"...students need to learn to be creative and to trust their own ideas. This demonstrates students' current understanding, which may be slightly flawed, but as a teacher it's my job to gain students' trust and to structure

the course such that students feel comfortable making mistakes without a significant detriment to their grade."

In contrast, a controlling TA responds with quick-fixes to surface problems that do not identify students' needs.

"I'd prefer that students be relatively autonomous, but if they don't come to discussion, I can't help them. I'd prefer to never take attendance, but if the situation doesn't improve, I may start."

V. DISCUSSION AND RECOMMENDATIONS

The TA training raised the TAs' awareness of IM. Both TAs mentioned the importance of IM and sought to engender it among their students. The TAs also frequently referenced the IM-supportive goals of supporting students' four needs: senses of autonomy, competence, relatedness, and purpose. Although both TAs intellectually agreed to the importance of IM, they varied in their level of adoption of IM-supportive pedagogies.

In much the same way that intrinsically motivated students always seek to better understand a domain, IM-supportive TAs need to become relentlessly reflective to better understand their students. When students fail or appear unmotivated, TAs must reflect on how their actions meet students' four needs rather than label students as "good" or "bad." This emphasis on students' needs may be fostered by focusing the TAs reflections more explicitly on students' needs. Although we primarily intended for the TAs' reflective journals to be used as a research instrument, we discovered that reflection may be even more important as a training tool and empowering TAs to become agents of change. In response, we plan to develop tools to help TAs practice these reflective behaviors while they are in the classroom. By combining deep reflection with a solid theoretical foundation in motivation, we believe that TAs can play a major role in promoting students' intrinsic motivation to learn and creating a new learning culture.

ACKNOWLEDGMENTS

Thanks to the intrinsic motivation section TAs.

REFERENCES

- [1] M. Borrego, J. E. Froyd, and T. S. Hall, "Diffusion of engineering education innovation: A survey of awareness and adoption rates in U.S. engineering departments," *Journal of Engineering Education*, vol. 99, pp. 185-207, July 2010.
- [2] G. L. Herman, D. E. Goldberg, K. Green, and M. Somerville, "Creating low-cost intrinsic motivation course conversions in a large required engineering course, in Proceedings of the 2012 American Society for Engineering Education Annual Conference and Exposition, Paper 3730.
- [3] R. M. Ryan and E. L. Deci, "Self-determination theory and the facilitation of intrinsic motivation on social development and well-being," *American Psychologist*, vol. 55, pp. 66-78, 2000.
- [4] J. M. Reeve and M. Halusic, "How K-12 teachers can put self-determination theory principles into practice," *Educational Psychologist*, vol. 44 no. 3, pp. 159-175, 2009.
- [5] M. Q. Patton. *Qualitative Research & Evaluation Methods*. (3rd Edition). Sage Publications Thousand Oaks, CA. 2002.
- [6] L.M. Rosu, L. DeStefano, "I-STEM Education Initiative report-evaluation of iFoundry, IM Conversion" unpublished.