The Transformation of Colorado's Developmental Education Program

Executive Summary

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THE TRANSFORMATION OF COLORADO'S DEVELOPMENTAL EDUCATION PROGRAM

EXECUTIVE SUMMARY

Rutgers' Education and Employment Research Center (EERC)[1] has prepared two comprehensive reports that examine Colorado's transformation of developmental education at the community college level. The first EERC report[2] includes a discussion of the colleges' developmental education pilots that predate the statewide reform initiative; the work of the Developmental Education Task Force (DETF); the redesign in English/reading and math; the strategies used to implement the redesign; emergent challenges; and recommendations for next steps. The second EERC report[3] presents both the outcome to date and comparative data for the redesign. This executive summary is a synthesis of both larger reports and focuses on the activities of the DETF, the new College Composition and Reading discipline and math pathways, and student outcomes for the first three semesters of the redesign.

SETTING THE CONTEXT

Across the nation, community colleges not only act as the first opportunity for many individuals to engage with higher education, but, in many areas, they are the only option for individuals seeking to further their education and/or prepare themselves for the job market. In Colorado, a largely rural state, the 13 colleges of the CCCS,[4] as well as two independent colleges, Aims Community College and Colorado Mountain College, offer a wide range of degree and certificate programs to help students develop critical skills for employment in the changing global economy, as well as to provide the academic foundation for those students who wish to continue on to four year institutions.[5]

In the 2012–2013 academic year, close to 64 percent of first time enrollees (recent high school graduates and non-traditional students) in a certificate or degree program at one of Colorado's community colleges required remediation in one or more subjects—math, reading and/or English.[6] The need for remediation in Colorado, while slightly lower than prior years, mirrors

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[1] EERC is the third party evaluator contracted by the Colorado community college system under a grant from the U.S. Department of Labor's Trade Adjustment Assistance Act (TAA).

[2] See EERC's report: The Transformation of Colorado's Developmental Program: Observations and Findings.

[3] See EERC's report: The Transformation of Colorado's Developmental Program: Student Outcomes.

[4] This report refers to the 13 colleges under the Colorado Community College system, which are: Arapahoe CC, Community College of Aurora, Colorado Northwest Community College, Community College of Denver, Front Range CC, Lamar CC, Morgan CC, Northeast Junior College, Otero Junior College, Pikes Peak CC, Pueblo CC, Red Rocks CC, and Trinidad State Junior College.

[5] Colorado Community College System. (2013a). Colorado's #1 Source of Higher Education Access and Opportunity. Retrieved from http://www.cccs.edu/.

[6] Colorado Commission on Higher Education. (2014). The 2013 Legislative Report on Remedial Education. Retrieved from http://highered.colorado.gov/Publications/Reports/Remedial/FY2013/2013_Remedial_relmay14_rev071614.pdf.

national trends; close to 60 percent of entering community college students require remediation.[7,8]

For many students, however, enrollment in a remedial course does not lead to a successful community college experience. In fact, during the 2012–2013 academic year only 62 percent of recent high school graduates passed one or more remedial courses.[9] Of those students who did pass the required developmental education (DE) course, only 57.6 percent enrolled again the next academic year or, put another way, only 35 percent of recent high school graduates persisted.[10] These percentages highlight some persistent concerns—students' successful completion of required DE courses; and their continued enrollment in courses leading to a certificate or degree and subsequent attainment of a certificate or degree—"retention" and "completion." In fact, in a cohort study undertaken by Colorado's Community College System,[11] only eight percent of all students who enrolled in remedial math (030, 060, and 090) graduated with a degree within four years.[12, 13]

Many students who enroll in DE courses take a sequence of DE courses before they are able to enroll in college level courses; i.e., students who test at the lower range of state assessment exams need to start at the 030 level and proceed through 060, 090, and 099—or four semesters worth of courses—paying for up to 13 credits that will not count toward graduation. Some students progress through the sequence, or are able to jump ahead when they pass course exams and/or re-take assessment tests. However, frequently students do not pass one or more course levels, and withdraw before completing the multi-course DE sequence. Therefore, these students never make it to the college level course needed for their certificate or degree completion. As one administrator commented, we are "*bleeding students through our current model*."

