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A Data–Driven Process for Improving Transfer and Applicability of Mathematics Courses in Washington State

This summary is part of the Charles A. Dana Center's "Notes from the Field" series, which highlights examples of innovative practices from colleges, universities, and systems.

Background

According to the Washington Student Achievement Council (WSAC) *2017 Roadmap Progress Report*, "the majority of job opportunities—particularly those that will support upward mobility and a good quality of life—will be filled with workers who have postsecondary education or training."[1] In other words, college creates opportunity, and a system that allows students to efficiently and predictably transfer and apply credits across two–year and four–year institutions increases the likelihood to earn postsecondary credentials.

Transfer refers to the way that a student's course credits move from a sending institution to a receiving institution. In many cases, almost all course credits

TAKEAWAYS

- *Collecting and utilizing data in a meaningful way is a critical step to identifying and understanding barriers related to the transfer and applicability of mathematics credits and to developing strategies that positively impact student retention and degree completion.*
- *Backwards mapping the transfer and persistence of students who earned a bachelor's degree can provide valuable insight into course–taking patterns or other characteristics that helped those students progress and succeed.*
- *The development of a large–scale, state–level data framework can serve to better coordinate efforts between diverse stakeholder groups—such as policymakers, practitioners, and researchers—as they begin to determine collaboratively which math pathways are most suitable for students in different programs of study.*

will transfer, but some courses may only count towards elective or general education credits instead of counting towards specific degree requirements. The term *applicability* denotes that transfer credits predictably apply towards degree requirements in a student's program of study.[2]

Currently, most state– and system–level policies and practices—including those in Washington—support the transferability of credits, but do not account for the applicability of those credits to a student's program of study. Even when students are able to transfer credits, those credits might not count toward their desired majors, which can lead to wasted time, increased costs for both students and the state, and students dropping out of college altogether.

> Applicability is the *student–centered* process to ensure that academic pathways (such as mathematics) are properly aligned with students' academic and career interests and that credits consistently apply to their chosen programs of study.

Washington presents an apparent paradox in student success and transfer. Graduation rates of community and technical college (CTC) students who transfer to a four–year college are among the highest in the nation. However, the transfer–out rates (the rates at which a community college's degree–seeking students transfer to a four–year institution) for students in Washington are in the bottom ten nationally.[3] In other words, not enough students transfer, but those who do are generally successful.

According to Devin DuPree, policy research associate for the Washington State Board for Community and Technical Colleges (SBCTC), one possible reason that too few students transfer from two– to four–year institutions in the state is "we have students who are finishing short–term credential programs [associate degree or certificate] with less desirable job outcomes . . . because they don't want to take the math required to finish a [four–year] degree."

A student at South Seattle College preparing for class.

Another significant barrier to students continuing their education is the lack of uniform transfer policies across two– and four–year institutions and the consistent applicability of mathematics credits between program departments and across institutions. Particularly for low–income students, the extra cost in time and money for additional courses is an unwelcome burden.

Washington has addressed issues related to the transferability of courses through the Direct Transfer Agreement (DTA) Associates Degree, which was established in 1971. Additional transfer degrees and policies enacted over the ensuing years have created a patchwork of transfer agreements between institutions across the state. The WSAC, the SBCTC, and Joint Transfer Council (JTC) work cooperatively to help coordinate transfer policies between higher education institutions in the state.

In 2015, Washington joined five other states in the Mathematics Pathways to Completion (MPC)[4] project to implement mathematics pathways in an effort to dramatically increase student success across both two–year and four–year higher education sectors. In Spring 2016, the Washington Math Pathways Task Force,[5] comprising mathematics faculty who represented two–year and four–year institutions, convened to begin addressing how mathematics can be barrier to postsecondary completion.

Less than a year later, the Washington Math Pathways Task Force published its final recommendations and strategies to improve the success of students in developmental and gateway mathematics courses.[6] Washington then transitioned its state–level work to focus on improving policy–enabling conditions that would support statewide implementation and scale of mathematics pathways. Initial efforts focused on launching a Transfer and

Applicability Working Group composed of administrators, faculty, policymakers, and state agency staff. The group's charge was to identify barriers to and the opportunities for consistent transfer and applicability of mathematics pathways, and to create a strategic process and plan for action to address such barriers.

