

**Office of the President**

**TO MEMBERS OF THE ACADEMIC AND STUDENT AFFAIRS COMMITTEE:**

**DISCUSSION ITEM**

*For Meeting of January 19, 2022*

**UPDATE ON UNIVERSITY OF CALIFORNIA, IRVINE – MEASURING UNDERGRADUATE SUCCESS TRAJECTORIES PROJECT (UCI-MUST)**

**EXECUTIVE SUMMARY**

This item provides an update on the UC Irvine Next Generation Undergraduate Success Measurement Project, now called the UC Irvine – Measuring Undergraduate Success Trajectories (UCI-MUST) project. This item highlights how UCI is institutionalizing data collection and support for this kind of research, including but not limited to roles of campus faculty and staff, management of data, and the creation of the Collaboratory for Data Analytics for Student Success (CODAS). This item concludes with UCI-MUST's initial insight into the impacts of the COVID-19 pandemic on student success and learning outcomes.

**BACKGROUND**

The Academic and Student Affairs Committee has had a series of presentations demonstrating ways the UC system and campuses are collecting quantitative and qualitative data, including recent undergraduate and graduate student and faculty surveys, to better understand learning outcomes, the impact of COVID-19 and remote instruction, and where to target efforts to improve student outcomes. These items also shared research efforts under way by faculty and at teaching and learning centers, including the September 2020 presentation by UC Irvine Professor and former School of Education Dean Richard Arum on the UCI Next Generation Undergraduate Success Measurement Project and how the campus was using that effort to gain initial insight on how remote instruction during the pandemic was affecting the student learning experience.

With the goal of broadening consideration of the value of undergraduate education, UCI received funding in Spring 2019 from the Andrew W. Mellon Foundation for this project to develop a state-of-the-art undergraduate measurement system to track undergraduate experiences, trajectories and outcomes. The system was meant to examine the value of liberal arts education (broadly conceived), but also recognized the need to improve higher education measurement to address that issue. The project goals were to:

- Develop and disseminate new measures of undergraduate education;
- Inform institutional improvement efforts and advance educational equity; and
- Identify value and improve social scientific understanding of educational processes.

Integrated diverse forms of data (including surveys, performance assessments, administrative records, learning management system data, and experiential sampling) are used to measure students' longitudinal trajectories and identify the near- and long-term, multifaceted benefits students derive from college attendance. The project began tracking more than 1,200 freshman and junior undergraduates in fall 2019 and a second cohort of 1,200 freshmen and juniors in fall 2020. A third cohort began in fall 2021.

Recently, UC Irvine transitioned the project from grant funding to institutional support, renaming it the UC Irvine – Measuring Undergraduate Success Trajectories (UCI-MUST) project. This item provides an update to the UCI-MUST project, including additional efforts to institutionalize support for this kind of research, and updated findings from this research on COVID-19 impacts on student success and learning outcomes.

### **UPDATE ON UC IRVINE – MEASURING UNDERGRADUATE SUCCESS TRAJECTORIES PROJECT**

The UC Irvine – Measuring Undergraduate Success Trajectories (UCI-MUST) measurement framework has been continually refined and is now organized by the following six dimensions of conceptualizing and measuring the value of college education in terms of student development and growth through longitudinal observation of undergraduate student experiences, attitudes, and behaviors:

**Measuring cognitive ability and intellectual dispositions.** This dimension takes cognitive performance as one component of a larger and more holistic approach to measuring development that occurs in college. Other intellectual virtues and character traits that position one to apply critical thinking skills include curiosity, open-mindedness, trust in reason, and the desire to seek truth. These dispositions belong to a cluster of traits that encourage the continued exercise of reflective cognition in academic and non-academic areas. This dimension, then, assumes critical thinking, adaptability, and problem-solving aptitude are crucial to success not only during students' undergraduate career but also in a fast-paced and ever-evolving digital age.