Prior to, and concurrent with, the establishment of Colorado's statewide Developmental Education Task Force, a number of Colorado community colleges experimented with different strategies to improve rates of retention and completion. These initiatives were funded by grants

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[7] Edgecombe, N., Cormier, M.S., Bickerstaff, S., & Barragan, M. (2013). Strengthening developmental education reforms: Evidence on implementation efforts framework of accountability. Working Paper No. 61. New York: CCRC.
[8] Bailey, T. (2009). Challenge and opportunity: Rethinking the role and function of developmental education in community college," *New Directions for Community Colleges*, 145, 11–30.
[9] Colorado Department of Higher Education (2014). Legislative report on remedial education, p.6.
[10] Ibid., p. 17.
[11] Nawrocki, K.K., Baker, E. D., & Corash, K. (2009). Success of remedial math students in the Colorado Community College System: A longitudinal study. p10. Retrieved from: https://www.cccs.edu/wp-content/uploads/2013/09/Success-of-Remedial-Math-Students.pdf.
[12] Ibid, p. 8
[13] Ibid. The authors recognize that there may be more students who transferred to four year institutions and therefore were lost to tracking and that some part time students may have taken more than four years to complete their degrees.

from foundations (e.g. Lumina, Gates), including Complete College in America, and by a grant from the U.S. Department of Labor (as part of the Trade Adjustment Act).[14]

Colorado's Developmental Education Taskforce (DETF) was established in 2011 by the president of the Colorado Community College System (CCCS), Nancy McCallin "*to review developmental education practices throughout the Colorado Community College System and make recommendations to the System.*"[15] Faculty and members of student services units from CCCS colleges were asked to: a) examine the role developmental education plays in a student's educational career; b) research developmental education practices and methods that can improve a student's success; and c) present to the Board of the Colorado Community College System their recommendations for changing developmental education so that it could lead to improved student learning and successful outcomes. Of real significance is that although the DETF was established by the president of the CCCS, from the beginning the 18-month policy design process was led by a diverse group of faculty, student services staff, and administrators representing all of Colorado's community colleges.

In February 2013, DETF's recommended DE redesigns were accepted by the CCCS Board.[16] Colleges were given latitude for the rollout of the new redesign models, but all Colorado community colleges in the system were required to have full implementation of the new models by the fall of 2014.

Over the past three years, as third party evaluators, EERC has engaged in qualitative and quantitative analysis of the work of the DETF, the process of implementation, and the outcomes to date. The following is a summary of key observations, findings, challenges, and outcomes to date.

KEY OBSERVATIONS AND FINDINGS

Funding for the Developmental Education Taskforce (DETF)

As mentioned above, DETF activities were supported by the TAACCCT grant. This support included faculty release time and summer salaries, honorarium and travel expenses for national subject matter experts who presented to the DETF, workshops, staff travel, and, finally, third party evaluation by EERC.

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[14] The Colorado Community College System received a three year TAACCCT grant ($17.2 million) to transform energy programs to online and hybrid formats and to expand DE experimentation at all 13 system colleges and at the two independent colleges, Aims and Colorado Mountain College.

[15] Colorado Department of Higher Education. (n.d.). Policies and procedures, section i, part e, statewide remedial education policy. Retrieved from: http://highered.colorado.gov/Publications/Policies/Current/i-parte.pdf.

[16] *The Chronicle of Higher Education* (2013, September 13). Colorado's Community Colleges Reform Developmental Education. Retrieved from: http://chronicle.com/blogs/letters/colorados-community-colleges-reform-developmental-education/.

Without the influx of dollars from the federal government, Colorado would not have had sufficient resources to undertake the scale of its DE transformation, including the establishment of the DETF and the implementation of the new DE pathways and courses.

The Developmental Education Task Force

The DETF met monthly for 18 months to research, discuss, collaborate, and create a new developmental education policy for Colorado. The members of the DETF included representatives from each of the thirteen CCCS colleges, and the three non-system community colleges (AIMS, CMC, and Colorado Mesa University's community college arm, Western Colorado Community College[17]), as well as CCCOnline. There were also representatives from the CCCS System office, the Colorado Department of Higher Education, and the Denver Scholarship Foundation. More than half of the Taskforce's members were faculty and department chairs from the three subjects that have traditionally been the foundation of DE: English, reading, and math. The others were student service staff and administrative representatives, such as deans and vice presidents from various colleges. In addition, DETF welcomed other interested individuals to observe meetings and/or participate in sessions. DETF also created feedback loops between its working groups and colleges to disseminate information and facilitate input.

