



A Second Year Review of a New FYE Program

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Work in Progress: A Second Year Review of a New FYE Program

Abstract and Background

This paper describes continued steps in evaluating faculty perceptions of a new first-year engineering (FYE) program at a major R1 university. We hope that these results will be of use to the greater engineering education (ENE) community as the number of FYE programs continues to increase in number across the country.

In a previous paper, we discussed major themes from the construction and management of a new FYE program (Ricco & Lumpp, 2017). We presented a few overarching themes at the subsequent conference presentation as well. These included: information sessions; parity of team members; construction of learning objectives; differing pedagogies; adopting and adapting materials from major courses; administrative; and housing members within departments. We made a number of initial conclusions, including that students were acutely aware of the novel nature of the course, and forgiving of issues surrounding them. Also, the themes of the course outlined in the learning objectives and outcomes were reflected in student responses, and they were aware of the importance of the new FYE program in the context of a larger college mission.

Methodology

The current mode of analysis is a thematic one, consistent with methods of thematic analysis (Braun & Clarke, 2006; Heppner, Wampold, & Kivlighan, 2008; Strauss, 1987). S(Braun & Clarke, 2006; Heppner et al., 2008) specifically, responses were analyzed using thematic analysis with a constructivist, latent approach, with respect to six steps: familiarization with the data; initial line by line coding; collating into potential themes; identifying & explicating themes; revision of themes based on the data as a whole and the naming of the themes; and producing a report with extracts of data relating the analysis to the research questions and existing literature. Each sentence in the responses were analyzed using descriptive emergent codes. Following our methodology, themes were identified from the data rather than created based on a priori theory or pre-set codes. The descriptive, emergent codes were collated by content and meaning into themes. Codes and themes were reviewed by a second researcher for accuracy and reliability. After reviewing both sets of codes, the themes were named. The overarching themes and themes by question, department and faculty standing were reported to stakeholders in an interim key-findings report.

Two sets of data were used in the gathering of this preliminary report: faculty surveys; and more in-depth focus groups. The faculty surveys were gathered in the Fall of 2016 and the focus groups were performed in the Spring of 2017. We will be mostly focused on preliminary results from the faculty surveys. Our team partnered with the university's evaluation center to avoid any potential ethical conflicts. Beyond ethical conflicts, this is also important as there are faculty both within the college of engineering (CoE) and the FYE group itself with group interview experience and one with significant experience with engineering education. Faculty being interviewed may not have been as forthright knowing data gathering was being performed by their peers. Furthermore, members of the FYE program abstained from surveys responses and focus groups.

A series of four questions was asked in survey form of all faculty:

1. What is your understanding of the rationale motivating this curriculum change?
2. From your perspective, what are the potential benefits of the FYE program?
3. What concerns do you have regarding changing to this new curriculum model?
4. What will constitute evidence of success or failure of the FYE program?

Both the surveys analyzed in the Fall during faculty retreats and the focus groups engaged in the following Spring revolved around these four questions, with organically occurring discussions occurring after some department sessions.

Results and Discussion

Nearly one-hundred faculty (N=94) out of a possible total of 157 full-time, tenure line faculty members responded with complete surveys. Among the four questions, the major themes are outlined in Table 1.

Q1:	Retention (N = 50) Improved ability for informed choice of major (N = 31)
Q2:	Increased ability to make an informed choice of major (N = 42) Increased student retention (N = 21)
Q3:	No response (N = 17) Concern regarding loss of courses, faculty, time, and student's delayed degree attainment (N = 17)
Q4:	An increase in student performance and success (N = 50) Increased retention (N = 31)

Table 1. Results of thematic analysis. Major themes for each question.

As performed in our previous work in progress from last year, we observed a number of striking phenomena between faculty and student responses. First, both faculty and students are acutely aware of the learning objectives and outcomes. This appears to be naturally occurring in the case of both populations, as the learning objectives and outcomes had not, at this time, been widely circulated among the faculty or student populations. For example, for faculty this indicates that the learning outcomes reflect the stated desires of faculty for students to become familiar with their respective majors and to make the correct choice of degree program. Students in our previous paper were aware of how numerous facets of the FYE program were designed to guide them to the right choice of major for them.

Almost expected was the faculty concern for allocation of faculty and course time. Each and every degree program at the university lost an introductory course taught primarily by their department's faculty. For example, one department lost an introductory course they believed was a cornerstone of their degree program and indicated on multiple occasions that only a faculty member with a doctorate in their field would be appropriate to teach it. For such a department to eventually put its faith in a FYE program is not inconsequential and convincing it of the merits

of FYE would be considered a success. As of the time of this paper, it is not clear whether this department has concluded FYE is a success or not.

