

## The Digital Innovation Greenhouse

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### Personalizing at Scale: Engaging Every Student as an Individual

The 20th century began with an industrial revolution. In it, corporations achieved unprecedented efficiency through careful quantitative analysis and widespread standardization. Public higher education, growing at unprecedented rates, was caught in the trend. By 1950, an industrialized approach to higher education was entrenched: measured in credit hours, GPAs, and degrees. The 21st century opened amidst an information revolution. It promises to change higher education as dramatically in this century as industrialization did in the last. The real revolution will come when we harness information technology to personalize education. We already gather rich and extensive information about each student's background, interests, goals, activity, and current status. Technology supported personalization will enable us to act on this knowledge; to optimize our education of an increasingly diverse student body, create much greater student motivation and engagement, and accomplish more with less.

During the next decade, data will be used to help us richly tailor all of our interactions with students. Accumulated information will allow expert faculty and advisors to continually refine their advice, and our messages will be delivered using methods known from behavior change research to be effective. Michigan will lead the nation in using data to personalize education, both through human interactions and with technology.

#### E<sup>2</sup>Coach – a tool for personal connection, advice markets, and social support

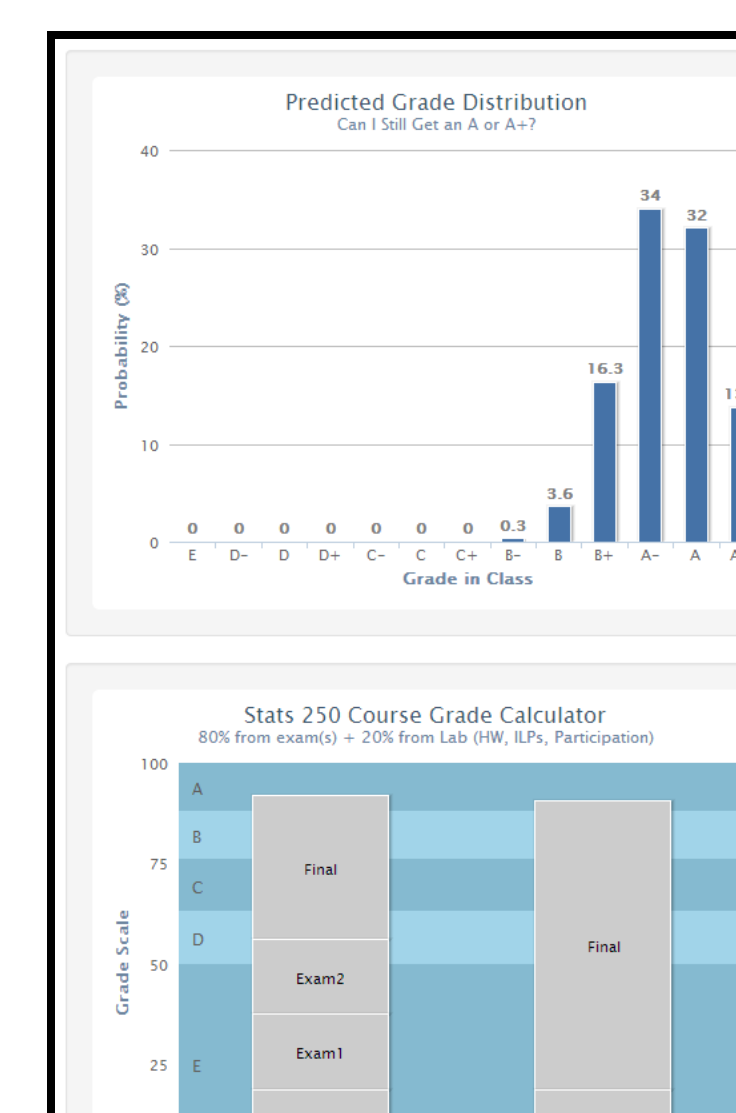
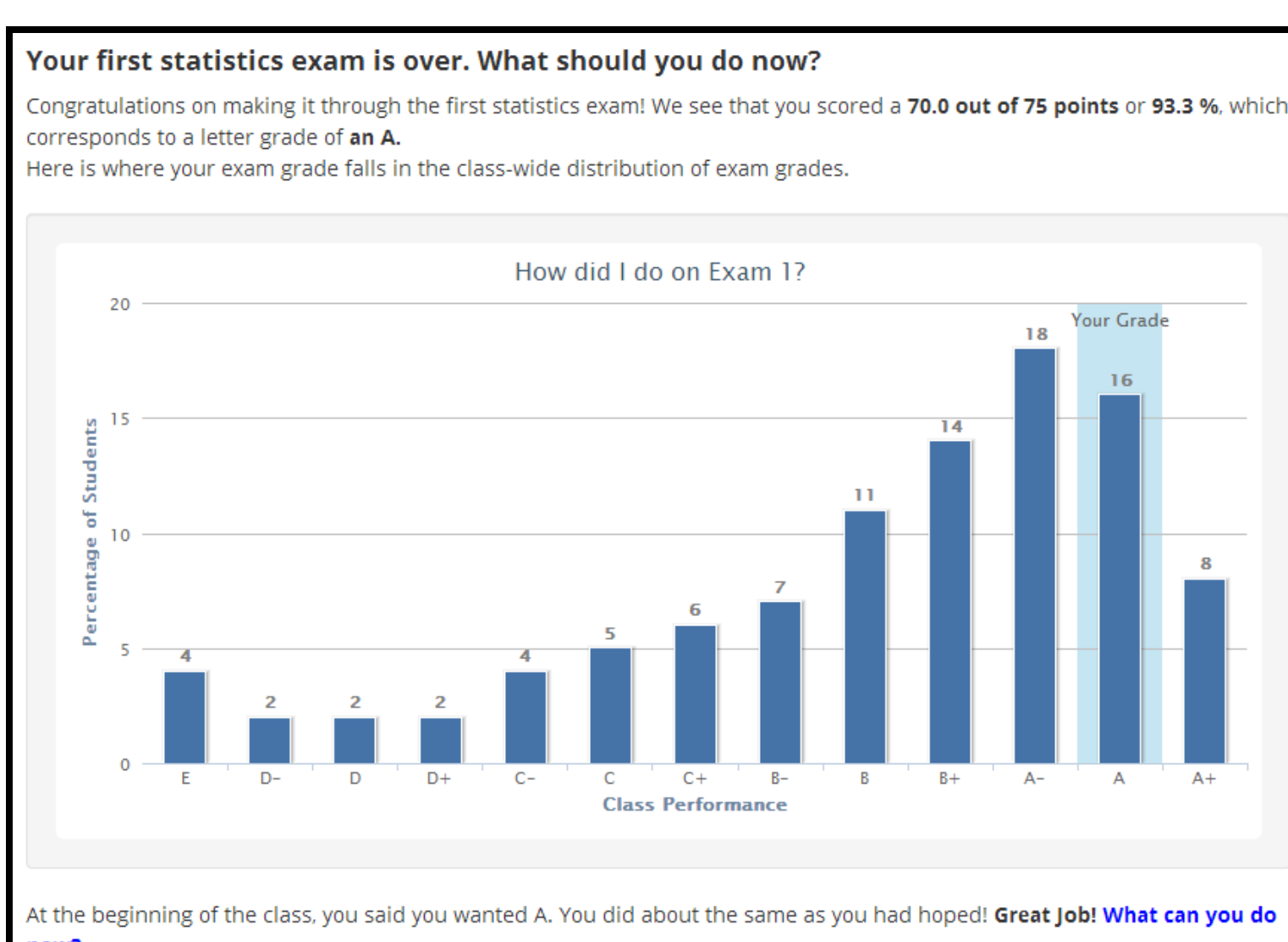
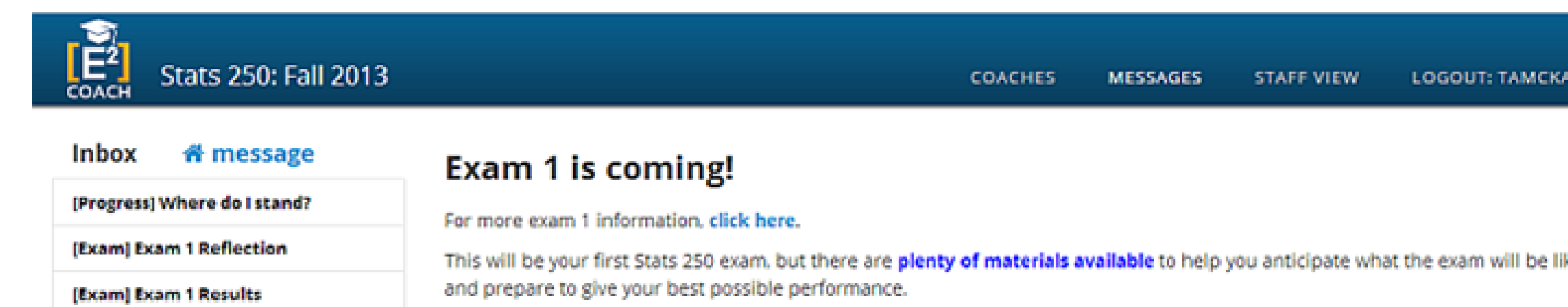
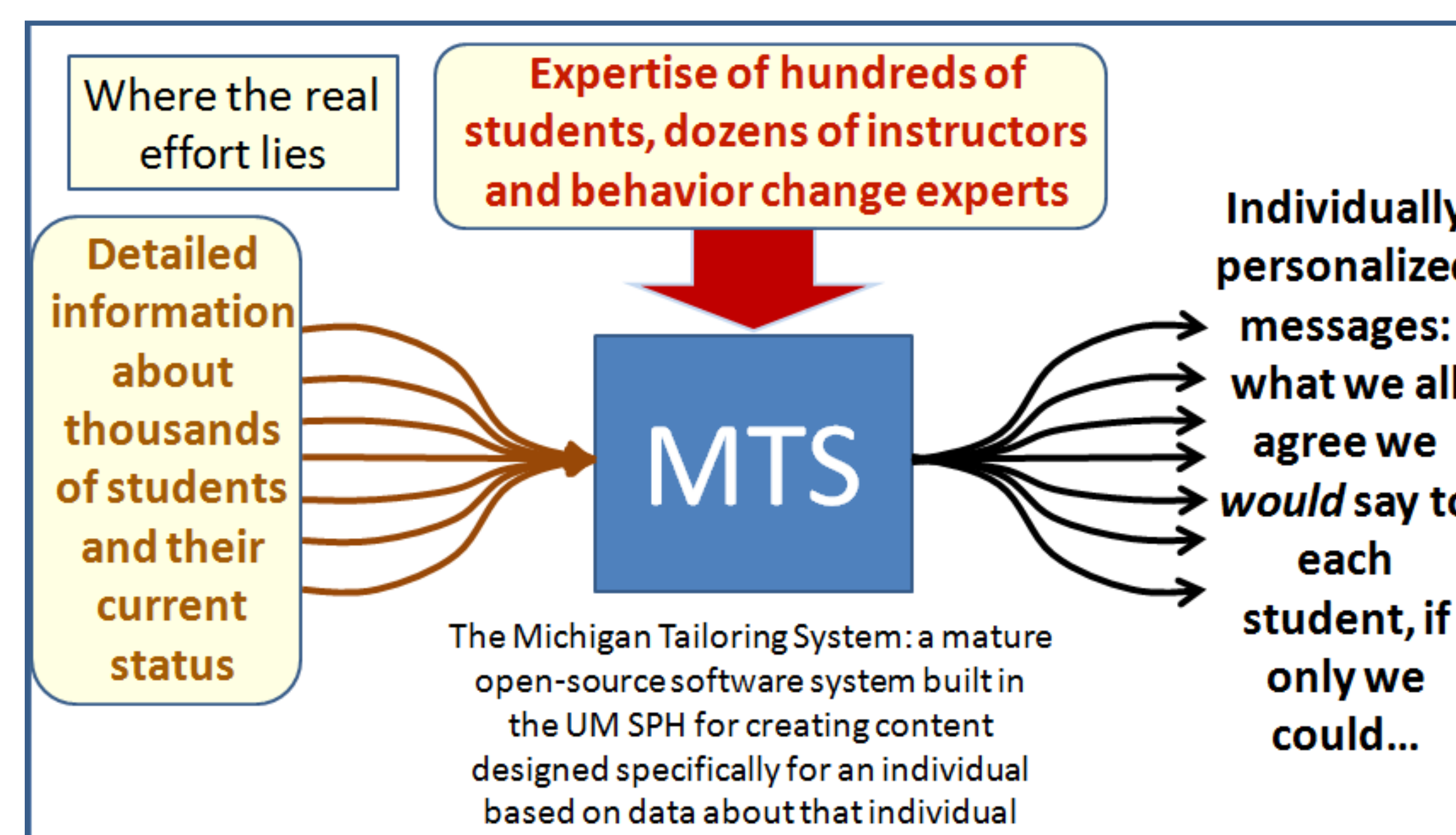
The University of Michigan has 20 years of leadership in the use of computer-tailored communication in support of public health goals. Building on this heritage, the E<sup>2</sup>Coach team has adapted this approach to provide personalized support to many thousands of students in introductory physics, chemistry, statistics, and biology classes.

