Extended Abstract - Integrating Academic Advising into the Engineering Curriculum

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***Abstract* – There is substantial room for improvement of academic advising in tightly scripted programs with high attrition rates and low numbers of underrepresented students, such as engineering. Successful advising in engineering is informed by understanding the progression of advising theory, and the dichotomous comparison between prescriptive and developmental advising that is often separated into a role for faculty and a role for student services. From this context, a cohort model for advising at teaching-focused engineering programs is proposed. The 'advising as educating' model integrates advising modules and coursework, prescriptive and developmental approaches, faculty and staff, as well as ABET outcomes and advising assessment. Ultimately, this approach seeks to streamline the advising load on faculty, connect high impact practices with early career and underrepresented students, and enhance classroom content.**

Index Terms – Advising, ABET, curriculum, faculty

INTRODUCTION

The role of faculty as academic advisor for a new generation of students is a resurging topic of interest in higher education. As higher education faces enrollment and tuition challenges, strong academic advising can not only improve retention [1], but also connect underrepresented and first generation students with high impact practices earlier in their college career [2]. These are exactly the students that benefit most from these experiences, but know to seek them out the least [3]. While there is an active ongoing discussion about advising and the faculty role, engineering faculty have not fully taken part despite high attrition and low numbers of underrepresented students.

There has been some work recognizing the distinct challenges of advising in engineering and STEM disciplines [4, 5]. With credit heavy programs, a rigorous curriculum that brings students face-to-face with failure, and personalities that tend to use a hard methodical approach, there is substantial room for increased knowledge and performance of academic advising in engineering programs. Progress has been made in disseminating student success components into first year engineering experiences [6], but this advising-as-educating model is often not continued throughout the student's career.

In this work-in-progress paper, we would like to start the discussion by first reviewing 1) some influential advising models including prescriptive, developmental, advising as teaching, and advising as educating, and 2) the landscape of engineering advising at different institutions and their advantages and disadvantages. We will then propose a cohort model for teaching-focused institutions that integrates academic advising into the curriculum and the ABET outcomes. This model would seek to streamline the advising load on faculty, connect high impact practices with early career and underrepresented students, and encompass aspects of developmental and prescriptive advising. This would be accomplished by creating ready-to-implement classroom modules, online tools, and assessment instruments that can be adapted by other faculty.

ADVISING THEORY

Advising theory has undergone a progression that has been motivated by dichotomous comparison. In the 1970s Crookston defined a new developmental advising model by comparing it to 'prescriptive advising' [7]. Over the next two decades, 'advising as teaching' was developed in comparison to developmental advising [8, 9]. Finally, Melander and others have laid a framework for 'advising as educating' by comparing this paradigm with 'advising as teaching' [10].

Crookston began the advising conversation through a seminal piece that offered a new model of advising (developmental) in comparison with perceived in-practice advising (prescriptive) [7]. Crookston described prescriptive advising as a model in which advisors maintain power and prescribe solutions to a passive student. In contrast, "the developmental adviser believes that students can find satisfaction in work accomplishment, stemming from a natural striving toward self-enhancement that is goal-related" [7]. Similarly, Hemwall and Trachte saw the roots of developmental advising as coming from developmental stage theories in psychology and higher education that were being applied in the 1960s [8]. Hemwall and Trachte "concluded that the developmental model for advising most often was presented as a counseling model and asserted as its goal the self-actualization or personal growth of the college student" [11].

Critics of developmental advising stated that the model distracted students from a focus on learning and decreased the importance of faculty members. Lowenstein stated that the problem with developmental advising is that it was only focused on the student's development and not the relationship between student and curriculum [9]. The focus on advising as counseling decreased the importance of faculty-advising, because the most likely person suited for a counseling role were student services support staff. Critics argued that when advising conversations focused equal weight on the totality of a student's experience, academic curriculum lost the weighted focus that it deserved [8].

Out of this critique grew ideas of advising as teaching [8, 9]. The new role for advising required a skillful learning expert who understood the scope of curriculum. The academic advisor guided the student in understanding the interrelationship of coursework and how courses fit together to create curriculum. To Hemwall and Trachte the aim of the advisor-student relationship was "self-transformation (making meaning of the world to transform it), not self-actualization (primarily identifying individual self-development)" [8].

As time marched on, increasing focus on student learning and student learning outcomes transformed the paradigm of advising as teaching to advising as learning/educating [10-12]. Advocates spoke of linking advising discussions to institutional learning goals and mission statements [10, 11]. Melander defined advising as educating as, "an educative process centered on assisting individual students in planning, acquiring and assessing their own educations as learners while navigating the institution's educational opportunities" [10].

While advising frameworks have evolved, many of the fundamental concerns about advising in practice have remained the same. In 1972, Crookston described the advisor as "an administrative control agent, a perception with which the student readily agrees" [7]. At this time, Crookston wrote that faculty often viewed advising as an extra burden that diverted resources from teaching. While the term 'prescriptive advising' was developed to describe a distasteful practice of limited interaction, the realities of resource constraints have allowed the distaste to persist. Strommer (1994) wrote:

> Most advisors recognize the difference between prescriptive advising and developmental and espouse the latter, but when five students are standing outside the door eager to register for next semester's classes before all seats are occupied and the advisor must attend a meeting in 15 minutes, prescribing is often what occurs [13].

Despite the extensive development of advising theory, the reality of thinly-stretched schedules results in the occurrence of predominantly un-intentional prescriptive advising.

APPLICATION TO ENGINEERING

Engineering is a discipline that typically employs large numbers of undergraduates using tightly scripted curricula. Within these accredited programs, curriculum is prescriptive before the advisor and student have an opportunity to form an advising relationship. Furthermore, advisors must maintain the quality of advising while also being cognizant of the need for efficient use of scarce resources.

