Detecting computing-enabled interdisciplinary domains using the MIDFIELD data set

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***Abstract*—This work-in-progress research paper presents initial results from a curriculum analysis of computing-enabled interdisciplinary STEM programs.**

Interdisciplinary curriculum development has been supported through integrating computing courses for decades. These specialized programs offer a targeted approach to solving complex issues and act as a point of attraction for students to enroll in one University over another. These interdisciplinary programs' curricula often include courses from their respective "parent" fields. For example, a bioinformatics curriculum can consist of courses from both computer science departments and biology departments. Specialized courses are often also created in the "child" field to meet the needs of the interdisciplinary students as well.

The Multiple-Institution Database for Investigating Engineering Longitudinal Development (MIDFIELD) project has collected complete course records of every student's path toward a degree from eighteen Universities across the United States of America. This data allows us to construct sets of courses that students choose to complete to fulfill their institution's requirements for graduation. We interpret this set of courses as representing the knowledge, skills, and abilities (KSAs) of the students who graduate with a given degree, which we use as our theoretical framework.

This work analyses the robust MIDFIELD data set to identify overlaps between interdisciplinary degree course requirements and their "parent" degree course requirements. The set of courses shared between curricula can indicate to curriculum designers the set of classes that other institutions have deemed sufficiently relevant to include and the courses offered through different departments. Identifying specialized courses is also valuable to evaluate possible efficient plans to create new departments at institutions where established "parent" programs are already present.

This study helps lay the groundwork for promoting computing-enabled interdisciplinary STEM majors to students. Research has demonstrated how a diverse team of computing-enabled professionals contributes significantly to solving complex problems. Implementing interdisciplinary majors can make computer science programs more attractive to students with marginalized identities who seek to bridge the gap between their lived experiences addressed through other STEM programs and computer science fundamentals. As such, this study aims to identify fundamental computer science courses that other programs have or can use computing to extend or create interdisciplinary majors.

***Index Terms*—Undergraduate Education, Curriculum and Course Development**

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