Two LEAPS Forward, One LEAP Back: A Two-Year Pilot of a Developmental Mathematics and English Cohort Program

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Learning Expectations and Academic Preparation (LEAP) was a two-year pilot offering a cohort (20 students) of our lowest scoring English and mathematics developmental students an intensive cross-disciplinary semester to accelerate through their developmental courses. Blending learning community and summer bridge best practices, LEAP incorporated significant scaffolding to help students develop transferable cognitive, academic, and college skills. In both pilot semesters, we achieved early successes; however, our retention/success rates over time tended to match rather than substantially exceed that of traditional courses. While LEAP did not achieve long-term sustainability, we reflect in this article on our "take-aways" as individual instructors, developmental program coordinators, and faculty members promoting stronger academic and college skills on a university-wide level.

Developmental Education Challenges at Western New Mexico University

Western New Mexico University (WNMU) is an open enrollment, 4-year public institution serving approximately 3,000 students in rural southwestern New Mexico. Because the closest community college and university are two hours away, we fulfill the needs of both the 2- and the 4-year+ college, with a student population closely resembling community college demographics. Over half of our students (52%) are first-generation college students, nearly three quarters of our students (72%) have a low expected-family contribution, and nearly half (47%) meet both criteria, which is the basis for identifying "at-risk" students.

WNMU offers multiple levels of remediation for English and mathematics. Traditionally, the following English courses were offered in this standard sequence: Developmental Reading I (through Adult Basic Education), Developmental Reading II, Developmental Writing I, Developmental Writing II, and for 3 years, a pilot Developmental Writing II co-requisite with English 101.[1] In mathematics, developmental students place into developmental mathematics or developmental algebra, courses that utilize the ALEKS program, which allows students to progress at their own pace through the sequence in face-to-face, traditionally scheduled classes. Students are placed through mixed methods (Accuplacer with additional diagnostics) to ensure accurate placement. While there are opportunities for students to "accelerate" in both mathematics and English, students placing into the lowest levels of English and mathematics still have many "hoops to jump" before completing their college-level course.

Kate Oubre and Tanya Rivers were hired in 2013 as tenure-track assistant professors in their respective academic departments, with each serving a one-fourth course release (Kate as English composition coordinator and Tanya as developmental mathematics coordinator). As the Complete College America movement was gaining traction, New Mexico, like many other states, was threatening to cut funding to developmental courses and mainstream all students into college-level courses. Kate was warned that she would be "fighting" for continued funding, but both Kate and Tanya were granted autonomy to reshape their respective curricula as needed. Both developmental sequences had been developed in the 1990s but had not undergone major revisions except for the dissolution of the developmental studies program, which had housed English and mathematics together, prior to 2013. Full-time faculty who had taught developmental courses had moved into other positions or were nearing retirement, and since developmental courses are considered a necessary if neglected stepchild at our university, we were largely left to our own devices. Thus, except where indicated in this article, the pronoun "we" means Kate and Tanya; we have noted the few instances of collaboration where appropriate.

When we started teaching at WNMU four years ago, retention and success rates closely mirrored the national trends with traditional remediation programs. (Complete College America, 2017). In terms of retention challenges, we noticed that students concurrently enrolled in our English and mathematics classes would "disappear" from both classes--remaining on our rosters but no lon-

1 Beginning Fall 2016, Developmental Reading and Writing courses have been re-structured into two courses: English 097 (Introduction to College English) and English 099 (Rhetoric and Composition I Workshop), a co-requisite support course for English 101. The English gateway courses are English 101 and English 102. Beginning Fall 2017, Developmental Mathematics courses have been re-structured into Math 097 (Math Fundamentals) and Math 098 (Introductory Algebra). The mathematics gateway course is major dependent.

ger attending classes. We also observed that a majority of students placing into all three of the lowest level of developmental coursework were not taking these classes in their first semester. Additionally, after our first year, the mandatory student success course for all incoming first-year students was phased out. Thus, while we coordinated our efforts to retain individual students, we recognized the need for a more systematic approach to better serve students.

Our Shared Pedagogy and Vision

After several discussions with our department colleagues over a "Research Across the Curriculum" informal gathering, we determined shared principles about developmental education and assumptions about and experiences with teaching our students. This shared vision helped us determine our program vision and model.