In a conversation after administering the survey, one department adopted an interesting and potentially dangerous approach simply called the “wait and see.” Given numerous potential issues that could arise, this department believed that simply observing the positive and negative effects of the FYE program would provide the best guidance for assessment. This department – like many of the others – was genuinely concerned about student preparedness in upper-level courses, and loss of control in the degree program to the FYE program. The faculty in this department voiced concern about a phenomenon the others did not – that the FYE program could potentially pit departments against each other in competition for students. Interestingly enough, this theme was not expressed by others, although it provides an interesting basis for future assessment, as degree programs competed for students via a number of mechanisms before FYE. As of the time of this paper, this department has not indicated whether or not their “wait and see” approach has led them to any conclusions.

There was also an apparent divide between the faculty themselves – especially between faculty with tenure and without tenure. Tenured faculty members tended to be more focused overall on improved retention as the primary impetus for adopting the program itself. Whether or not this indicates a lack of a deeper understanding of the purpose of a FYE program is not evident from this preliminary result. It is clear from the surveys that the tenured faculty were highly concerned with enrollment dropping in their particular departments, possibly indicating that retention for established faculty is commensurate with retention in a particular department, and not retention for the college or university as a whole. Tenured faculty also indicated that the best metric of success of the FYE program would be student performance in general, and not student retention – performance here generally defined as performance in subsequent degree program courses.

Tenure track faculty without tenure believed that informed choice (aka “choosing the right major”) was the primary rationale for the FYE program itself. Like tenured faculty, they were concerned about unequal representation of their own degree programs in the FYE curriculum, and that future student performance would be the biggest indicator of the success of the FYE program. Lecturers indicated that retention and informed major choice were the impetuses for the FYE program adoption, and also indicated that future performance was the best indicator for FYE program success.

One major theme included those faculty who were cautiously optimistic of the FYE program itself. Of those who indicated they were unsupportive or could not or were unable to reflect upon program positive outcomes, the majority were tenured faculty members. This makes sense as tenured faculty members have the most political capital to freely speak their minds (or freely respond to surveys even if they are anonymous).

Not at all of this is without harsh – and sometimes inconsistent – criticisms of the program itself. One such bone of contention among faculty is the level of required work within the FYE courses. Some faculty had heard from students that the coursework was relatively easy,

including a few who explicitly described the work as “GPA boosters.” Other faculty had heard the opposite, that the work was difficult given the number of credit hours required. The number of credit hours for the design-centric course in the three-course FYE program is two semester hours, and this includes the construction of a team-based project, significant team formation training, and other activities normally present in three- or four-hour courses.

Another potentially harsh criticism that needs to be explored as we continue to explore the data and collect more responses is the perception of recruitment fallout. Numerous faculty explored the possible recruitment advantages of disadvantages the FYE courses have introduced into the college. Among some faculty, the FYE courses appear to have an electrical and computer engineering focus, possibly due to the Matlab programming requirements and extensive use of Arduino microcontroller technology throughout the project components of the course. While the curriculum has been crafted given input from all departments and has explicitly included elements from departments that may feel more disadvantaged by the choice of programming elements, the long-term effects on enrollment and recruitment issues per department remain unknown.

Conclusions and Future Work

Our first conclusion is that the faculty and lecturers appear to have many of the same concerns or awareness issues surrounding FYE that student have in our previous work. The alignment of the learning objectives with faculty and student responses is a positive one for us. Second, multiple departments being concerned with items beyond retention is positive, as it means they understand the purpose of a FYE program is not limited to enrollment numbers. It still remains to be seen how departments respond to increased or decreased enrollment numbers both at the college level and within their own departments. From subsequent surveys performed earlier this year, it is not clear at this time if departments will just the FYE program positively if college enrollment increases while individual department enrollment decreases. We look forward to presenting this and initial results from our Spring faculty focus groups.

The future work that remains to be done is extensive. This work has run parallel to ongoing faculty interviews that are taking place in the Spring. By the time those are complete, we will have three years of faculty interview results and be undertaking the first cut at a longitudinal analysis of faculty perceptions. Also, there is a before and after FYE perceptions survey completed by undergraduates – some of whom have not taken the FYE courses – that will help us assess more accurately the perceptions of the program from the student viewpoint.

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