Bachelor of Arts in Statistics and Data Science: Learning goals

Challenge to be Addressed

The Department of Applied Mathematics (APPM) recently introduced a new major: a BA in Statistics and Data Science. At the start of my time with the Faculty Fellows, APPM's main academics webpage has no content related to the BA, and our undergraduate students page contains only requirements for graduation for our BS in Applied Mathematics. There is no explicit mention of our learning goals for our undergraduate majors; thus, students may miss the exciting things that they will learn and opportunities that will be available to them if they complete either of these degrees. This Faculty Fellows Project (FFP) has been an opportunity to present learning goals and degree information for the BA in a way that is exciting to current and potential students. As an extension of this FFP, APPM's associate chair is hoping to make a page for each course with learning goals, typical instructor(s), texts, etc. This is an ongoing project, but here is an example of the information that such a page might contain.

Desired Result

The goals of this FFP are to (1) to articulate the learning goals of the BA in a clear and concise way that is aesthetically pleasing and consistent with best practices in pedagogy; and (2) to help students see the valuable skills and exciting opportunities that Statistics and Data Science majors acquire.

In addition, we hoped to present our learning goals on our website in a way that is exciting to current and potential students. The Department of Ecology and Evolutionary Biology does a nice job of presenting well-formulated learning goals in an aesthetically pleasing way, and emulating their approach was desirable. We have not yet met this goal, for reasons mentioned below.

Description of the Project and Outcomes

As a member of the Statistics Committee in APPM, I have been involved in the development of BA. As part of that development, I worked with faculty on the committee--including Stephen Becker, Anne Dougherty, Vanja Dukic, Will Kleiber, Manuel Lladser, and Eric Vance--to articulate the learning goals for the major (directly addressing goal (1) above). I drafted these goals over a period of a few months, and the committee then went through an iterative process of refining the goals. The most detailed presentation of these learning goals can be found here. We can see that the goals are partitioned into *educational goals* and *learning outcomes*. Educational goals describe the intended purposes and expected results of the degree. The

essential question being addressed here is: What are we attempting to accomplish? Learning outcomes are statements that describe significant and essential learning that has been achieved by learners. The essential question being addressed here is: What do we want learners to be able to do by the end of the degree? One important virtue of the presentation of the learning outcomes is that each outcome is mapped onto a set of courses that works toward meeting the outcome. This mapping is helpful in making sure that each course is taught so as to meet the appropriate learning outcome for the major. It is also helpful in giving students a clear sense of what they should come away with in each course.

Note that, along with the goals, the committee has given some notes on how we might assess these the degree program. Assessment is an ongoing discussion within the department.
We faced a challenge with respect to the second component of the project--presenting the learning goals on our website in a visually pleasing way. At the beginning of the 17-18 academic year, the APPM IT specialist Jacob Tafoya left the department, and his position wasn't filled until the spring semester. This vacancy is one reason why we have not yet completed this second component. However, we have made progress toward this component of goal (1) in the following ways:

a. We created a brochure for the degree that highlights our educational goals and gives students information about the degree (including a course flowchart, career opportunities, and collaboration opportunities). This brochure addresses goal (2) above.
b. We updated our web page with some information about the BA. This isn't quite the visually pleasing presentation that I had hoped for, but it's a start! I hope to work with our new IT specialist toward fully meeting this goal.

Reflections on the Faculty Fellows Project

The FFP has been a great experience! Taking on a long term project within the department has had several benefits:

- It will have a positive impact on students thinking about the major and students who end up declaring the major.
- It gave me the opportunity to take on a leadership role with respect to the BA degree.
- It allowed me to work more closely with other faculty in the department that I wouldn't have worked with otherwise. This was rewarding both professionally and personally.
- Working on my FFP increase my visibility within the department, and, I believe, lead to a better performance evaluation!
- In the Fall of 2017, I was asked by my chair to develop and be the director of our new professional MS degree. The work that I was performing for my FFP was directly relevant to the development of the MS. Here's a description of this degree.

The FFP has also made me excited to continue similar work. Here are a few projects that would be nice extensions of my FFP:

- Make a web page for each APPM/STAT course with learning goals, typical instructor(s), texts, etc.
- Our web page still leaves something to be desired in terms of displaying information about our majors in a visually pleasing way. It would be nice to transform our academics page a bit with this in mind.

Finally, this project would not have been possible without help and support from Anne Dougherty (associate chair in APPM), Keith Julien (chair in APPM), Eric Vance, Will Kleiber, Vanja Dukic, Stephen Becker, and Manuel Lladser.