1. Learning is based on three principles in line with Edwards and Beattie's reiteration (Winter 2016) of the National Research Council's *How People Learn*, that new knowledge must be built on a strong foundation of prior knowledge, that cognitive development occurs when the brain forms networks and connections, and that self-reflection and the development of metacognition help to reinforce learning and build those cognitive connections (p. 30).

2. Students become more engaged with one another and with their professors if they forge personal connections and create a sense of community, which is a common assumption and goal in the learning community model (Yale, n.d.).

3. Students scoring at the lowest levels in mathematics and English also face challenges in abstract as well as critical thinking.

4. Students in remediation face challenges outside of academic coursework that must be addressed for them to succeed. Current research shows that additional supports do have positive effects on developmental students' success, although the long-term results are mixed (Rutschow and Schneider, 2011, p. 52). Despite concerns about the long-term benefits, we felt strongly that with the elimination of our student success course in 2015, along with our at-risk student population needs, we needed to address external as well as curricular concerns.

5. Current models for accelerating students in a fast-track program would not benefit these students. While we are committed to providing motivated and higher-functioning students options for acceleration, we believed that concentrating and intensifying foundational skills should be the focal point of the program, a concept that is consistent with current models as reported by Hanover Research (2013, p. 13).

6. Transfer of skills within a discipline is very challenging for students, and transfer across disciplines requires even more of a cognitive leap. We wanted to incorporate opportunities for students to practice and reflect on transfer of knowledge and skills with interdisciplinary projects, a practice that is consistent with strong learning community models that achieve slightly better outcomes than those without cross curricular integration (Rutschow and Schneider, 2011, p. 41).

7. Students who demonstrate a need for developmental courses in mathematics, reading, and writing would benefit most by taking those foundational courses early in their academic careers.

After identifying our shared principles, we determined that the Western State Colorado University PRIME program would serve as an excellent model for our program. According to WSCU's Institutional Research, not only did they achieve a 98-99% (fall to spring) retention rate over a 5-year period, but they also graduated their first fifth-year class in 2015 with 50% of their original cohort. We had lofty ambitions to match WSCU PRIME's success and retention rate. To accomplish this, our practical goals were to assist the cohort in determining and building on foundational knowledge of mathematics and English to reach college level as efficiently as possible; to model and encourage transfer of skills across reading, writing, and mathematics; to embed college and student success components; to enhance student independence and knowledge of university resources; to create a learning community environment; and to promote opportunities already available for motivated students to streamline their individual developmental mathematics/English sequence to be college-ready within one year.

With funding from an Albert I. Pierce Foundation grant, we were able to travel to Gunnison, Colorado, for advice and guidance in constructing our program design that blended the learning community and the summer bridge program models.[2]

2 The authors wish to thank Albert I. Pierce Foundation and WNMU Collaboration Grants for their assistance in funding the development of LEAP as well as WSCU PRIME faculty members Edith Cranor-Buck (Mathematics) and Shelley Read (English).

The Learning Community Model and LEAP

The learning community model's general principles fit well for developmental students not only in acculturating them in the academic expectations of college but also in forging connections and utilizing support structures already in place at the university. In broad terms, the PRIME program models a common sense of purpose in insisting on students' reliance on one another as well as their two professors to succeed at the college level. Many learning communities focus on underprepared students and seek to help them advance to college-level work quickly by helping them forge connections that will provide lasting support.[3]

Following the learning cluster model, LEAP scheduled three "linked" classes for a cohort of 20 students: Developmental Reading II, Developmental Writing I, and Developmental Mathematics. These courses were offered during a common block of time five days a week, with both instructors attending all class meetings and sharing common office hours; these features were designed to add consistency and a standardized schedule that reinforced "school" time. Additionally, we worked with the university's student service specialists to develop a list of "developmental friendly" courses to fill out students' schedules. To assist in fostering community, we developed team-building strategies and opportunities to help students forge academic and social bonds. Further, we worked with our campus partners to ensure that we had a clear set of protocols for advising students and linking them to the proper university resources (including advising, financial aid, registrar's office, counseling, business office, etc), and in year two created 'just-in-time" mini-lessons during class on achieving academic success and navigating our college system. Throughout the semester, we asked students to reflect on their experiences in LEAP as well as the mathematics, reading, and writing strategies and skills they had acquired to help them become more self-aware about their learning. Finally, we made ourselves available in the spring for additional student support, including teaching the next course in the sequence.

