

Challenges and (Best?) Practices
MS in Data Science, University of Delaware
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Intro

The MS in Data Science (MSDS, <https://www.msds.udel.edu>) at the University of Delaware is described below. Because the program is new, I feel that these are not best practices, but we keep striving to improve. Challenges are listed at the end.

History

A campus-wide Data Science Working Group (DSWG) was formed in 2016 to foster data science research at the University of Delaware. Over the course of the following year, the DSWG held several meetings and events and produced a white paper in the fall. In May 2017, a data science symposium was hosted by the Research Office and organized by a faculty committee co-chaired by faculty from the Colleges of Engineering and of Agriculture and Natural Resources. Featuring keynote talks, breakout sessions and short research presentations, the symposium helped lead to the campus data science white paper. The keynotes included speakers from the NSF and Georgia Tech.

These events, in no small part, inspired this degree program. The presentations made it clear that successful data science programs involve collaboration across multiple disciplines; generally, we took this to mean statistics, computer and information sciences, and mathematics, together with domain or application areas. During the summer and fall of 2017, a group of faculty discussed and proposed this master's degree program, which was subsequently passed by the departments, participating colleges and the University. The first students were admitted in the fall 2018 semester in a year spent as a soft opening; 5 students were in the program in the spring semester. In the 2018-19 academic year, we increased to 14 students, we no advertising other than our web page, and an in-person recruiting event in the spring of 2019 (our grand opening). Advertising began in earnest for fall 2020 admissions during the holiday period of 2019, and the university started advertising its array of data science related majors in late February 2020. The program has 40 students in the fall (and would have had over 50 were it not for the pandemic and visa issues). Our first three graduates completed the degree with the end of the spring 2020 semester.

The Program

The MS in Data Science is as a professional masters with a flexible set of core requirements in statistics, mathematics and computer and information sciences with a range of possible application areas. The total credits required is 30 at this time. A total of 18 credits come from the requirements in the three departments above (2 courses from each department), and the remaining 12 credits may be selected from a wide range of courses around the university. There is a thesis option where up to 6 credits may come from the thesis. Project courses are also allowed. In those courses, a syllabus for the semester is approved by the program, and the student reports on the progress at the end of the course.

Each student meets with the director, and then an advisor is found to plan the degree. The plan is submitted to the director for approval. The plan can be changed later with approval. We view the flexibility of the degree design as a strength.

Administration

The program has a director, and a graduate services coordinator. It is not housed in any single department officially, being an interdisciplinary program. It will move to a newly founded Graduate College on campus in the coming year. The finances have been ad hoc and approved each year. For the first year, three deans chipped in one third each; the next year, the provost funded the program. In the coming year, the provost will fund it through the graduate college. No tuition revenue sharing scheme is allowed.

The program uses departmental colleges, and has no courses of its own. While this was anticipated to be a safe approach, it turns out that departments can't always deliver all the courses that they want to teach each semester.

Challenges

Challenges overcome:

1. To make the interdisciplinary degree in the first place, the departments had to be convinced to cooperate. Fortunately, there were enough regular faculty that were really interested to make this happen. There was enough interest from the deans who had the main departments (all in different colleges), to chip in to hire a staff person, buy out courses for the director, etc. University systems had to be modified to accommodate the proposal and revision processes. The registrar's office and its systems people have made it all work, and it's getting easier.
2. Offering combined degree programs is facilitating growth. These are 4+1 BS/MSDS combinations, and we are going to offer dual degree programs at the graduate level. These are expected to help recruiting for all involved.

Ongoing challenges:

1. We found that marketing is essential for the program to be found in the somewhat crowded mid-Atlantic region. We also have some recognizable programs in the region to compete with. It is not easy to get money to advertise our program from the administration or our partners.
2. Regarding courses, getting students placed in courses that they want for the current semester may not happen. However, so far, they have been able to get the desired courses eventually.
3. Relying on departmental courses means that the students don't get a sequence of dedicated courses for the major, and this is desirable. It can be complicated when the culture of the campus is strongly oriented to departments, but we can get there.
4. Relying on departmental courses and not having the unified core makes it harder to form a community of majors. We were able to do this with small numbers, but rapid growth and the pandemic are making it more difficult.
5. The program is expected to grow rapidly, and an assistant director is needed. Justifying that spending with the financial stress caused by the pandemic is difficult.
6. We want to have an impact on the local and regional employment in the field. Our non-academic partners are eager to hire. All of our first graduates are hired; it's a start!