Special Session - Academic Pathways Study: Special Interactive Session on Findings and Implications for Engineering Education and Practice

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Abstract - The Academic Pathways Study (APS) is a mixed-methods longitudinal study of engineering students at four institutions. The goals of this special interactive session are to begin the processes of (1) knitting APS knowledge into the larger body of engineering education scholarship, and (2) develop ways of thinking about these findings that inform engineering education program planning and classroom practice.

Index Terms - Academic Pathways Study, learning, student development, mixed methods research

INTRODUCTION

The NSF-funded Center for the Advancement of Engineering Education (CAEE) seeks to understand U.S. undergraduate engineering students' experiences as they navigate curricula, institutions, and pre-professional expectations. The Academic Pathways Study (APS) component of CAEE focuses on understanding and enhancing the engineering student's learning experience. The APS uses multiple quantitative and qualitative methods: performance tasks, surveys, ethnographic interviews and observations, and structured interviews in a multi-institution, longitudinal examination of engineering student experiences. This mixed methods approach to engineering education research allows us to answer a broad range of research questions surrounding undergraduate engineering student learning and development.

GOALS OF SESSION

The APS currently marks its fourth year observing 40 engineering students at each of the four partner universities. As a result of our comprehensive research design, we have an enormous dataset, and a number of findings about what undergraduate engineering students in the U.S. come to know about their discipline, how they come to know it, and how they put this knowledge into practice. In this special session, we intend to use the successful interactive format developed by Adams \textit{et al} and implemented in FIE 2005 in a session titled “Communities of Practice – What are We Learning?” to share findings from the APS with a diverse audience of engineering education scholars. In today’s knowledge-rich environment, it is imperative to identify conceptual links between and among scholarship, and to weave a larger vision of what is and what can be for engineering education. Therefore, the goals of this interactive special session are to begin the processes of (1) knitting APS knowledge into the larger body of engineering education scholarship, and (2) develop ways of thinking about these findings that inform engineering education program planning and classroom practice.

SESSION CONTENT AND AGENDA

This 90-minute session will include three activity periods and conclude with a final discussion and reflection period. The description of each component follows.

- Part I (10 minutes) – Introduction. Members of the research team will present a brief overview of the Academic Pathways Study, an outline of the activities included in today’s special session, and instructions for audience participants.

- Part II (20 minutes) – Poster presentations. APS researchers will present posters summarizing various major findings from the study, from a variety of methods.
Audience participants are invited to go around the room, view the posters, and chat one-on-one with APS researchers. Participants will be provided with sticky notes and encouraged to post their reactions to the posters, guided by the following questions:

- What other research findings do these remind you of? What other research might be informed by this research, and vice versa?
- In what ways might teaching, curricula, and/or engineering programs be improved, knowing what we know now?

Part III (40 minutes) – Concurrent small-group discussions. Audience participants will divide themselves into small groups broadly defined by three interest areas: (1) engineering education research, (2) the engineering classroom, and (3) engineering programs. Depending on the size of the audience and the interests of participants, there may be more than one group for each broad topic.

Group members will participate in interactive small group discussions facilitated by APS researchers. In each group, participants will be provided with a one-page summary of the APS findings from the posters for reference, and asked to put on their “area of interest hat” (i.e., researcher hat, teacher/instructional designer hat, or program planner hat) as they discuss these findings.

- Research group: The research group will be asked to discuss the findings in light of other strands of engineering education research, including their own research projects. The purpose of this discussion is to knit APS findings into the larger body of engineering education scholarship by identifying possibilities for further research, opportunities for research collaboration, and other potential scholarship activities.
- Classroom group: The classroom group will be asked to discuss the findings in light of what currently occurs in the engineering classroom, and what could occur. What teaching practices and instructional designs are suggested and supported by the APS findings? The purpose of the discussion in this small group is to better inform the engineering classroom.
- Program Planner group: The program planner group will be asked to discuss the findings in light of engineering programs. What student support services are suggested and supported by the APS findings? How might we look at the overall design of educational programs to better serve engineering undergraduates? The purpose of the discussion in this small group is to better inform engineering programs.

Part IV (20 minutes) – Debriefing and reflection. During this component of the special session, the audience will be called together and a representative from each small group will report on their group’s discussion. Audience participants are invited to reflect on what they have heard, and identify the most interesting themes developed during the special session. As a large group, we will discuss possible next steps for researchers, educators, and policy makers.

**Anticipated Audience**

We hope and expect our audience to comprise a broad range of engineering educators, administrators, and researchers.

**Session Outcomes and Future Opportunities**

Session participants will gain knowledge about APS not only as an individual large-scale study of engineering students’ learning and development, but also as one thread of the larger engineering education tapestry of scholarship and practice. We also expect that APS researchers and audience participants alike will benefit from potential implications from this work as well as the identification of potential scholarly collaborations. We will post a summary of the results of the discussion on the CAEE website.

**Summary**

This session uses an approach that has been shown to be effective for sharing and constructing knowledge, which situates each of our varied perspectives within an engineering education community of scholarship and practice. As a result, we will begin the process of weaving findings from the Academic Pathways Study into the larger body of knowledge about engineering education.

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**References**