Existing E<sup>2</sup>Coach applications provide personalized feedback, encouragement, and advice to students in large introductory courses. One of the most important features of E<sup>2</sup>Coach is its ability to speak in multiple voices. When providing advice, authors can choose to speak as themselves or in the voices of others, including authority figures like the instructor, or identity salient peers, who can open their advice with phrases like “Just like you, I was a premed student really worried about doing well in physics...” Testimonials like this include photographs of the speakers, further enhancing the sense that someone relevant to the reader is sharing this advice, not just a generic voice.

#### Student Explorer – informed, efficient human connections

Academic advising has been long been recognized as a high impact tool for improving student outcomes, promoting student motivation, and fostering success and persistence in the face of academic, social, and behavioral challenges. Unfortunately, advisors spend much of their limited contact time with students on administrative tasks like override approvals and graduation audits. In the future we foresee, repeated tasks, even when personalized, will be handled by tailored communication technology. Face-to-face advisor time will be focused on moments and topics which benefit the most from personal interaction.

Student Explorer leverages real-time course performance data. It provides students and advisors with frequent updates on students' academic progress, providing the opportunity to catch students who are in trouble early on and to notice those who are thriving. A principal goal of this proposal is to scale-up the functionality and use of Student Explorer so that it will reach to all academic advisors and every undergraduate student at the University of Michigan



**Let's talk about homework, Mena.**

Why do we have practice homework? We want you to be comfortable with the online homework tool in terms of the kinds of questions you'll be asked to complete. This also gives you a chance to start getting the completion of homework regular routine. You will also see how your homework is graded.