In addition to our LEAP support structures, we included inter-disciplinary and cross-disciplinary projects into our academic coursework to help students practice conscious and methodical skill transfer. Kate incorporated mathematics activities and lessons in English with Malcolm Gladwell's *David and Goliath*, an 11th grade reading-level text that includes statistical analyses. In mathematics, Tanya incorporated lessons that helped students better understand language in relation to mathematics. Most importantly, based on Tanya's "Math in the Real World" writing assignment, we created a career exploration project, including a resume and mock interview, a research and field interview project, and a written report outlining the role of mathematics and English in a student's chosen major and/or career. With these assignments, we hoped to bridge the "silo effect" in students' thinking about academics, and help them find value in challenging academic skills by peering into their future profession.

The Summer Bridge Model and LEAP

WSCU's PRIME developers utilized the summer bridge model as a fall-semester program, providing students who fit the traditional at-risk demographic (often underrepresented racial minorities, low-income students, and/or first-generation college students), with support during the academic school year.[4] Part of their rationale, which also holds true for WNMU, is that their student population is not available to attend summer programs. By creating this as a fall experience in the academic year, these programs conform with The National Council for Postsecondary Research study recommendations to offer "more support and transitional experiences to help students reach and sustain attainment goals" (Barnett et al, Executive Summary 2012, p. 5).

LEAP borrowed from the best of learning community and summer bridge programs to provide students with opportunities to determine prior knowledge, build skills, reflect on their experiences as learners, begin to make connections across disciplines in order to synthesize and firmly embed that learning, and develop a social cohort and support system. By offering a "summer bridge" program in the fall semester, we worked to meet acceleration model goals of "just-in-time" learning and provide students with assistance in accessing university resources at the time when they most need it—in their first fall semester of classes. In our second pilot, we emphasized discussion and reflection around cognitive development and learning and reduced our very rigorous academic scaffolding a bit earlier in the program to help students begin that transition towards independence. Additionally, since all LEAP participants took these mandated courses concurrently, they were set up for greater academic success and acceleration over their peers by program design.[5]

3 Long Beach City College STAR program, TRIO (Yakima Valley Community College), Clark College, and the Kingsborough Community College system have used this model successfully. See National Resource Center for Learning Communities (n.d.) and Rutschow and Schneider (2011).

4 See U.S. Dept. of Education, 2015.

5 All Developmental Math students have an opportunity to complete early and begin (or even potentially complete) Developmental Algebra during the semester; thus, LEAP students also had options to accelerate even more quickly depending on their dedication, skill acquisition, and motivation.

Two Years of LEAP: What the Numbers Show

Our original vision was to achieve a nearly 100% retention and success rate as we stated in our proposal for the Albert I. Pierce Foundation grant that we received. Thus, our primary measurements were quantifiable:

- How many LEAP students achieve success (C or better) in their courses with us?
- How many LEAP students are retained from fall to spring?
- How many LEAP students are retained from fall to fall?

At the same time, we built in other assessment tools to measure individual as well as cohort learning and success, including student surveys, reflections, metacognitive and transfer exercises (or portions of academic assignments), and informal feedback.

Although we experienced short-term successes with individual LEAP students and the cohort as a whole, the data regarding longer-term success and retention, though difficult to assess directly, align with previous studies, making it a challenge to continue allocating (and budgeting) the intense resources required for this type of learning community cohort.

LEAP Success

The LEAP population over both semesters was quite small, with a course cap of 20 students and early attrition of one or two each semester. Despite changes we made to improve scaffolding techniques, group cohesion, and metacognition, our results across both pilot cohorts showed only a modest success, illustrated in Figure 1.

