Personalizing at Scale: Digital Innovation Greenhouse

INSTITUTIONAL CONTEXT

The University of Michigan's student body is larger and more diverse than ever. Students can sometimes experience a university as large as Michigan as faceless, inattentive, and unaware. Communications they receive may seem generic (e.g., "Welcome to Michigan!"). Some faculty members may not relate the material they teach to diverse student interests, and some students may find themselves in classes without a peer who understands their life experience. Too often, no one notices until it's too late when a student is in trouble and has stopped attending their classes.

Information technology opens new possibilities. It allows institutions to gather, with little additional effort, extensive data about each student's background and experience, their current state as well as their future goals. This information can be made available in creative and appropriate ways, to faculty, advisors, and students to allow them to base their actions on data rather than anecdote. By providing access to evidence useful for decision-making, it also allows individuals to learn from the experience of all, rather than just the few with whom they happen to interact.
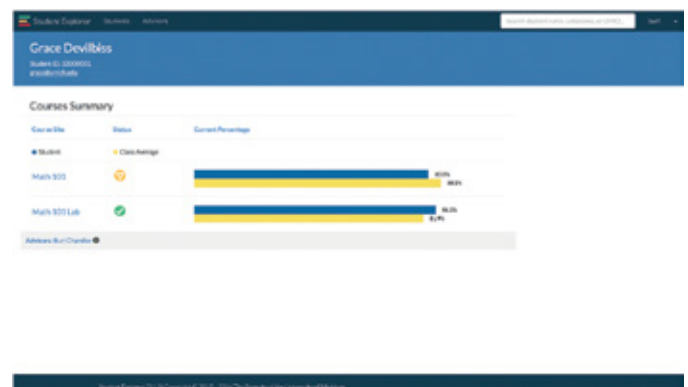
Over the last five years, the University of Michigan has used learning analytics and data to coach each student toward success in ways that recognize their current circumstances, consider their goals and identities, and deliver support through the voices of faculty, staff, and prior students. Restricted reporting tools give students, faculty, and staff access to information about the past, without putting personal privacy at risk. One major outcome of this, Digital Innovation Greenhouse (DIG), is an innovation incubator focused on personalization at scale. DIG's tools help students, faculty, and staff connect appropriately, make better decisions, and shape their own behavior by learning from the collected experience of the community.
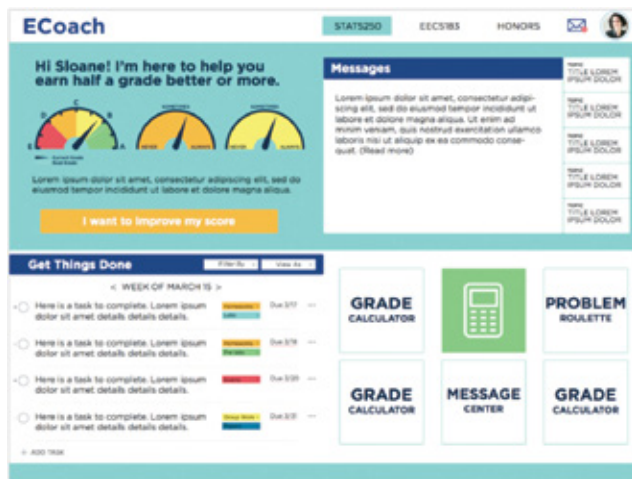
USING DATA TO IMPROVE STUDENT OUTCOMES

STUDENT EXPLORER is an early warning system that leverages Learning Management System data (see Figure 1 below). It helps advisors track the progress of over 20,000 undergraduates and identify those at risk. It begins with a high-level view, classifying each student's performance in each class as *encourage* if the student is performing well; *explore* if there are signs the student is struggling; or *engage* if the student clearly needs assistance. Depending on the classification assigned, an advisor better knows when to reach out to students to help get them back on track.

Figure 1: Student Explorer

ECOACH has provided personalized feedback, encourage-ment, and advice to more than 15,000 students in an array of large introductory STEM courses since 2012 (see Figure 2). Using knowledge of each student's background, inter-ests, goals, and current state, *ECoach* helps students adopt more efficient, effective approaches to learning.

Figure 2: ECoach

ART 2.0 is an academic reporting toolkit. Its first ele-ment, called *CourseProfile,* provides students with an array of information about the more than 9,000 courses on campus. Presented as a kind of 'baseball card', it displays enrollment and instruction histories, student evaluations, and information about who takes the course, such as pre-vious students' years, typical future majors, as well as what courses they took before, alongside, and after this course. Since its launch in March 2016, *ART 2.0* has been adopted by more than 5,000 students.

By providing access to aggregated, student-level historical data, DIG's tools allow students, faculty, and staff to learn from the experience of every Michigan student. Using individual data, they provide personalized support based on each student's unique qualities and goals. Because DIG's information is deeply integrated in Michigan's IT systems, appropriate, role-based access control is built into all of these tools, maintaining data privacy and security.

RESULTS

DIG tools are being widely adopted and are impacting the student experience in many ways. *ART 2.0* is supporting students' selection of courses, *Student Explorer* has reinvigo-rated their discussions with academic advisors, and *ECoach* is helping them identify better approaches to learning, improving their performance in big introductory courses by 0.25 - 0.5 letter grades.[1]

LESSONS LEARNED

The Digital Innovation Greenhouse was created to address a recurring problem with insufficient support for faculty to grow innovation to scale. Faculty innovators invent digital education tools within their own environment and demon-strate their effectiveness. They would like to grow them to scale, but have historically often lacked the support and expertise to accomplish this efficiently. The DIG team of software developers, user experience designers, behavioral and data scientists provide a necessary bridge between innovation and infrastructure, using a design-based im-plementation approach informed by research to translate educational innovations from idea to action. Creating an in-tentionally designed innovation team like DIG has worked very well for Michigan. It may be a good model for other universities as well.

1   Huberth, M., Chen, P., Tritz, J., & McKay, T. A. (2015). Computer-Tailored Student Support in Introductory Physics. PloS one, 10(9), e0137001.