The composition of the taskforce, the active engagement of its members, active solicitation of experience and perspectives, and its transparency were all critical factors in its ability to meet its charge, and achieve large scale buy-in of its redesign of Colorado's developmental education programs.

The process of self-education through the use of national subject matter experts,[18] and the exchange of experiences and information about some "home-grown" innovations in Colorado, contributed to the identification of best practices and the opportunity to pilot promising strategies at individual colleges.

DETF's recognition of diverse student populations and institutional cultures across the 16 colleges, and its decision to allow flexibility related to roll-out and implementation, maximized the potential for a "good fit" for the redesigns, but also created new challenges related to the evaluation of outcomes.

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[17] Note that Western Colorado Community College (WCCC) is not a stand-alone community college but an extension of Colorado Mesa University; for that reason, no data from its DE experiences has been included in this study.

[18] National subject matter experts came from Washington's Integrated Basic Education and Skills training (IBEST), the emporium model of Tennessee Developmental Studies redesign, the Community College of Baltimore County's Accelerated Learning Program (ALP), the Los Medanos Community College and Chabot College California Acceleration Project (CAP), the Jackson State Community College SMART (Survive, Master, Achieve, Review, Transfer) the Dana Center at the University of Texas at Austin Pathways project, and mainstreaming from the City University of New York.

Perceptions of the Developmental Education Task Force (DETF)

The majority of faculty and staff with whom EERC spoke talked about the DETF in a positive light. As one taskforce member said, "*I thought the whole experience was amazing*."

As noted above, DETF strove to establish multiple feedback loops that would engage faculty and staff both in the process of learning, and in the process of making choices about the direction of Colorado's DE programs. Reps and colleges, however, varied in how they realized this function, including the formation of campus-based DETF work groups and their activities. To some extent, variations reflected differences in college enrollments, urban versus rural locations, and/or residential versus non-residential status. Some colleges established faculty committees to review curriculum and discuss the ideas being generated by the DETF (e.g., CCA). Other colleges, such as FRCC, RRCC, and ACC, established interdepartmental committees that varied in composition but that frequently included representatives from faculty, student services, financial aid, the registrar, and institutional research. Faculty and staff at these colleges spoke of a sense of involvement in the DETF process, even when their own preferences were not included in the final mix of choices.

However, not all colleges and/or departments were as successful in their bidirectional communication. A variety of explanations emerged: the college or department had not had a representative on a specific committee; the college or its representative had not set up a formal method of communication to discuss the activities of the DETF; and/or the college had multiple campuses or large departments that made internal communication difficult.

EERC observed that when there was an interactive dialogue between the campus and DETF through the college representative, the work of the DETF was viewed more positively, and faculty's sense of ownership in the process increased. As one faculty member who had only participated in her campus DETF work groups commented,

> *I've always felt there's strength in the system. And I've always felt that when you can share, it's synergy. The results will be so much bigger than the sum of all the individuals.*

During the course of the DETF work, CCCS sponsored a series of state and regional meetings, including the 2 to 2 Conference, and a professional development event to discuss the work of the DETF and/or the resultant redesigns. The consensus about these meetings was extremely positive, and EERC repeatedly heard in its interviews that the meetings were critical to the overall DE transformation. Of special note was the frequency with which faculty and staff spoke positively about professional development sessions, and their desire for ongoing opportunities to meet and discuss their experiences with the redesign with their counterparts across the state, as well as to continue to engage in peer to peer learning.

The Colleges' Responses to the Developmental Education Task Force (DETF)

EERC observed an association between colleges' establishment of formal campus planning and feedback mechanisms related to the work of the DETF, and the colleges' implementation of DETF models and pathways. The earlier the college engaged both faculty and staff, and the greater the specificity of its plans, the smoother was its passage towards the transformation of DE. Early inclusion of student services and IT helped these colleges identify, if not anticipate, some challenges to implementation, including listing learning communities as co-requisites.

Not surprisingly, across Colorado the structures for implementation generally reflected the active involvement of senior college leadership and the colleges' tradition or culture of innovation.

Changes in Curriculum

The DETF recommendations have transformed developmental education in Colorado in four critical ways:

- The DE requirement has been reduced from a sequence of courses (e.g. 030, 060, 090, 099) to a single semester stand alone or co-requisite course.
- English and reading have been integrated into a single discipline, College Composition and Reading.
- Two different math pathways have been created: quantitative literacy and pre-algebra.
- "Soft landing options," either on campus or in the community, have been created for students who do not meet the DE cut score based on state assessment tests.