**Development of identity and adaptive life-course agency.** This dimension takes higher education institutions as providing an ideal context in which students develop skills in adaptive agency and self-regulated motivation, including expectancies and values associated with life goals, goal engagement, disengagement, and goal adjustment. These skills are essential because they help students navigate the uncertainties and discontinuities rampant in modern globalized societies. Along these lines, the project developed and collected detailed longitudinal assessments of educational and occupational goals, self-perceptions of competence and values, self-reports of engagement with goals and flexibility to adjust goals if necessary, perceptions of academic-related experiences, and perceptions of their impact on subsequent educational, occupational, and civic engagement planning and choices.

**Self-regulation skills.** Self-regulated learning skills refer to the ability to set goals, plan, organize, and monitor one's own behavior. These skills are highly relevant for being an active and efficient agent in one's own life. Postsecondary education is an ideal setting to develop such

self-regulated learning skills by observing and learning from others who successfully use these skills and by interacting with demanding course and learning material that requires self-regulated learning. UCI-MUST used for example, measures to operationalize time-sensitive self-regulation behaviors such as when students submit assignments before a deadline and the regularity of study activities across the academic quarter.

**Social capital.** This dimension recognizes that, at the institutional level, colleges and universities provide access to professional opportunities, affiliated organizations, and alumni communities that support social relationship formation and expand social networks—these relationships are an essential component of success in higher education. The project employed several survey items that allow the researchers to investigate the links between student success and social networks. For instance, students were asked to identify their closest friends at college and provide information about each friend. In combination with student record data, the project was able to model the career outcomes of students who report having friends of higher socioeconomic status, as well as assess the degree to which the university supports the formation of demographically diverse social networks through classroom interactions.

**Civic engagement.** This dimension begins with institutions of higher education being one of the most important socializers of civic behavior in society, as early adulthood is a crucial period for the development of lifelong civic attitudes and practices. Colleges and universities foster civic engagement through a multitude of overlapping pathways. UCI-MUST seeks to advance understanding of civic attitudes, which play mediating roles between college experiences and civic behavior, by administering weekly surveys covering a wide range of student experiences, which allowed the researchers to identify mechanisms underlying civic engagement. Also, the project conducted multiple surveys during the outbreak of COVID-19. Students were asked about their perceptions of social responsibility related to social distancing which may be related to reported trustworthiness of sources of information and subjective value of civic involvement.

**Mental health and psychological flourishing.** UCI-MUST includes measures to assess how a college education leads to quantifiable increases in both mental health and flourishing during and after college and to improved functioning in society after college. In addition, the project included frequent assessments of perceived stress, mental health, and general life satisfaction. The various instruments involved also provided information about other, possibly mediating factors; for example, the degree of engagement, environmental mastery, social connectedness, and substance abuse.

Beginning in academic year 2021–22, postgraduate outcomes of some of the students in the original cohort will be identified along multiple dimensions including labor market outcomes, postgraduate enrollment, relationship formation, civic participation, health and well-being.

Taken together, these measures provide a path forward to identifying the value of postsecondary education for individuals and a mechanism for colleges and universities to respond to student needs and support student success. Hopefully, such efforts will provide a starting point and catalyst for broader institutional movements within the UC and beyond to expand, iterate, and deepen undergraduate measurement focused on improving student outcomes.

## INSTITUTIONALIZATION OF EFFORTS, INCLUDING UCI-MUST

**Institutionalizing UCI-MUST.** Institutionalizing this measurement effort required creating a campus-wide support structure for the project. To create a mechanism for ongoing sophisticated data collection and analysis methods to improve student success, UCI established a unit named the Collaboratory for Data Analytics for Student Success (CODAS). Located within the Office of the Vice Provost for Teaching and Learning, and the Division of Teaching Excellence and Innovation, CODAS brings together leaders from the UCI School of Education, the UCI Education Research Initiative, and others to support instructors in the collection and analysis of quantitative and qualitative data from UC Irvine – Measuring Undergraduate Success Trajectories (UCI-MUST).