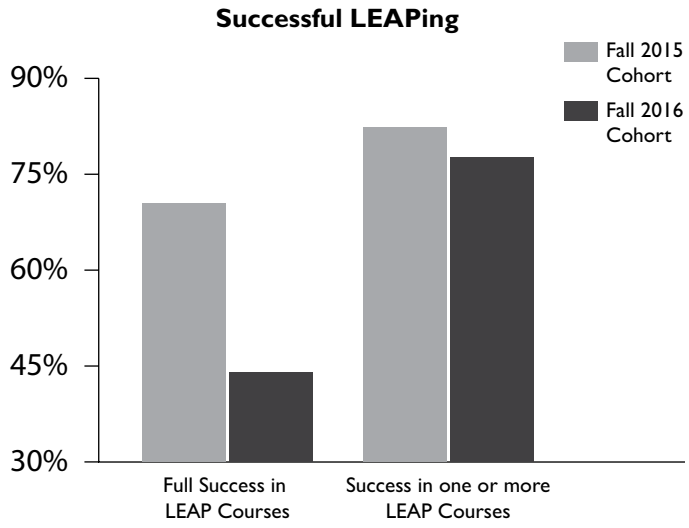

Figure 1. Course Success

In a mini-longitudinal study, Kate currently (Fall 2017) teaches four LEAP 2015 students who have completed their English composition sequence and are now enrolled in a 200-level literature course to meet general-education requirements. Although these students passed their gateway course, each one still faces very significant challenges in reading and writing that remain potential obstacles in attaining a bachelor's degree.

LEAP Retention[6]

Because of the small size of the university as well as the small number of students who refuse to take all three developmental courses concurrently, there is no clear control group by which to compare LEAP student retention. Thus, LEAP students could only be compared with students in another developmental mathematics section taught by the same instructor. The following charts compare the Fall 2015 cohort with that "control group." LEAP students follow the national trends, retaining at a slightly higher rate initially, but by their second spring, the retention of the LEAP students is virtually identical to the control group, as Figure 2 reflects.

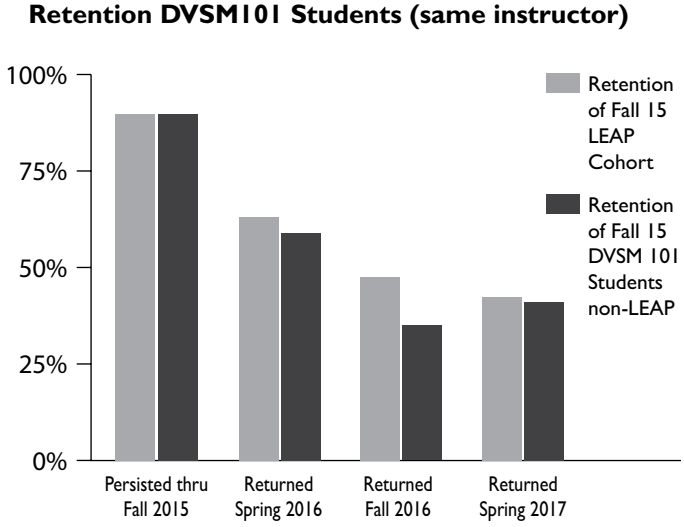

Figure 2. Comparative Retention DVSM 101 LEAP vs. "control"

As shown in Figure 3, although the retention rate decreases, the percentage of students returning each semester subsequent to LEAP increases for the LEAP Fall 2015 cohort, which is comparable to the control group. After the initial decrease in students returning in the Spring 2016, LEAP students continue to return at an increasing rate through the Spring of 2017.

6 Throughout this article, "retention" is used to designate continuing enrollment semester to semester (fall to spring, fall to fall).

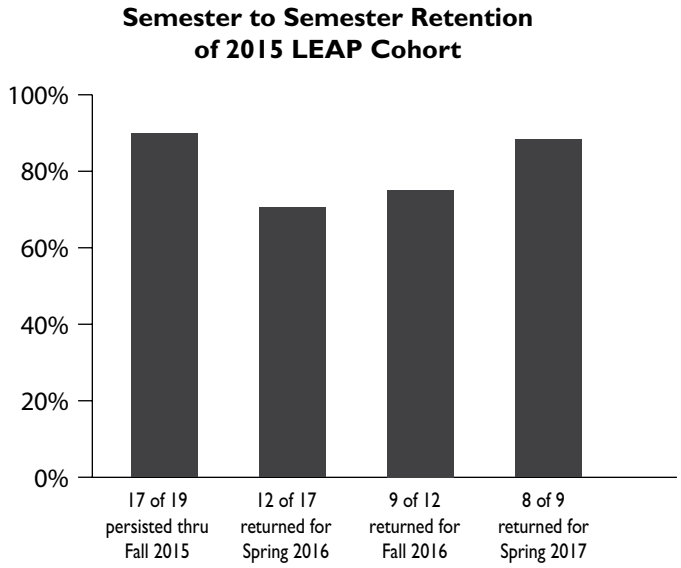

Figure 3. Semester-to-Semester Retention of 2015 LEAP Cohort

Since we have not polled students exiting, returning, or re-entering after a stop-out, it's difficult to know whether or not their LEAP experience had a direct influence on their decisions about college. However, we do sense from their behaviors when we meet that their experiences with the two of us have "mattered" to them in some way.