Parallel to the dichotomous nature of prescriptive and developmental advising, engineering programs have placed responsibility for advising in two distinct sectors – the faculty with their knowledge of the curriculum (prescriptive), and student services staff with their background in counseling (developmental). At smaller, teaching-focused institutions the faculty are more likely to do the majority of the advising, but often without knowledge of advising theory. In contrast, at large universities advising may be centralized with professional advisors residing entirely outside of the faculty. Just as the balance between prescriptive and developmental advising is constantly evolving in the context of advising theory, the balance between the role of faculty and student services staff in advising is a matter of ongoing evolution.

Studies in the 1990s examined the effectiveness and student satisfaction with faculty versus professional advisors. A study at two large research institutions found that student assigned to faculty reported greater interaction and satisfaction; the results were more pronounced with younger students and students with higher GPAs [14]. While the later study found no significant differences in faculty versus professional advisor availability and concern, they did find that students used faculty advisors more and that professional advising services were severely underused, leading to the suggestion that coordination between the two be improved [15].

This suggestion identifies one of the primary dangers of this dichotomy: practitioners come to believe that advising paradigms are mutually exclusive. On the contrary, each advising framework holds meaningful truths that articulate components of good advising. Each advising framework also holds implications for the relationship between faculty, students, and support staff. It appears that the best advising may blend prescriptive administration, developmental conversations, and learning-focused reflection around curricula. It is critical that engineering programs rigorously assess and reflect upon their advising model, considering advising theory and input from stakeholders, to intentionally determine the balance that best serves their students.

PROPOSED ADVISING MODEL

At our small, teaching-focused, private, regional liberal arts institution we have undertaken assessment and reflection on the advising model used in our engineering program. The

typical incoming class in engineering has increased to 50-70 students in the last few years. Any student admitted to the college may declare an intended major in engineering.

As a result of this unique profile, faculty are the primary academic advisors, with increasingly less time for a growing student population. Student services also contribute to developmental advising in the realm of residential life, learning services, the career center, and intensive professional advising for academically challenged and first-generation college students. All first year students are assigned a seminar with faculty who serve as their academic advisor during the first semester. Students are then transferred to a major advisor during their second semester. While this approach has been highly successful, there are drawbacks in credit-heavy programs as seminar advisors are typically not familiar with the major. This requires careful oversight from faculty in the credit-heavy majors to make sure freshman are 'on-track' from the beginning, adding another unseen advising burden to faculty in these majors.

One approach to streamlining the advising load on faculty while connecting high impact practices with early career and underrepresented students is to integrate advising into the curriculum. Here we present a year-by-year model where advising modules are incorporated into required courses and mapped to ABET outcomes (f through j).

- **Introduction to Engineering** (1st year, both semesters)
  - What is engineering and is it right for you? (f, j)
  - Student Development – study skills, introduction to student services, learning styles (i)
  - The Core Curriculum at Etown – connection to institutional learning goals, engineering field (h)
  - Opportunities for High Impact Practices – community based learning, undergraduate research, study abroad (varies: a-k)
  - Making a 4-year plan – choose core courses, high impact opportunities intentionally and early

- **Sophomore Project** (2nd year, spring semester)
  Group design project for client in community
  - "Educate for Service" – connecting your education to the institutional mission (f, h)
  - Job vs Career vs Calling (i, h)
  - Reflection on 4-year plan

- **Junior Project** (3rd year, spring semester)
  First design stages for group capstone project
  - Career Planning – job search, writing resume and cover letter, graduate school strategies (g, i)
  - Senior year graduation check

- **Fall and Spring Seminar** (4th year, both semesters)
  External and internal speakers on engineering topics
  - Life long learning plan (i)
  - Final reflections on: the institutional mission, your core program, your career and calling (h)

This integration of advising and curriculum has been performed successfully at Elizabethtown and other institutions by incorporating student success components in first year introduction to engineering courses. However, the integration is often not explicit and not continued. This model also bridges the divide between faculty and student services, as those staff with expertise can be brought into the classroom to enhance modules, rather than depending on students to seek out staff as needed.

This approach falls solidly within the philosophy of 'advising as educating' and features the concept of self-authorship, where students take on more ownership of advising as they progress [16]. One key aspect to developing self-authorship and streamlining the time requirement inherent in credit-heavy programs is the concept of 'flipping' advising so that checksheets and exercises (such as short reflections) are moved to an online format. These would be completed together as a cohort in the early years, but required for upperclassmen as a graded assignment.

Assessment is another key aspect of successful advising and teaching. Integrating advising into the classroom strengthens assessment of student advising outcomes on specific modules. Along with each module, assessment instruments could be developed and implemented more centrally in the classroom environment. Mapping the modules onto ABET outcomes allows for advising to be assessed with the same mechanisms and importance as the rest of the curriculum. In addition, these advising modules assess some of the more imprecise ABET outcomes. At Elizabethtown, we use an electronic portfolio to capture student reflections on these outcomes, which would continue under this model.

This model also distributes the ownership and burden of the advising load amongst the faculty. The instructor of particular courses can handle some aspects of advising within the classroom, which will enhance the syllabus and the student experience. The advisor assigned to a specific cohort can streamline the prescriptive duties by reviewing the online assignments and leading the relevant lectures for group advising, with subsequent individual meetings as needed. By understanding the theory of 'advising as educating,' this model reduces the burden and creates opportunities for faculty to enhance the student experience by sharing passions and talents (for service learning, abroad experiences, job search expertise, etc) within the curriculum.

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