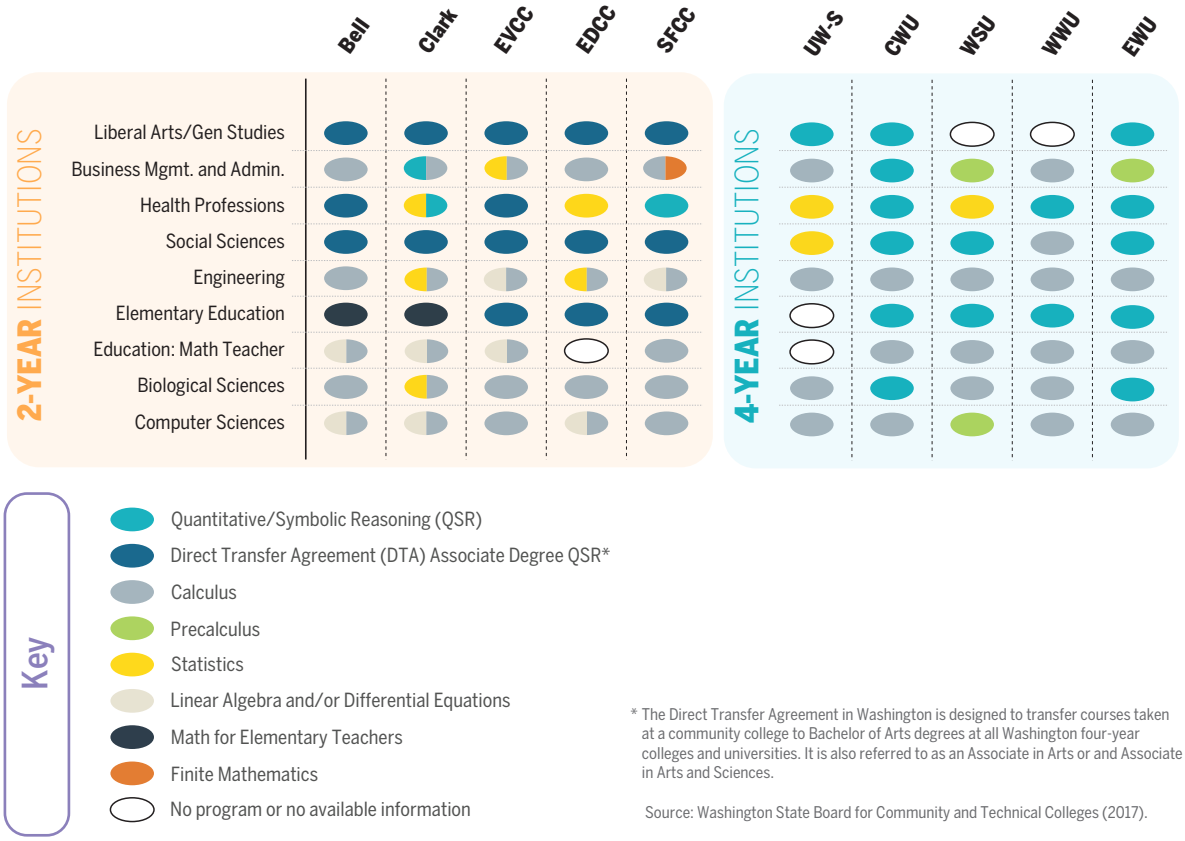
Challenges

Washington faces unique data challenges. Neither the CTCs nor baccalaureate institutions in the state had ever consistently tracked the degree programs that students selected when they entered the institution. The lack of readily available and meaningful data made identifying and addressing transfer and applicability barriers very difficult because it was not possible to verify whether the mathematics course(s) that students had taken at sending institutions would apply to their programs of study at receiving institutions. There was also no student unit record data system in place to follow an individual student's pathway through the higher education pipeline.

Solutions

Given the limitations of traditional data sources, the Transfer and Applicability Working Group relied on multiple outside sources to understand the student experience with transfer in Washington. Before the first working group meeting, the Dana Center conducted a data analysis on total student transfer by major to determine the top programs of study for transfer students and the top sending and receiving institutions. The Center then determined the alignment of math requirements for those programs and institutions, and presented those findings at the first working group meeting as a way to spur discussion and actionable next steps. The analysis of this initial data showed the complexity that students have to navigate in transferring math credits (see Figure 1).[7]

Figure 1. Data Center Analysis of Program Alignment for Top Sending and Receiving Institutions in Washington.