College Composition and Reading

The DETF integrated DE English and reading into a single subject—College Composition and Reading (CCR)—and created three principal options for students.

- *CCR 092 (five credits)*: Reading and writing is integrated, and students work on content from multiple disciplines (contextualization).

- *CCR 092 (five credits) + Lab–CCR 091 (one credit):* Reading and writing is integrated, and students work on content from multiple disciplines (contextualization). In addition to taking CCR 092, students testing into the lowest remedial level must enroll in a co-requisite complementary lab to further prepare them for college-level coursework.

- *CCR 093 Studio D (three credits):* College composition and reading for students who need only modest remediation is taken concurrently with a 100-level predetermined discipline strand. The discipline-specific content in these concurrent courses is designated GT, or "Guaranteed to Transfer." The discipline strands include

communication, arts and humanities, social science, science, and career and technical education. CCR 093 is offered in a number of ways: from team-taught learning communities to linked classes offered jointly to a cohort taught by different instructors.

- *CCR 094 Studio (four credits) with English 121:* A reading and writing course taken concurrently with English 121 serves as a learning community for students requiring modest remediation.

Math Pathways

In math, the DETF created two separate pathways.[19]

- *Quantitative Literacy–MAT 050 (four credits*): This course is intended for students testing at the medium and high levels of remedial math who express an interest in enrolling in a 100-level non-algebra or non-transfer math course. Passing this course allows a student to continue on an academic pathway for non-algebra Career and Technical Education (CTE), associate degree, and transfer courses.

- *Algebraic Literacy–MAT 055 (four credits):* This course is intended for students testing at the medium and high levels of remedial math who express interest in taking a 100-level algebra course and/or those interested in STEM careers and possible transfer to four-year institutions. The curriculum for this course involves content necessary to prepare for MAT 121 and MAT 122.

- *Algebraic Literacy Lab–MAT 025 (one credit):* A support lab to be taken as a co-requisite with MAT 055 for students who test below the algebraic literacy placement score.

- *Applied Quant Lab–MAT 091 (one credit):* A support lab to be taken as a co-requisite for students who test at the high end of the remedial scale and enroll in MAT 103, 107, 108, 109, or 112.

- *Quant Lab–MAT 092 (one credit):* A support lab taken as a co-requisite for students who test at the high end of the remedial scale and who want to enroll in MAT 120, 135, 155, or 156.

[19] Note that the state intended the single-course math pathways outlined above to be mutually exclusive. However, EERC has found that some students are moving from MAT 050 to MAT 055, using MAT 050 as a first step towards possible STEM career pathways. This was not the intention of the DETF. It is unclear whether this is an issue related to student advising or whether students are simply changing their minds with regard to their academic and/or career goals in the course of taking MAT 050. Further, there have been cases in which students who did not successfully complete MAT 055 subsequently registered for MAT 050 in order to progress out of DE math. Again, this was not the intention of the DETF. Sequential enrollment or double-back enrollment needs to be examined further to better understand the factors contributing to student use of two math pathways rather than one.

- *Algebra Lab–MAT 093 (one credit):* A support lab taken as a co-requisite for students who test at the high end of the remedial scale and who want to enroll in MAT 121 or 123.

Rethinking Teaching and Pedagogy

The transformation of Colorado's DE programs involved significant changes in structure, curriculum content, and pedagogy. It "*rallied a lot of people around an effort to help increase student success.*" It opened up dialogues between DE and transfer faculty and in the process, some believe, it reduced the historic bias toward DE students and faculty.

For many, it was collaboration for change.

> *I'm just thrilled at the way that these groups have worked together, but also how the deans have embraced this change and invited the leaders in math and CCR to come into a department meeting, to talk to the faculty members, to really talk about the change. So it's not just about a change in English and math, but it's in the change in the way we look at students and help…them (to) succeed.*

One senior administrator talked about the cultural change that occurred on her campus —the re-conceptualizing of the student's experience both prior to stepping into a classroom and within the college classroom itself.

In EERC interviews, many observed a shift toward a more collaborative model of teaching and learning, one that focused more on faculty-student and student-student interaction in the classroom, i.e. less lecturing. The engagement of students included helping students to map their own learning, explicitly demonstrating the integrated progression of skill development and capacities. In other words, student engagement helped students understand that course content is not just a series of discrete content areas and skills, but rather includes skills and knowledge that are built on top of one another.

