

Workshop C - Developing a Classification Scheme for "Introduction to Engineering" Courses

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Abstract - Many Universities and Community Colleges offer a course entitled "Introduction to Engineering" or similar. These are often designed from scratch and tend to be "personal courses" – designed by instructors to cover what they feel is important. Therefore, while they may be prerequisites to second-year courses, first-year engineering programs are not necessarily integrated into the curriculum. Further, since they are often designed with little consideration for existing models, overall outcomes and content vary widely.

This leads to three issues: first, course developers often "reinvent the wheel" by failing to disseminate successful models. The problem is exacerbated by a lack of definition of first year models: a developer may know what they want in a course, but how do they find a course with similar outcomes with nothing more than "first-year engineering" as a description?

Second, with little focus on specification of models for these courses, many become a grab bag of unrelated topics.

Finally, there are issues preventing community colleges from offering "Introduction to Engineering" courses, leading to disadvantages for students who could transfer into 4-year programs. Without standard outcomes for a first-year course, students may receive credit for material that is much different than material they covered, and community colleges may not be able to design an introductory engineering course that is applicable to multiple institutions.

This session will invite those interested in developing a classification scheme for "Introduction to Engineering" courses. The goal of the session will be to catalog efforts underway toward the overall goal of developing a classification scheme and to create a community of practice to facilitate this development.

PURPOSE OF THE WORKSHOP

An ongoing Delphi study to develop classification schemes for first-year "Introduction to Engineering" courses is expected to yield a classification scheme. This workshop would be the culminating event of the project, where participants who had not previously met or discussed the objectives and assessment methods of those objectives would discuss the scheme as developed through the Delphi process. The expected results are:

- To examine the scheme to ensure that it adequately captures the opinions of the participants
- To begin dissemination of and use of the classification scheme
- To begin / continue dialog on assessment techniques or processes that may need to be developed.

Discussions with colleagues at the 2012 First Year Engineering Experience (FYEE) conference discovered at least three researchers working on a similar goal through different methods. The facilitators have an NSF project to develop this classification scheme via a Delphi study and are conducting interviews, analyzing databases and syllabi. The facilitators held a Catalyzing Collaborative Conversations (CCC) session at Frontiers in Education with strong interest; about 15 participants engaged in informal conversation, answering a series of open ended questions. This session would allow various investigators the opportunity to discuss current plans and results and build upon the work of each other.

A white paper presenting the classification scheme will be developed during and after this session. Further, efforts toward synthesizing a proposal to develop any identified assessment methodologies will be in place; participants interested in pursuing further work in this area will be able to form a community of practice.

FUNDING

Funds will be available for participants in the workshop who have participated in the Delphi study through Spring 2013. These funds will be applied toward travel expenses to attend FYEE. The amount per participant is expected to be between \$500-\$1000 per person (to be finalized in mid-January).

FORMAT

The format will be one of a working group: Following initial introductions, the current version of the classification scheme will be presented. Small group discussion followed by a round of sharing results will follow; this will ensure that any fine-tuning of the scheme that is necessary can occur. After this, a series of open ended questions will be posed to the group. Some questions will be those that started the Delphi study. After these questions, issues to explore more deeply will be introduced, including necessary assessment

methodologies that need to be developed, how this classification scheme can be used to improve student success and/or retention, etc.

After the large group discussion, time will be allotted to form communities of practice in specific areas. Areas may include those further, probing questions including: tie to retention, assessment methodologies, development of objectives identified as important but largely missing from existing courses, etc.

SPECIFIC QUESTIONS

What is the breadth of the audience that will be interested in the subject of the Workshop?

The audience of approximately 30 participants will have completed a Delphi study in this area. The list of participants includes faculty from a diverse set of schools, but includes only those interested in first-year engineering. This seems to be an ideal participant list for the FYEE conference, and FYEE seems to be an ideal conference at which to hold this workshop.

To what extent are the practices described in the workshop innovative, leading-edge, cutting-edge?

Identifying a classification scheme for first-year engineering courses represents a gap in the research that will be addressed by the full study. This workshop represents the culmination of the study, and represents an opportunity for anonymous participants in an Internet Delphi study to meet and engage in conversation on next steps in the research.

How does the workshop help attendees develop ideas for future research or projects that can be included into their First Year program?

The workshop wraps up with the formation of ‘communities of practice’ where faculty interested in specific areas can join a community of faculty who can pursue further research or implementation at their institution. This is a strength of the proposed workshop.

To what degree have questions about purpose, potential hypotheses, and possible methodologies been addressed?

At this time, the initial round of the Delphi study is scheduled shortly, and the three rounds are scheduled to be completed by the beginning of April. The workshop comes at the culmination of this work.