The Connected Courses Project (CCP)

Strategic Plan Theme: **Student Success**

Funding Level: **Between $1-5 million**

Facility Needs: **No new facilities will be needed**

Submitting Unit: **NA**

Collaborating colleges/departments/units involved with this proposal.

The following individuals have offered their collaborative support to the CCP: • Stephen Thomas, Assistant Dean for STEM Education Teaching and Learning in the Office of the APUE • Lynmarie Posey, Associate Dean for Undergraduate Studies, NatSci • Gabe Ording, Director, Center for Integrative Studies in General Science • Amy Pollock, Katie Krueger, and Laura Catano, Coordinators for Large-enrollment courses that are prerequisites for many other courses across the university. • Eva Farre, George Mias, Janette McGuire, Michaela TerAvest, Kevin Haudek, and Jinjie Liu, faculty who teach in course that are part of MSU's prerequisite system. Full implementation across MSU would require campus-wide collaboration with course instructors, large-enrollment prerequisite course coordinators, curriculum coordinators, discipline-based education researchers, advisors, undergraduate program directors, assistant/associate deans, the Center for Teaching and Learning Innovation, the Office of the Register, and IT services.

What is the proposal's big theme or idea?

The big idea in the Connected Courses Project (CCP) is that explicitly and meaningfully connecting learning across courses associated in the MSU prerequisite system and linking this learning to the goals of the diverse students found in our courses will increase student engagement, learning, and success.

To illustrate, consider fundamental genetics, a course taken by over 1000 students each year. To take this course, students must first take organismal biology which requires cell and molecular biology which requires general chemistry which requires college algebra. This series is a gateway to many life-science careers, including medical school, and connects to courses across the university. At its best, the prerequisites system connects knowledge across courses and disciplines in ways that help students succeed in subsequent courses and enable graduates to meet their personal and career goals. At its worst, the prerequisites increases time to graduation with no evidence that they are meeting their intended purposes. Prerequisites frequently frustrate students who see no connection between lower-level prerequisite courses, upper-level courses, and their ultimate goals. Students often view prerequisites as "weeder" courses, even after these courses have been transformed and align with current evidence-based pedagogies and are taught by instructors who care deeply about student success. Students in these courses are often discouraged by perceived lack of connection to their goals, causing them to give up career aspirations or extend time to graduation when lack of engagement results in the need to repeat a prerequisite course.

Most course linkages in the current prerequisite system were made based on curriculum committee's perceived utility of a course as a prerequisite and often rely only on syllabi and faculty's own undergraduate experiences with those courses. Many of these linkages were created decades ago with little significant review since. Currently, many instructors can provide a general description of why the prerequisite for their course is needed, but few can provide specific examples learning objectives, instruction, or assessment from the prerequisite course that support learning in their course. In some cases, instructors may not even realize prerequisites exist or the reason for the prerequisite is lost in history.

The key adjustment needed to change this situation is to build systems that support instructor-generated

evidence that learning in the prerequisite course supports student learning in the associated course and require documentation of this evidence if the courses are to remain associated. The University cannot simply mandate these connections, it must build systems that support evidence-based connection building, change teaching workloads to include the time required to develop and maintain connections between courses, and ensure instructors who create meaningful connections between courses are valued and rewarded.

What is the proposal's goal?

The overall goal of the CCP is to support student engagement, learning, and success by transforming teaching culture at MSU so that instead of focusing on the few courses in which they teach, instructors support student learning across the curriculum in ways that link to the personal and career goals of the diverse students in their courses.

There are many meaningful ways for instructors to connect courses and document these connection and instructors should be given latitude to do so in ways that work for their courses and context. The following example illustrates one way this might be done that aligns with NatSci strategic plan and teaching evaluation metrics. In this example, instructors from associated courses identify, from each course, learning objectives that connect the courses. The instructors then review associated instructional materials, assessments, and evidence of what students know and can do followed by discussions of what they see, collaboratively working to identify if there are strong connections between their courses that make the prerequisite associations meaningful. They can then collaboratively improve the connections between their courses and link learning in their course to students' goals. Ideally, instructors would collaboratively document multiple ways the prerequisite supports learning in the associated course and how this learning links to students' goals. They would be required to submit evidence of at least one concrete connection between the courses for the courses to remain associated in the prerequisite system. Instructors in associated courses would need to maintain collaborative relationships, ensuring that the connections to other courses are maintained and strengthened as they update and improve their individual courses. Alternatively, instructors may determine that their courses should no longer be associated in the prerequisite system.

Additionally, the CCP will help educate instructors regarding the aspirations and goals of the diverse student populations in their courses. This will facilitate connecting instruction to students' goals. Data from career services, outcomes from affinity focus groups, and input from advisors and student support groups will be collected and provided to instructors to ensure diverse voices are heard and considered as instructors collaborative link learning in their courses to student's goals.