CODAS will use a cornucopia of data along the lines of the above dimensions to inform efforts to improve student learning and outcomes and to continue to develop cutting-edge measures to understand the student experience. Its research will continue to focus on UCI undergraduates but aspires to promote use of improved measurement techniques with higher education institutions across the nation, including community colleges.

**Staff support.** Staff provide the day-to-day work of surveying the student cohorts and managing that data so it is available for research and institutional improvements, which are important tasks and part of the institutionalization of UCI-MUST. They work to coordinate the survey data with other institutional surveys, such as the University of California Undergraduate Experience Survey (UCUES) and campus Student Information Support data. Staff will also move towards institutionalizing UCI-MUST by adapting the campus' learning management system (LMS) to the project. The LMS data structures will be further developed for both research and implementation and this data will be a permanent part of the Student Data Warehouse.

CODAS will utilize multiple data sets. An important component of the process is simply identifying and determining which data to use that will be beneficial to improving instruction and student outcomes. The advantage of CODAS is in combining the research on what data is most useful with research on how best to utilize the data once it is identified. CODAS then provides opportunities and facilitation for turning research into practice in a meaningful way.

**Facilitating connections between both major research efforts (such as UCI-MUST) and individual scholarship.** For example, CODAS is working with the UCI Office for Data and Information Technology on the data analytics platform. In addition to these data streams, the existing research of several professors will be folded into CODAS, including Mark Warshauer and Di Xu, national experts on online education, and Ben Castleman, national expert on use of behavioral “nudges” on digital devices.

CODAS is set up to be both an internal- and external-facing organization. For the former, CODAS will generate detailed reports on student experience and learning outcomes, which could be used in myriad ways. For example, “mini grants” will be awarded to promote and support UCI faculty working on improving instruction in their area. CODAS can be leveraged to aid in supplementing and enhancing faculty projects, resulting in a new pool of potential collaborators.

**Faculty will continue to remain involved.** Over the past two years, the project’s research team has tracked a random sample of two cohorts, each with more than 1,200 UCI undergraduates. Data is being collected in three different strands, each overseen by a School of Education faculty member. Everything, from transcripts to online classroom behavior and living situations to student moods, is being considered and will be analyzed by campus faculty.

CODAS also utilizes the work of the UCI Education Research Initiative (ERI). Established in 2018, ERI is a multidisciplinary community that seeks to improve the educational experiences of UCI undergraduates, particularly underrepresented minorities (URM), first-generation, and low-income students. The ERI has a research mission that identifies and disseminates interventions, instructional practices and policies to increase postsecondary success and reduce racial inequality, and an implementation mission that supports and facilitates the application of research into practice.

**Campus staff also help in the continued efforts to obtain research funds to support additional projects and research.** For example, School of Education Professor Mark Warschauer recently completed a five-year, \$2.5 million National Science Foundation–funded grant, “Investigating Virtual Learning Environments,” which analyzed survey, clickstream, and learner outcome data from tens of thousands of students in hundreds of online classes to understand and support students’ online learning. This data will be leveraged in CODAS, providing a structure and framework for bringing together the different elements of a university that are necessary for supporting students as broadly as possible through data driven efforts.

**Expanding the scope and institutionalizing UCI-MUST has required creating a campus-wide support structure, including CODAS.** CODAS is using data to improve student learning and outcomes and continues to develop cutting-edge measures to understand the student experience.

Combining the world-class research of its participants with UCI professors who are already working to improve teaching in their particular fields and disciplines makes this collaborative unique. CODAS will not just be a traditional academic research center that generates findings for the field as a whole, but one that also inspires the shaping of internal institutional practices and improves performance. While the current focus is on UCI undergraduates, the intention is to share the structure and work being done to serve as a model that could be implemented at other higher education institutions across the nation.

“I hope that the work being undertaken by CODAS is widely disseminated and adopted by universities and researchers across the world. By creating additional metrics by which we consider student success, as opposed to relying solely on GPA and graduation rates, we will have a much better understanding of the student experience, and thus be able to consider ways to holistically improve this experience. By changing how we view and measure student success, we will hopefully be able to create a more diverse and equitable higher education landscape.”