In an attempt to collect qualitative information about the students' experiences in LEAP, in the first semester we assigned tasks that very specifically asked students to reflect on the courses, specific components of the LEAP program, and their experience as learners in this modified college environment. What we found while reviewing these assignments as well as university-administered course evaluations is that students:

1. appreciated most having two instructors in the room for every class meeting,
2. sometimes identified skills and concepts in one subject that could be transferred to the other (mathematics to English or English to mathematics) but needed a lot of support to do so, and
3. appreciated the opportunity to make connections with classmates that carried over to other areas of student life.

As our intention for the program was to provide opportunities for students to build skills, connections, and a social cohort and support system, we consider the students responses to these directed questions a success of the program. It is evident that the students, without such clear and directed prompts, would not have commented on the various components of LEAP that made the program unique among college courses since most of these students had no prior college experience.

LEAP's Challenges

Although we are proud of individual students for their success and perseverance, the factors working against many of our cohort members forced us to recognize how challenging it would be to sustain the LEAP program. Additionally, we could only reach a maximum of 20 students a year with LEAP when our entire developmental and first-year student populations need many of the strategies we incorporated into our program.

Additionally, for LEAP students, concentrating the lowest level students into one group did not build community as we had planned, but instead created more intense pressures on us as instructors because the students lacked the skills to appropriately support one another. Throughout the semester, and continuing into subsequent semesters, we found that many LEAP students either a) became dependent on us to connect them to appropriate campus resources to troubleshoot their complicated lives or b) lacked the skills to even identify problems and seek resources independently. For these and other reasons, we found our efforts to build an independent, healthy, and helpful learning community challenging.

Finally, while WNMU provided institutional support to run the pilot, with New Mexico's consistently tightening budget constraints on higher education, we needed to implement more cost-effective measures to reach more students who can benefit from embedded college success strategies within their core coursework.

LEAP's Lasting Influence

Although we could not continue to justify the intensive resources required to run the LEAP program well, our experiences with LEAP have provided lasting benefits to us individually, programmatically (within our disciplines), and collectively in terms of what we can offer the university at large.

Kate's Reflections on Teaching English

On a personal level as an instructor, I gained a deeper understanding of my developmental English students' mathematics and "life" skills. Although Tanya and I frequently discussed our students' challenges, witnessing them first-hand in the concentrated and intensive LEAP environment had a significant impact on my teaching practice. For example, Tanya teaches percents in developmental mathematics, a concept that still challenges students at the end of the semester. In one lesson, Tanya asked students to solve basic percent word problems about shopping, and many students, including adults who shop every day for their families, could not calculate basic sales (10% or 20% off). I realized that such basic percentages as grades that

I mark on student assignments are meaningless to this population, so I have altered my practice to include more numeric grade explanations on student work.

The most significant programmatic English outcome of LEAP was a major change in the developmental English curriculum. In LEAP, I had the opportunity to simultaneously experiment with a 6-credit hour integrated reading and writing curriculum that also incorporated study/college skills. Based on our LEAP program data, the Humanities Department and WNMU's Curriculum and Instruction Committee approved English 097: Introduction to College English (6-credit hours of integrated reading and writing), which was implemented in fall 2016 to replace the traditional and separate "basic" developmental reading and writing courses.

Finally, in terms of student success, LEAP highlighted the vulnerabilities of students at this level; while I often imagine that I can reach everyone and prepare them for college-level work, it is not a reasonable goal. Despite the national trend towards co-requisite models to accelerate students' skill development in English, the Complete College America model is mainly designed to help "cuspers," not students at this level of remediation, a finding that developmental English faculty members on the New Mexico Developmental English Taskforce agreed upon unanimously in our report last year (2016).