* The Direct Transfer Agreement in Washington is designed to transfer courses taken at a community college to Bachelor of Arts degrees at all Washington four-year colleges and universities. It is also referred to as an Associate in Arts or and Associate in Arts and Sciences.

Source: Washington State Board for Community and Technical Colleges (2017).

After identifying areas of possible misalignment and problems with the applicability of credits, the working group then worked with outside analysts to develop a large–scale analysis of students who had been awarded a four–year degree to see which mathematics courses students had taken during their years of undergraduate study. Bill Moore, Director of K–12 Partnerships with the SBCTC and state facilitator for the Washington Math Pathways Task Force, noted that this backward–mapping approach provided insight into the "natural" pathways that students were taking to fulfill their mathematics requirement for their programs of study. Several important findings emerged from this large–scale analysis:

- While 90% of students who transferred did so with a DTA, which are designed to support effective transfer and increase completion, the actual graduation rates varied widely across programs. Some DTAs include a Major–Related Program (MPR) that guarantees credits will apply directly to a degree. Students with these DTAs were more likely to graduate.
- The analysis of math requirements by program showed major misalignment across institutions.
- Review of course–taking patterns found that many students were retaking courses in the Calculus sequence after transfer, indicating that some institutions were not consistently accepting transfer credits.

Acting on this new information, the working group drafted a state–level data framework to use in future monitoring and progress assessment of transfer and applicability of mathematics credits across sending and receiving institutions. Additionally, the data framework will be coupled with school–level placement data and student success rates to better understand which mathematics pathways are most suitable for students in various programs of study.

Washington State Transfer and Applicability Working Group: Guiding Data Elements

- Total student transfer by major between institutions for the most recent academic year
- The last mathematics course students took at their two–year sending institutions
- The first mathematics course students took at their four–year receiving institutions
- The persistence and success rates of a cohort of students who started at a community college

Next Steps

Data framework findings from the Transfer and Applicability Working Group continue to bolster ongoing efforts of the group to improve policy–enabling conditions that support institutions to implement the recommendations of the Washington Math Pathways Task Force and, ultimately, to help students achieve their academic goals. Recommendations that specifically address transfer and applicability issues in Washington were drafted as a result of the Transfer and Applicability Working Group's efforts and presented to the Joint Transfer Council for consideration and coordinated state–level action in Fall 2018. "This work is about removing math as a barrier and making it something that helps students not just complete what they were planning to do, but also helps them complete more education than they have right now. It gives them more ability to create a ladder to pursue a higher degree later on," says DuPree.

Endnotes

[1] https://www.wsac.wa.gov/sites/default/files/2017.Roadmap.pdf.

[2] https://dcmathpathways.org/sites/default/files/resources/2018-03/State-Approaches-Transfer-Applicability-March-2018%5B1%5D.pdf

[3] https://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-transfer.pdf. See also https://www.wsac.wa.gov/sites/default/files/2017.Transfer.Report.pdf

[4] http://dcmathpathways.org/where-we-work/mathematics-pathways-completion-mpc

[5] https://wamathpathways.org

[6] https://dcmathpathways.org/resources/task-force-report-washington-math-pathways-completion-task-force

[7] https://dcmathpathways.org/resources/call-action-mathematics-pathways-scaling-and-sustaining

Contact information

For more information about transfer and applicability as a part of the Math Pathways to Completion project in Washington, please contact:

William Moore, Ph.D.
Director of K12 Partnerships
Washington State Board for Community and Technical Colleges
bmoore@sbctc.edu

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About the Dana Center

The Dana Center develops and scales math and science education innovations to support educators, administrators, and policy makers in creating seamless transitions throughout the K–16 system for all students, especially those who have historically been underserved. We focus in particular on strategies for improving student engagement, motivation, persistence, and achievement.

The Center was founded in 1991 at The University of Texas at Austin. Our staff members have expertise in leadership, literacy, research, program evaluation, mathematics and science education, policy and systemic reform, and services to high-need populations.