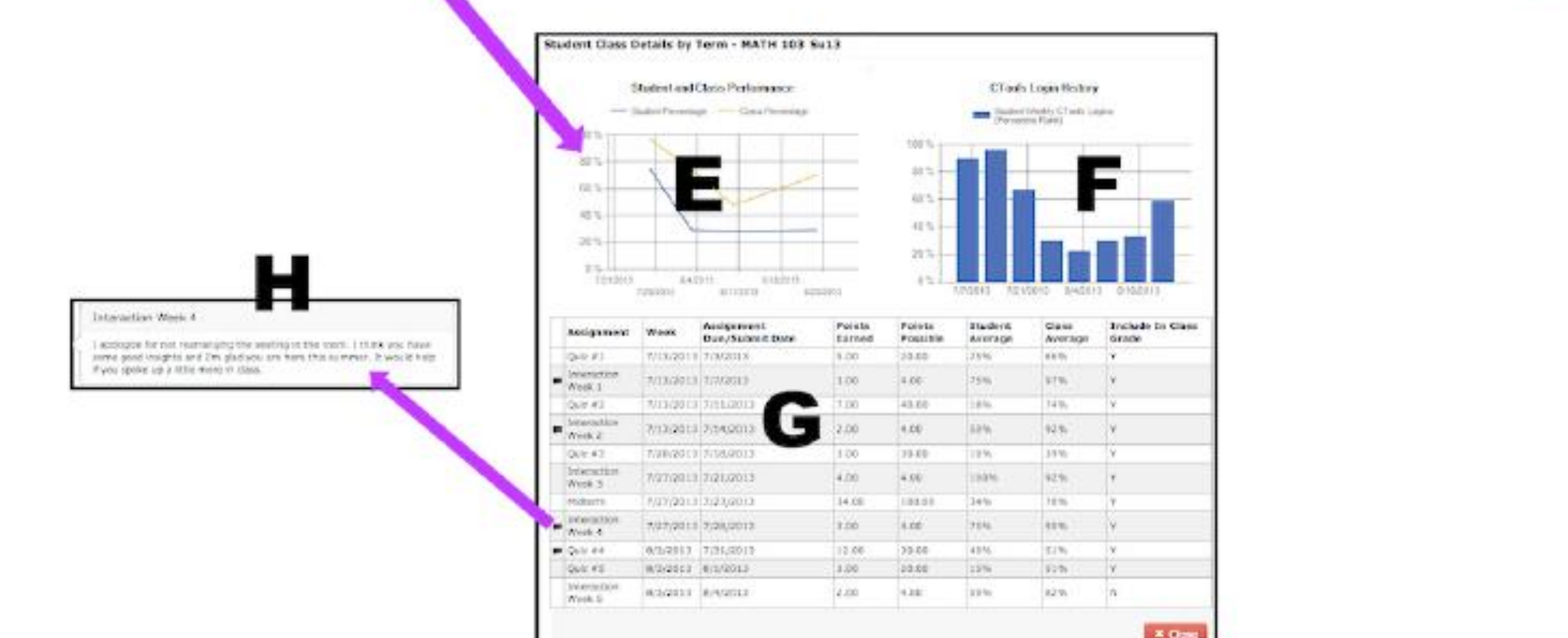
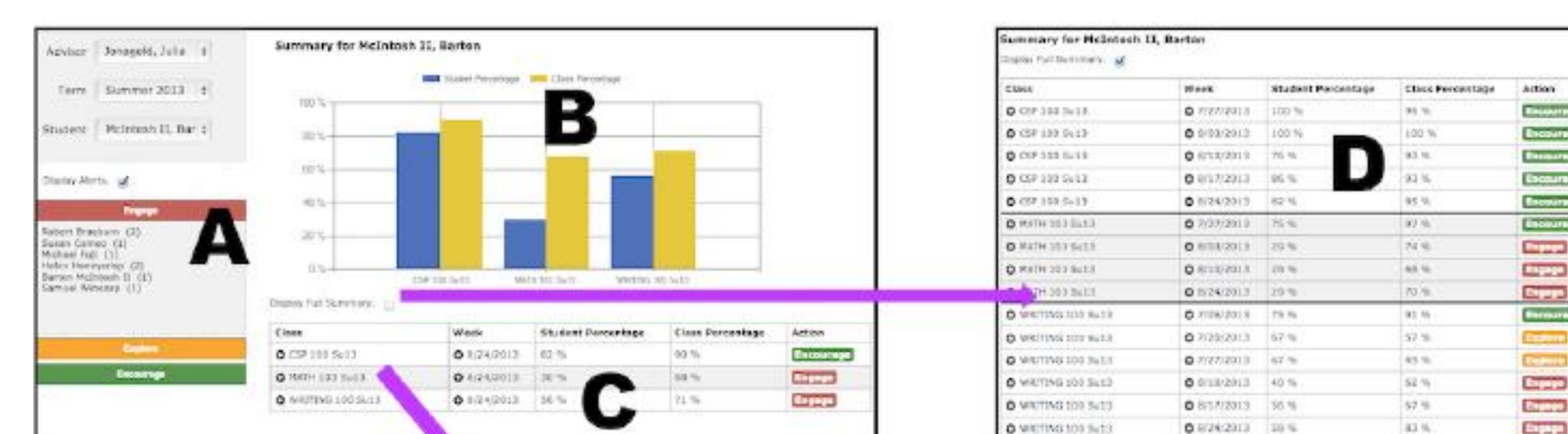
We see that you did the practice homework - great!