A greater attention to critical thinking—its early and continuous weaving into coursework—was another common thread in faculty's discussions with EERC. Faculty also spoke of the need to more actively attend to reading and writing, and to focus on these skills across the curriculum, e.g. in science and history classes, and not just in designated English courses.

Reflecting on the successes observed during some of the pre-DETF pilots, many faculty expressed interest in expanding the use of contextualization in English and math courses.

Implementing the DETF Redesign

The state board mandated that the DETF redesign had to be fully implemented at all community colleges in Colorado by fall 2014. However, DETF left up to the individual colleges

when and how they wanted to launch the redesigned courses prior to fall 2014. EERC tracked the rollout of redesigned courses and identified some interesting patterns.

College Composition and Reading: The colleges that had been involved in pilots or had experimented with new curriculum or pedagogical strategies prior to the redesign mandate were far more likely to begin to offer new CCR courses in fall 2013. In addition, colleges that launched CCR in fall 2013 offered multiple CCR options, e.g. CCR 092 and 094. This pattern was also seen among colleges that first launched CCR in spring 2014, with the single exception of NJC, which only launched CCR 094 that term.

CCR 092 and 094 were usually the first to be implemented—faculty stated that the two courses CCR 092 and 094 were similar to earlier pilots in which compression and/or mainstreaming had been used (e.g. CCD, FRCC), as well as to pilots that had integrated reading and English (e.g. CCA).

CCR 093 was far more challenging to launch—coordinating English and subject matter transfer faculty (e.g. CCA) was cited as one obstacle, as was the size of the DE student body to be served. Small/rural colleges (e.g. NJC, LCC) noted some difficulty in running CCR 093 due to their relatively small student enrollments, so they opted not to offer it as an option. At the same time, faculty were concerned about trying to do too much, so limiting options from the faculty perspective aided in implementation.

One of the biggest differences across the colleges relates to their decision to plunge in and only offer the redesign or to straddle the redesign with existing DE models. At times, decisions were based on the size of a college's DE student population. Thus, colleges like LCC decided to jump in during fall 2013 and only offer redesign models. Other colleges, concerned about students already in the DE pipeline, decided to overlap the different phases so students could choose to complete their DE requirements either under the old system or via the new options (e.g. CCD, NJC, ACC, and RRCC).

Math Pathways: Echoing the pattern of CCR, colleges previously involved in pilots were more apt to offer one or more redesigns of math courses in fall 2013 or spring 2014 than were those colleges that had not been engaged in DE experimentation. The difference in the pattern is a slight one. In contrast to the number of colleges that launched CCR in fall 2013, two fewer colleges launched math redesigns in fall 2013.

Regardless of when a college first launched DETF math courses, all but NJC, ACC, and PPCC offered both 050 and 055 in the same semester. This may reflect faculty's recognition that the two math courses served different cohorts of students. This contrasts with the CCR options that varied more in their use of pedagogy or strategy than content.

At the same time, given the greater similarity of Math 055 to 099, it is interesting to note that of the three colleges that offered a single redesign as their inaugural math course, two began with Math 055 (PPCC and ACC) and one offered Math 050 (NJC).

In contrast to the roll out of the CCR, colleges more frequently straddled the launch of the math redesign with pre-existent math pilots and models. When asked about this, colleges explained that the math pathways were a more radical change than the CCR options and required more faculty training. In addition, they stated that the new math pathways created new advising challenges. To respond to these concerns, a number of colleges (e.g. PPCC, ACC, and NJC) decided to provide a choice for those students already in the pipeline, as well as for new DE students.

Faculty observed that engaging in "reverse design" curriculum development for the math pathways required a significant amount of dialogue between DE and transfer faculties. Colleges with a historic separation between DE and college math faculties (e.g. CCD and CCA), and/or infrequent interaction between these faculties, needed time to find new and effective ways to collaborate.

Of note, EERC learned that both traditional DE and transfer faculties preferred to teach the Math 055 course rather than the Math 050 course. Faculty explained that the content of MAT 055 was similar to the content of courses they had previously taught, because it is based in algebra, so they felt more comfortable teaching it. With fewer faculty interested in MAT 050, some chairs had to spend extra time recruiting and training faculty to teach the 050 sections. This may account for some of the delay in implementing DETF math courses and/or offering multiple sections earlier than the required fall 2014 deadline.