– Brian Sato, Director, UCI Education Research Initiative, professor of teaching, School of Biological Sciences and Associate Dean, Division of Teaching and Excellence

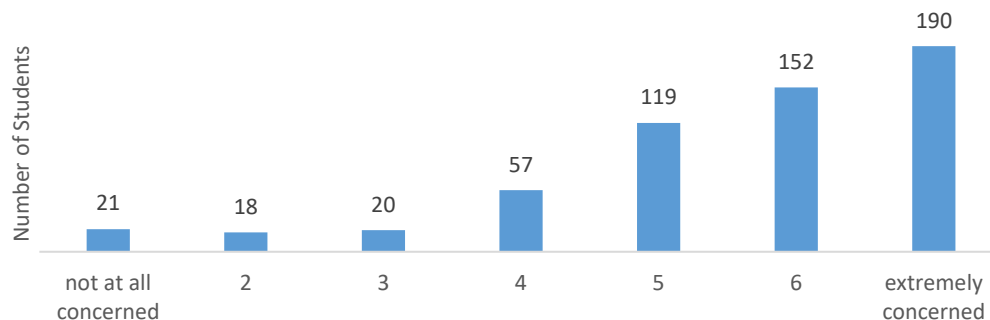
### WHAT THE MEASUREMENT SYSTEM HAS TOLD US SO FAR REGARDING THE IMPACTS OF THE COVID-19 PANDEMIC ON STUDENTS

The COVID-19 pandemic introduced unexpected campus changes, such as remote learning and greater dependence on the LMS, that have been examined in the UC Irvine – Measuring Undergraduate Success Trajectories (UCI-MUST) study. In particular, the project has focused on the impact of remote learning and the COVID-19 pandemic on student academic progress, academic engagement, and psychological well-being with differential impacts for Pell, first-generation, and underrepresented minority (URM) students examined.

As a part of the study, students are surveyed weekly on their extracurricular activities, learning behaviors, experiences with discrimination/microaggressions, and overall mental health and well-being. Students are also asked at end of term about instructional practices and any changes in goals or plans that they had. Students were surveyed starting in fall 2019.

**Students had concerns about remote classes interrupting academic progress.** In the first year of the pandemic (spring 2020), the majority of students were extremely concerned that the shift to remote classes would cause interruptions to their academic progress. However, the project to date has found little evidence that time to degree or academic achievement has been negatively affected.

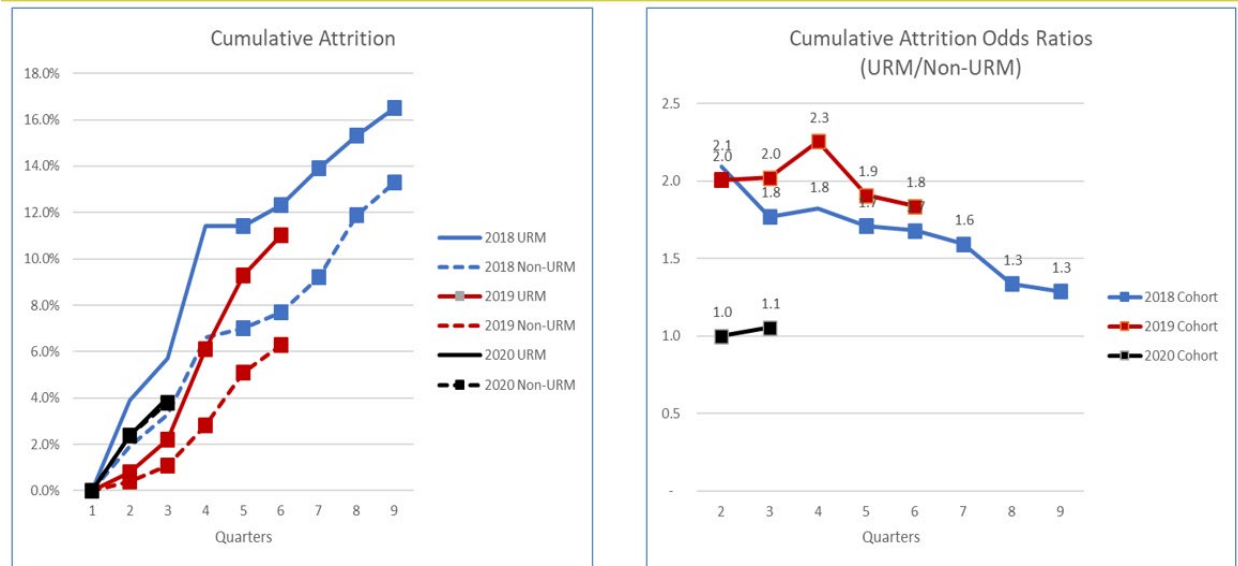
**Figure 1. Number of students with concerns that the shift to remote classes will cause interruptions to academic progress, UCI-MUST student survey**



