First-year Seminar: Revealing the Hidden Curriculum

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Introduction

The transition from high school to college can be thrilling, yet stressful for all students. However, underrepresented minority students (URM) in Science, Technology, Engineering and Mathematics (STEM) fields often face additional hurdles in the form of societal and professional norms omitted from the formal curriculum. This so-called "hidden curriculum" affects day-to-day learning (such as when/who to ask for help, how to study effectively, how to collaborate with peers) and can extend to transitional periods (such as finding research and funding opportunities, asking for reference letters, and post-graduate planning) with potentially long-lasting impacts. Even graduate students struggle with these unwritten but consequential rules (Hariharan 2019).

Method

To expose the hidden curriculum and retain URM students in the STEM web, a powerful solution is the first-year seminar or "bridge" course that focuses on STEM topics (e.g. Wienhold and Branchaw 2018; Lisberg and Woods 2018). Such courses promote key determinants in STEM success including self-efficacy (one's belief in their own ability to succeed as a scientist) and scientific identity (one's sense of oneself as a scientist).

Week	Topics
1	Course Overview – Humanizing STEM
2	Building Community: Peers, Grad Students, and Faculty
3	Campus Resources: Clubs, Advisors, and Administrators
4	Academic Practices: Study Skills and Office Hours
5	Instrumental Skills I: Benchwork and Fieldwork
6	Instrumental Skills II: Analysis (graphing and statistics)
7	Scientific Communication: Verbal and Written
8	Team Science: Collaboration and Cooperative Learning
9	Laboratory Tours
10	Research and Scholarship Opportunities
11	Diversity, Equity, and Inclusion: Disrupting Barriers for Ourselves and Others
12	Scientific Integrity and Ethics
13	What Can Be Done with a STEM degree?
14	Questions, Concerns, and Planning

Table 1. Sample topic list for a first-year seminar course.
Depending on student and program needs, this format can be condensed into a short pre-college course or embedded within existing introductory courses.

A sample topic list for a first-year STEM seminar course is shown in Table 1. During early sessions of the course, the importance of discussion, collaboration, and participation should

be emphasized as key skills in STEM. To acknowledge the diversity of student perspectives, discussion questions might ask: who is in STEM? who are your STEM role models? what are your goals? what obstacles might arise on your path? how could they be overcome? Both common and unique responses should be discussed and followed-up throughout the course. While seminar topics should be tailored to student and program needs, we believe a focus on building confidence, promoting interpersonal relationships, motivating student engagement, and providing opportunities to share personal experiences and devise strategies for action are central.

From our experience, the following also support course goals:

- mandatory office hours
- reflective writing to map goals and strategies for overcoming challenges
- individual and small group discussion with faculty and professionals in the field
- mentorship by upper-level and graduate students
- incorporation of student-selected topics
- emphasis on proactive and intentional communication between students and faculty/mentors
- guest speakers who share professional and personal journeys (e.g. URM and non-URM faculty and professionals)
- active learning exercises (e.g. peer discussions, content- and opinion-based polls, problem-solving, instrument practice)

By supporting students early in their academic careers, more URM students can thrive in the STEM web.

References

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