The DETF gave colleges the freedom to choose the structure or format of the new math pathways courses, e.g. flipped classes or emporium models, and conceptual versus procedural formats. Some colleges also gave faculty the freedom to choose what they wanted to teach—as one instructor noted, faculty were "*allowed to teach to their strengths*."

In summary, colleges already involved in experimenting with math or English/reading pilots appear to have been more able and/or willing to move forward with both math and CCR redesigns prior to the mandated start date than those who were less engaged in earlier pre-DETF pilots. This suggests the importance of historical context and culture to the pace of change. It also appears that colleges, in hindsight, agree that it is better to "jump in" than it is to straddle the old with the new.

Professional Development

In the months just before and after DETF made its recommendations, CCCS held several workshops for student services staff. The focus of these sessions was the redesign and the expanded role of advisers—to help students decide which CCR and/or math pathway best fit

their capacities and future goals. Issues related to registration and to Banner were also covered. Participants reported that these working forums involved a great deal of sharing, creativity, and problem solving, and many commented that the sessions were energized by the excitement many faculty and staff felt about the upcoming changes. At the same time, there were concerns about the added workload and responsibilities being placed on student services and the staff capacity to meet demand, especially just before and during registration.

A number of colleges also sponsored conferences, forums, and workshops using foundation, TAACCCT, or their own institutional funds. While some of these professional development meetings did not specifically focus on DE, many addressed issues related to student engagement, especially adult learners, working across class, and issues related to race/ethnicity/ethnicity (e.g. PPCC's "Students speak. Are we listening?").[20]

As EERC spoke to faculty and staff, a consistent theme was how critical ongoing professional development was for both new and existing faculty. Concern was registered about the availability of resources after TAACCCT sunsets (September 2015). Colleges that identified a changing stream of adjuncts as an implementation challenge were particularly worried.

CHALLENGES

A variety of challenges emerged during the roll-out of the redesign, many overlapping with one another, e.g., advisers and Banner system limitations. Problem solving around one issue at times helped to inform the response to another issue. The issues below have been organized here by subject area and not hierarchically by importance.

Integration of DE and Transfer Level Faculty

Historically, many colleges had separate DE and transfer level faculty, e.g. CCD, CCA, FRCC, NJC, ACC, PPCC, and PCC. Several colleges, such as CCD and CCA, also had multifaceted service structures to support DE students that included DE faculty, advisers, tutors, dedicated labs, and courses/workshops (such as AAA—Advance in Academic Achievement) for these students. Post DETF, some colleges chose to dismantle these organizational structures, so the cultures that lay underneath their formation had to be addressed, if not transformed.

Elimination of Reading as a Separate Discipline

The integration of reading with English to create the new College Composition and Reading courses stimulated a good deal of concern among reading faculty. One issue was related to job security. Some dedicated reading faculty had a masters' in education with a specialization in reading, but lacked either a master's in English or at least 18 graduate credits in English, the Colorado Higher Education requirement to teach college level English courses. As a

[20] http://www.ccsse.org/center/institutes_workshops/.

consequence, these faculty members are unable to teach some sections of CCR 094, as the courses are paired with a college level course and, in an ideal delivery environment, the same instructor would teach 094 and ENG 121 together. Although they could be assigned to teach sections of 093, 092, and soft landings or labs, if offered by their college, dedicated reading faculty worried about the renewal of their contracts. Reading faculty also had significant concerns about the place reading would have under the new DETF curriculum, and about whether the English and composition faculty fully understood the pedagogy of reading.

As a result of the above issues, faculty tensions were high on some campuses. In fact, tensions at some colleges progressed to "*fighting in anger*" as one faculty member noted about the content and pedagogy to be used in the new courses.

These concerns were echoed in part by the subject matter expert, Rebecca Cox, Ph.D.,[21] who was contracted by EERC to review the new redesign curriculum in math and English/reading. In her report, Dr. Cox raised the issue of "the extent to which each course reflects an *integrated* instructional approach, as well as the instructional expertise required to teach the redesigned CCR courses." Engaged in a materials review and not classroom observation, she was unable to assess the extent of integration, but commented that:

> *By definition, an integrated instructional approach does not connect reading and writing in a unidirectional way, but rather guides students towards using processes and strategies in reading to inform their writing, and vice versa.*[22]

Re-conceptualizing DE Math

Math faculty on the whole did not face the same credential challenge faced by reading faculty. However, at a few colleges, such as CCD, math faculty were required to have an MA and 18 graduate credits in math, and many of those teaching DE classes only had a BA degree. In some cases, this caused similar faculty concern about job security.