**Students had lower attrition rates and improved course outcomes.** Cohorts that entered UC prior to the pandemic (fall 2018 and fall 2019) had lower attrition rates over time than the entering fall 2020 cohort, who started during the pandemic (see figure 2). In terms of differences by URM status, there was no clear pattern: the fall 2018 cohorts URM/non-URM differences in

attrition diminished post pandemic; the fall 2019 cohort has slightly greater differences; and the fall 2020 cohort had smaller differences along these dimensions.

**Figure 2. Cumulative attrition rates and odds ratios URM and Non-URM, fall 2018–2020 entering cohorts**



Students coursework term grade point average improved and have remained higher than pre-pandemic performance (see figure 3).

**Figure 3. Average GPA by term, URM and non-URM students, winter 2019 through spring 2021**

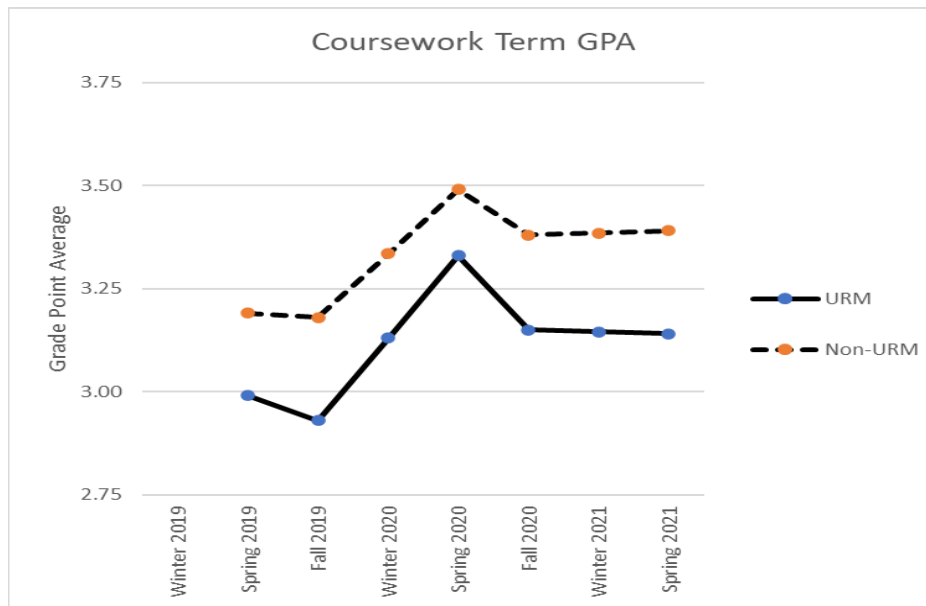
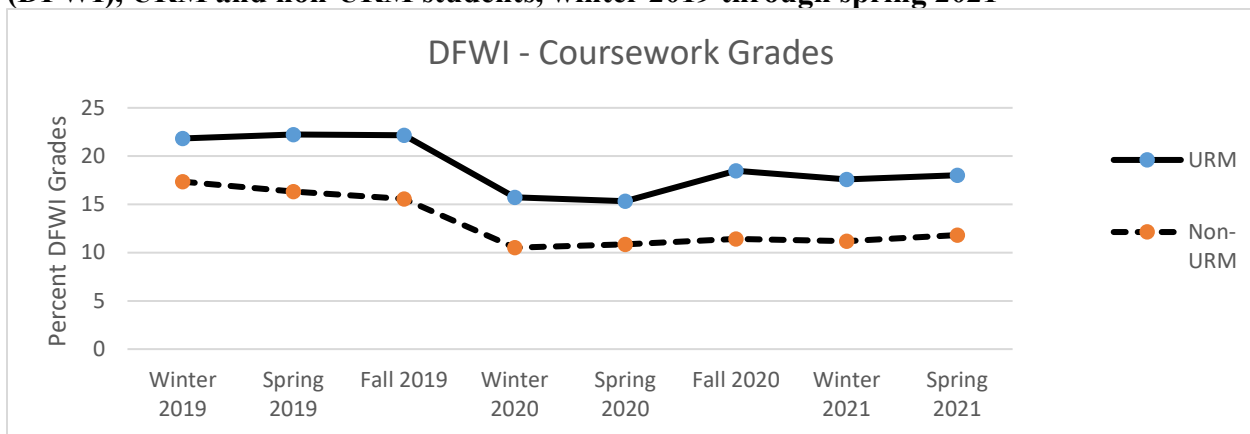