Taken together, the stronger connections between courses and the linkage between learning in these courses to students' goals will increase student engagement and success.

Define the significance, or impact of your big idea.

CCP will impact the learning experiences and success of undergraduates taking courses that are part of MSU's prerequisite system, including courses that are corequisites. Students often do not see connections between perquisite courses and their ultimate goals. Making these connections explicit will: 1) Increase students' abilities to use knowledge across disciplines in meaningful ways. This will enhance MSU graduates' abilities to address complex, real world problems, for example, pandemics and climate change. 2) Decrease time to graduation by explicitly connecting prerequisites courses to upper-level courses and to students' goals in ways that engage and motivate students, reducing the number of students who must repeat prerequisite courses because they withdraw from or do not pass the course. 3) Decrease time to graduation by identifying and removing prerequisites that are not meaningfully connected to subsequent courses. 4) Facilitate cross-disciplinary networking and build ongoing collaboration between faculty from across the university. The ongoing networking and collaboration needed to maintain connections across courses will include discussions of evidence-based pedagogies and best practices in teaching and learning. This will improve overall undergraduate instruction, ensuring learning outcomes across courses are clearly articulated, appropriately aligned, and assesses. 5) Support advising and other student success efforts as the explicit connections between courses are documented and made available so students, advisors and other support networks can connect courses to ultimate personal and career goals.

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Who will be impacted?

If implemented across campus, this proposal will impact any undergraduate student at MSU in a major that has prerequisites as part of its curriculum, any faculty at MSU who teaches an undergraduate course that requires a prerequisite or is a prerequisite for a subsequent course, and advisors and support networks that work with students in curricula that require prerequisite courses. It has the potential to have significant positive impacts on students of color and first-generation students for whom connections between learning in courses and their personal and career goals can be especially important.

The College of Natural Sciences (NatSci) is well positioned, if provided the needed resources, to pilot the CCP. This proposal builds on and extends elements the Biology Initiative, a program previously supported by funding from the Provost's office, and aligns with NatSci's strategic plan action items of collaboration to deliver a broad and cohesive education in natural science and with revision of teaching evaluations. It is supported by key collaborators across NatSci that are already in place. Piloting CCP in NatSci would impact tens of thousands of students each year. Following this pilot, campus wide implementation would amplify the impact and create connected curricula across MSU. Implementation at scale will need to acknowledge and reward the work some units have already done in this area and provide significant, flexible resources and support that respects the different realities and cultures encountered in different contexts while still incentivizing and rewarding behaviors of individual instructors, units, and colleges that make progress in meaningful connections between courses.

What does sustainability for your proposal look like?

The CCP will create a culture of collaboration that provides time for instructors to work together, identifying and strengthening meaningful connections between courses. It will also provide time and resources needed for instructors to understand the goals of the diverse students in their courses and link learning to students' goals.

Creating and sustaining this collaborative culture will require leaders in units, colleges, and the university ensure that instructors who connect their courses are provided appropriate support, rewarded in RPT/C processes, and recognized by creating unit, college, and university level awards. Teaching assignments and expectations will need to be updated to account for the significant time and effort required to make meaningful connections between courses. Support for instructors to allow time for cross-course collaboration may include release time from other duties, summer salary, hiring extra instructors, providing extra GTA/ULA support, or some other provision to ensure every instructor teaching an undergraduate course that is part of the prerequisite system has time to collaboratively develop meaningful evidence of connections between linked courses. Large introductory courses with linkages to many other courses, courses with many sections taught by different instructors, and courses that link across disciplines or colleges present special challenges and may require additional support, possibly in the form of new positions to guide building and maintenance of the connections.

The CCP will also require a Curriculum Pathways Dashboard with underlying database to provide multidi-

rectional collection and dissemination of information needed for curriculum analytics is required. Instructor generated evidence of connections between associated courses and linkage to students' goals would be archived here and available in ways that help students, advisors, and support networks understand how courses in different curriculum support students' goals. It could be set up so students can explore paths to different careers, mapping how learning in each course aligns with what is needed to meet that career goal. Information on career paths from career services and insights into students' goals from affinity focus groups and advisors that highlight voices of diverse students would be available in ways that help instructors link learning in their courses to the goals of diverse students. Data from the registrar, such as student withdrawals and failures in each course, correlations between grades in linked courses, and waitlist for course would be available in ways that help instructors, undergraduate program directors, and unit curriculum committees identify bottlenecks in specific curriculum and work to resolve these issues. This system could also facilitate exchange of strategies that have been used to successfully build connected courses as well as approaches that have been less successful to help guide ongoing efforts.