Using Institutional Data to Identify and Address Educational Inequities in STEM

Facilities, Equipment, and Other Resources

This research will take place at University of Michigan, a public research institution in Ann Arbor, Michigan. As one of the best public research universities of the United States and a leader in higher education, the University has all of the appropriate facilities, equipment, and other resources necessary to successfully carry out the proposed research. The University of Michigan was ranked the No. 1 U.S. public university by QS World University Rankings in 2022.

Since 1817, the University has provided a national model of a complex, diverse, and comprehensive public institution of higher learning that supports excellence in research, provides outstanding undergraduate, graduate, and professional education, and demonstrates commitment to service through partnerships and collaborations that extend to the community, region, state, nation, and around the world. The University's mission directs the institution “to serve the people of Michigan and the world through preeminence in creating, communicating, preserving and applying knowledge, art, and academic values, and in developing leaders and citizens who will challenge the present and enrich the future”.

Permeating all 19 Schools and Colleges, research is central to the University of Michigan’s mission and comprises significant expenditures every year. The University of Michigan is a strong advocate of promoting collaboration and interdisciplinary research initiatives that involve faculty and students across the campuses. The University serves its student body of more than 47,000, retains an eminent faculty of 8,000, and its libraries hold more than 14.5 million volumes. Michigan's excellence in higher education rests on the outstanding quality of its schools and colleges, fourteen of which accept undergraduate students, as well as on national recognition of individual departments and programs and on the many major scholarly and creative contributions of its faculty. More than 100 of the University’s graduate programs are ranked top ten in their fields, indicating remarkable breadth and depth of excellence.

FACILITIES

Computers. Several computers are essential and already available to carry out this project. Computers will be used for data entry, maintenance, and storage as well as for day-to-day management. All computers that will be used in the course of this project are backed up regularly and password protected. All personnel have access to the Zoom video conferencing system which can seamlessly facilitate electronic meetings even if some participants do not have Zoom accounts. The home units of the PIs all have robust systems of TVs, computers, and cameras that will allow us to easily hold electronic team meetings when necessary. The project team has access to multiple forms of electronic storage space that are secure, regularly backed up, and can be remotely accessed through a VPN connection from anywhere in the world.

Office space. All members of the research team have adequate office space, and the postdoctoral research associate will be provided space through the Center for Academic Innovation (the home unit of PI Hayward). These office spaces include access to phones, the internet, fax machines, copy machines, and scanners, among other common office items. The offices are also equipped with standard furniture such as desks and chairs and disposable supplies. Common meeting space for project team meetings and conducting interviews is available through all participating units.

Other. All team members will have access to the University of Michigan Library, one of the largest academic libraries in the world. We also have access to information technology services and support and some software licenses through the University’s Information and Technology Services unit. For statistical support, the University’s statistical consulting center (CSCAR: Consulting for Statistics, Computing and Analytics Research) can be contacted when needed.

EQUIPMENT

Audio recorders. The project team has access as needed to multiple audio recording devices for interviews, focus groups, or observations.

OTHER RESOURCES

Administrative support. All units involved have full-time administrative assistants and accountants who are available for day-to-day clerical needs for the project including purchasing and billing support.

Center for Academic Innovation teams. The Center for Academic Innovation (CAI; PI Hayward's home unit) has several teams that can provide ancillary support for this project as needed

- ***Behavioral Science:*** The CAI behavioral science team specializes in designing engaging opportunities that leverage the significant body of work from the health sciences to help people be informed and proactive, make decisions, and achieve their goals. They have experience helping design technologies for the large residential courses to authentically reach the most important populations, and in helping to design and conduct research studies to ensure efficacy. The team also brings expertise in intervention design, plain language, and motivational interviewing. They increasingly work in the open learning initiatives portfolio, leading efforts to support learner-led action in Teach-Outs.
- ***Learning Experience Design:*** CAI staff have deep expertise in learning design, with a focus on designing learning experiences at scale (e.g., MOOCs and large foundational residential courses). These experts have helped faculty to transfer traditional residential course content into experiences that are accessible to learners from diverse linguistic, regional, and content-knowledge backgrounds. The learning experience designers work to create best-in-class learning experiences that help students discover, commit to, and learn challenging new material.
- ***Marketing & Communications:*** The CAI marketing and communications team is composed of specialists in the roles of graphic design, digital media, events, web development, content strategy, and marketing. Functioning as an in-house agency, this team works across all domains to provide consultation and services to all of CAI and our partners.
- ***Media Design:*** The CAI media design team specializes in the creation of high-quality multimedia content for use in online courses and other online educational experiences. This team collaborates with faculty members and the CAI teams to design and build robust digital educational materials, including video, motion graphics, 3D animation, podcasts, extended reality, documentaries, and other forms of emerging media. They have access to five production studios, seven editing suites and a number of field production setups.
- ***Public Engagement:*** The CAI public engagement team supports faculty across campus to bring innovative public engagement projects to life. The team specializes in building faculty capacity for effective engaged work, convening diverse stakeholders to collaborate across silos, and applying technology and design/innovation frameworks to public engagement projects. Other areas of expertise include participatory design and facilitation, coalition-building and strategic planning, and communication support for efforts geared to broad audiences, among others.
- ***Research & Development:*** The CAI research and development team is responsible for establishing a robust culture of research. The team is composed of full-time educational researchers, data scientists, and user experience researchers with the parallel goals of supporting the CAI staff members in being informed regarding the reach, efficacy, and opportunities within the portfolio, and supporting faculty across Michigan in conducting educational research in collaboration with CAI. The team is well-versed in the complexities of both qualitative and quantitative educational research, including analyzing natural experiments, infrastructure options to deploy randomly controlled trials and A/B tests, and the many complexities of navigating institutional data warehouses and vendor data.
- ***Software Design & Development:*** The CAI software development team works to further the growth of innovative research-based and research-generating learning technologies and platforms. Staff includes visual designers, front- and back-end developers, user-experience designers, and a development operations team skilled in deploying cloud-based applications at-scale using Amazon Web Services. Together this team scaffolds the whole process of creating new learning technologies from ideation to launch, in addition to providing consultation services to faculty collaborators who need expert technical guidance to navigate the rapidly changing learning technology landscape.

Faculty support. The education research communities at the University will act as robust and substantial intellectual resources for this project, in particular the ***discipline-based education research (DBER) community*** that spans biology, chemistry, engineering, mathematics, and physics and the ***SEISMIC community,*** a group that conducts several research projects focusing on equity and inclusion in large, introductory STEM courses (SEISMIC: Sloan Equity and Inclusion in STEM Introductory Courses). Feedback from these colleagues can be obtained through various regular meetings and teaching- and learning-related events such as annual internal conferences.