You scored well on this assignment. Keep up the good work! We have seen that students in the past start to lose their homeworks because they forget to:

- answer the question being asked
- always include units
- give a title and author for graphs
- show all your work (because good work with a wrong answer will probably still earn you some credit)

Even though you plan to obtain a grade of an A or A+, you can still implement good homework techniques. Anna says:

"I was very successful in this course. But if I had a 'do-over', I would probably start my online homework assignments earlier so I wasn't as stressed about turning them before the deadline."



### How to nurture promising seedlings: Build a Greenhouse!

After years of effort and substantial expense, we have now developed a number of digital engagement projects proven to be effective and shown to be scalable. Unfortunately, the teams which have led the creation of these tools are researchers, focused on creating and testing innovations. The chasm between innovation and infrastructure is present in all kinds of technology transfer.

You can't take these pea-green seedlings and drop them into a sunny field – they'll wither and die. Instead, you need to take them into a greenhouse for propagation, an interim space which understands both why innovations arrive so fragile and how to make them stronger before they're taken outdoors. In the world of entrepreneurial business these spaces are often called 'incubators', like Ann Arbor SPARK, or 'accelerators', like the University's TechArb. But we prefer a greener, more organic metaphor: the Digital Innovation Greenhouse: DIG. Supported by a Transformation grant from the University's Third Century Initiative, along with generous contributions from the College of Literature, Science, and the Arts and the Learning Analytics Task Force, DIG will be housed within the Office of Digital Education and Innovation.

#### The DIG team:

- Tim McKay, DIG Principal Investigator, E<sup>2</sup>Coach Team Lead
- Mike Daniel, DEI Director of Policy and Operations, provides managerial leadership
- Rachel Niemer, Assistant Director of CRLT, DIG Communities of Practice Team Lead
- Steve Lonn, Student Explorer Team Lead
- Gus Evrard, ART 2.0 Team Lead
- Perry Samson, DIG Entrepreneurial Opportunities Team Lead
- **Four new developers – WE ARE HIRING NOW!**

#### What DIG will do for you:

1. **Build out Student Explorer and E<sup>2</sup>Coach**, making their functionality available for a much wider range of users. Student Explorer will be expanded to support all students, working with all academic advisors. It will also be integrated with E<sup>2</sup>Coach, so that messages sent by advisors to students can be tailored. E<sup>2</sup>Coach itself will be expanded both in scale – for use in many more classes – and breadth - to a wide variety of other uses, from recruiting and orientation to major recruiting and career services.
2. **Establish Communities of Practice** around the adoption and use of these tools. To ensure a good communication of best practices among users and to maintain a tight connection between users and the DIG development team.
3. **Over see the creation of a next generation Academic Reporting Toolkit.** ART 2.0 will provide students with substantially better, more personalized information to inform their decision making. For example, when students prepare to register for classes, ART 2.0 will tell them much more about every course: how large it is, who takes it, what they've taken before, what they take after, what they major in, what it prepares you for, what majors the course meets requirements for, who is teaching it, whether they've taught it before, how students have rated the class in the past, and how students have rated the instructor in the past.
4. **Make available an experienced team of innovation to infrastructure developers:** We expect the DIG development team to provide consulting support to new digital engagement tools moving toward the Greenhouse. When they are ready for DIG support, the DIG team will be available on a contract basis to help build out the software for new projects. Having this expertise in house will provide a significant new kind of support to digital education tools across campus.
5. **Help support the development of new data-driven student support tools:** The initial DIG projects rely largely on Student Record and gradebook data. Many of the most exciting new opportunities in Learning Analytics involve behavioral data, from clickstreams to actual student writing. As tools aimed at studying the implications of these new forms of data are developed, the DIG team will be available to help bring them to scale.