One of the significant issues that emerged for math faculty was pedagogy—what was best, to teach math conceptually or procedurally, and should Math 050 and Math 055 be taught differently? DETF and math department chairs gave faculty flexibility to decide what they wanted to do in their own classrooms. Some faculty felt that a conceptual approach, including the use of contextualization, worked best for MAT 050, but that a procedural approach was better for MAT 055. Their argument was that MAT 055 prepared students for STEM courses and careers, which would require students to know how to work procedurally. However, there was no consensus, and the lack of consensus may impact ongoing outcome evaluation.

[21] As part of the TAA evaluation grant, a subject matter expert in developmental education was contracted to review the redesigned curriculum and related Online Educational Resource materials.
[22] Cox, op cit., pp. 8-9.

In addition to faculty concerns about pedagogy, the subject matter expert, Dr. Cox, raised concern that not all colleges are offering MAT 025 along with MAT 055. As such, the colleges are not "providing the recommended one-semester developmental math option" that had been designed to provide additional support to DE students "who wish to pursue the algebra pathway." Further, Dr. Cox raised concern about whether advisers are "accurately assessing students' educational goals" in order to be able to guide the students to the most appropriate DE math pathway.[23]

Faculty Jobs

Full and part time faculty job security was a concern from the beginning in conversations about redesigning DE. As noted above, reading faculty and some math faculty without advanced credits were especially nervous about job security. Adjuncts were also very worried about their jobs. They had complied with the state interpretation that federal financial aid funding could not be used for the 030 level courses, and now, post DETF, there would be a substantial reduction in the number of DE courses and sections. Further, many colleges had not yet confirmed plans for on-campus soft landing options. To respond to the changes in enrollment, to what extent would colleges use attrition, or layoffs? A number of faculty who were not yet "on board" with the redesign also felt vulnerable. They wondered if faculty were cut, would they be the first ones to go.

EERC does not have data about the number of full and part time faculty in math, reading, and/or English whose contracts were not renewed for the 2014–2015 academic year or why. However, faculty layoffs did occur for at least one college, CCD. While the perception at the time of the EERC interviews in spring 2014 was that the cutbacks at CCD were a result of the DETF, there were also other factors, including faculty/student ratios, which influenced and may have been more significant causes for the layoffs. Regardless of the actual cause(s) of CCD's layoffs, per the Thomas theorem, "what is perceived as real is real in its consequences." And anxiety was expressed by many faculty with whom we met, especially adjuncts and contract faculty, across the colleges.

In hindsight, perhaps colleges' greater sensitivity to faculty anxieties and discussion about other concurrent factors might have been far more helpful than what faculty reported CCCS had told them—unequivocal statements that "no jobs will be lost." No doubt the fairly pervasive sense that the DE transformation was, in fact, faculty led, reduced the erosion of trust in relation to CCCS and respective college administrators that occurred among some faculty.

Student Advising and Student Services[24]

The new math pathways, and to some extent also the new CCR courses, require students to make informed and critical choices prior to registration. This is a major change for DE students

[23] Ibid. p. 7.

[24] Note that we were not able to get information about each of the 15 colleges within the consortium—thus, some colleges that have similar programs and services to the ones discussed here are not identified within the text.

and means that advisers who work during registration have to be well versed in the new options as well as in academic and career pathways. At the same time, it is important for students to have other easily accessible informational resources to guide their choices about CCR options and math pathways.

To meet this need, some colleges have already established mandated orientations, online resources (e.g. RRCC, CNCC), mandated in person advising (e.g. OJC), registration packets, etc. EERC, however, has learned that some of these student orientations primarily target full time students. As a result, many part-time DE students may not receive early advising. For example, at CCD, over 75 percent of students during 2013–2014 were part time students,[25] but student orientation was only mandated for full time students. In addition, CCD no longer "distinguishes between DE and college level courses" and thus has removed DE as an entity from its website and registration materials. It should also be noted that across the community college system, the majority of DE courses are taught by adjunct faculty who have less access to and knowledge about college resources. It is unclear if there are other, and sufficient, opportunities for CCD's part-time students to find the information they need to make informed choices.