Tanya's Reflections on Teaching Mathematics

Working with Kate in LEAP has had a profound effect on how the developmental mathematics courses that I teach are delivered, and since I am the coordinator of those courses, this has trickled into ALL developmental mathematics sections at WNMU. First, it was a true privilege to observe a colleague's teaching on a daily basis, something we rarely (if ever) get to experience in education. I have learned so much by watching Kate scaffold assignments, activities, and courses for students in need of such support. As such, I have redesigned the developmental mathematics courses, still using ALEKS as the main delivery mechanism, to provide students with a more cohesive course. The courses now offer instructors the space to improve scaffolding and support, encourage students and instructors to make connections between topics, and hopefully, will allow students to transfer knowledge between the two courses in our developmental mathematics sequence and beyond. I am also continuing development of instructor resources to model best practices in the developmental mathematics classroom. The resources include activities and projects that have been strongly influenced by my experiences with the LEAP program.

As LEAP was coming to a close, the developmental mathematics courses were venturing into online offerings. These online versions of the developmental mathematics courses are also strongly influenced by my experience with students in LEAP. First, witnessing the struggle with written language that these students have has prompted me to take more control over the course content in the online setting. While we still administer the course content using the ALEKS program, I have made many videos to instruct students, both in content and also in navigating the software that we use. While there are students who prefer written instruction in the online setting, I have had a majority of the online students comment on how helpful the videos are, even if the written versions are posted directly with the video. Second, I have embedded written activities in the online courses (which are making their way into the face-to-face courses as well). I have learned, in working with Kate, that having students write about their ideas and experiences with mathematics is a powerful way for students to connect to the mathematics they are learning. Students start on day one writing, via a timeline, about their mathematics history, and then they progress to writing detailed solution-manual type pages by midterm and writing about how the mathematics they are learning in these courses will be used in their "real life." The development of this last project began in my non-LEAP sections and was revised multiple times with the input and guidance of Kate (an invaluable experience and exemplary example of humanities and mathematics collaboration).

Finally, my experience with LEAP has changed my personal approach in working with developmental mathematics students. As an example, pre-LEAP, when talking to students (whether in lecture, small group, or individual mode) I would rarely ask if they understood the words that I was saying. Now, I ask, regularly, for students to rephrase what I've said or ask them to define a word that I've used. These are not mathematics terms. These are words that are part of the academic vocabulary that I use daily and forget that students new to college, new to even the idea of college and elective (vs. compulsory) education are not familiar with nor familiar with the context in which the vocabulary is used. (The words "comprehensive" and "assessment," for example, were in my syllabus for years before I realized that students had no idea what a comprehensive assessment was). I have also had the revelation that connecting mathematics to English models the concept of "transfer." I have used parts of speech and sentence structure vocabulary and ideas in mathematics class to emphasize mathematics concepts such as negative numbers in arithmetic and equations vs expressions.

Kate and Tanya's Ongoing Work at the University Level

As our reflections indicate, our experiences both with LEAP and non-LEAP developmental and even introductory college courses revealed that students on campus were not navigating the college "system" effectively. As we considered the "just-in-time" student success components that we had incorporated into LEAP, we believed that these components could benefit a much larger cohort of students.

In order to reach this larger audience, Tanya developed mini-modules (lessons, resources, and short quizzes) that she piloted in an online developmental mathematics course spring semester 2017. Additionally, we worked with mathematics, computer science, and English faculty members through a university collaboration grant to adapt Tanya's materials and create new components in our online learning management system (Canvas) that could be utilized by any faculty member who wished to participate:

- Navigating Canvas and Mustang Express
- Disenrollment
- Syllabus 101
- Traits of a Successful Student
- WNMU Tutoring
- Navigating Campus (a flowchart)
- Mid-Terms!
- Student Handbook
- FAFSA—Financial Aid
- Withdrawing—Financial Aid
- Calculating GPA—Student Aid
- Registration
- Preparing for Final Exams

As we completed the construction of this online course curriculum, the new Applied Liberal Arts curriculum planning committee, on which Kate served, unanimously voted to incorporate these modules into the new pilot course, Humanities 176, a learning community program required for all first-year students. By embedding and contextualizing these foundational aspects of university life across the spectrum, we hope to create a stronger, richer base of knowledge for students so they can help themselves and others successfully navigate their college experience. Since our Center for Student Success and Applied Liberal Arts and Sciences Committee are fully invested in this project, we will be closely monitoring and assessing our successes and challenges throughout the semester and year.

Dr. Katherine A. Oubre is associate professor of English at Western New Mexico University in Silver City, New Mexico. Tanya Rivers is associate professor of mathematics, also at Western New Mexico University.

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