Figure 4 shows students also had fewer negative course outcomes (as measured by D or F letter grades, Withdrawal or Incomplete course outcomes) than pre-pandemic, some that may be due to more flexible grading options during the pandemic period. Differences in course performance for URM and non-URM students significantly declined early in the pandemic, but have now returned to pre-pandemic rates.

**Figure 4. Percentage of students receiving D, F or incomplete grades of withdrawing (DFWI), URM and non-URM students, winter 2019 through spring 2021**



**Students faced personal challenges during the pandemic that affected academic experience.**

For example, the number of responsibilities students had during the pandemic was negatively correlated with the number of hours they spent within the LMS system, at study sessions and with the number of hours they submitted assignments before deadlines. Procrastination related stress was also negatively correlated with number of study sessions reported.





**Campus adaptations to the pandemic also included promoting instructional practices that encouraged more active learning pedagogical approaches.** Students spent less time in lectures, participated in more interactive learning activities (like classroom discussions), and had greater academic behavioral engagement than found in prior pre-pandemic classrooms (see table 1).

**Table 1. Instructional activities and hours studying, fall 2019 and fall 2020, UCI- MUST survey**

	Fall 2019	Fall 2020	Difference
Lecture	79.07	57.12	-21.95
Groupwork	4.54	3.57	-0.97
Discussion/Other Class Activities	16.39	39.3	22.91
Study Time	6.51	8.84	2.33

UCI researchers have identified evidence that undergraduate students at the institution received minimal disruption to their continued academic progress during the pandemic and the campus’ move to remote instruction. This continued progress was likely due to student adaptation to the new environment, as well as campus institutional adaptations including encouraging the adoption of active learning pedagogy, which saw increases in academic behavioral engagement.

### CONCLUSION

The University of California and its campuses are collecting quantitative and qualitative data and conducting research to better understand and support student learning and outcomes. Prior Academic and Student Affairs Committee items presented systemwide institutional and survey data on undergraduate and graduate student and faculty experiences during the remote instruction period. These systemwide data collection efforts, along with campus use of LMS data, measures of student performance, and research projects like UC-MUST will help the campuses continue to adapt instructional methods and support to promote student success.

### KEY TO ACRONYMS

CODAS	Collaboratory for Data Analytics for Student Success
D, F, W, I	“D”, “F”, withdraw, incomplete grades
ERI	Education Research Initiative
LMS	Learning Management System
UCI-MUST	UC Irvine Measuring Undergraduate Success Trajectories Project
UCUES	University of California Undergraduate Experience Survey
URM	Underrepresented Minorities