Separate from orientations, most colleges (e.g., OJC and CCD) assign entering students to advisers associated with the student's identified major area of study, e.g., an academic adviser linked to that specific department or field. At NJC, students are actually assigned to subject matter faculty for advising. At most colleges, students without an identified major get assigned to a general adviser. "Undecided" students are probably the most in need of assistance to select the math pathway that would best suit the career or academic pathways they are contemplating, or to help them narrow the range of possible pathways.

To meet the needs of these and other students, some colleges (e.g., ACC) provide advising immediately after a student sits for the placement test. A few colleges mandate that DE students meet with an adviser. However, many colleges are still developing their advising services for DE students. Given the implications of the new math pathways for future academic choices and career opportunities, EERC remains concerned that there might not be sufficient structure to serve the needs of DE students, especially those who are part-time and/or "undecided."

Access to advisers is but the first step. It is also extremely important that advisers are well informed about the linkage between academic and career pathways—a linkage that studies suggest impacts student retention and completion rates.[26,27] Across the colleges, faculty and staff shared with EERC their concern that there has been insufficient attention, training, and

[25] Fast Facts Colorado Community College System. Retrieved from https://www.cccs.edu/about-cccs/institutional-research/fast-facts/.
[26] Jenkins, D. & Cho, S-W (2014). Get with the program...and finish it: Building guided pathways to accelerate student completion. New York: Columbia Community College Research Center.
[27] Karp, M.M. (2013). Entering a program: Helping students make academic and career decisions. New York: Columbia Community College Research Center.

resources directed to advising—especially the advisers who work with potential students, and DE students who have not yet decided on their academic major. This suggests that the traditional bifurcation in advising between academic supports and career counseling be changed. Under the TAACCCT, such a combination was achieved through the role of the career coach at many colleges. However, as of fall 2014, most career coaches had left their respective colleges or had been reassigned to other programs (e.g., RRCC and FRCC coaches are now career navigators under the TAA Round III CHAMP). In most cases, their roles and functions have not been replaced, or if replaced, the replacement often lasted just until the sunset of the grant, September 2015.

Finally, an additional advising concern that has been raised is in respect to students who test into the lowest range of the Accuplacer. This group "*is hardest to serve, and most in need of clear and effective advising about possible options, including referral to adult basic education (ABE) programs*"[28] and on-campus options. It is not clear how the colleges are serving these students now—and what additional resources will be provided to them as their soft landing options are developed by the colleges and/or community.

Student Success versus Open Access

Faculty and staff discussed with ERCC the emergence of a post DETF paradigm shift. They observed that historically, the central function of community colleges was to serve their communities and to provide "open admissions." They now worry that the door to college is not as open as it has been in the past, and that student performance and success frame the new paradigm. The reality is a bit different—the colleges still remain open in terms of many of their educational programs—but for academic credentials, the bar has been raised higher.

Still, some of the administrators, student services staff, and faculty EERC interviewed voiced serious concern about the community college becoming a gatekeeper versus a gateway for this population of students. They wondered if funding under the recent state legislatures' "Adult Education and Literacy Act of 2014"[29] would be sufficient to meet the needs of the lowest performing students. Others wondered if the colleges had a historic responsibility to do more to "make up" for what students did not receive in their K-12 education rather than bridge gaps to create access to courses needed for current programs of study.

It is too early to tell if, and how, new or expanded ABE programs, and/or college-based soft landing programs, will be utilized by potential students with low skills in English and/or math,

[28] Cox, R. D. (2015). TAA Grant Evaluation—CCCS Developmental Education Redesign—Subject Matter Expert Review. Unpublished EERC Report. P.6.

[29] In 2014, the Colorado legislature passed the Adult Education and Literacy Act of 2014, which established the Adult Workforce Partnership Program to be administered by the Colorado Department of Education. Under this Act, the state will work in partnership with WFCs to provide educational programs that include basic literacy and numeracy skills. See more at: http://www.cde.state.co.us/cdeadult/colorado-adult-education-and-literacy-act#sthash.WkG3NpzD.dpuf.[29] Cox, op cit., p. 7.

and how program participants will then matriculate into the DETF courses and/or actual college level courses. But little will happen if, as indicated above, there are not formal advising resources to attend to their special needs.

OUTCOMES

Across the colleges, faculty and staff shared with EERC their intense interest in tracking outcomes over time. As one faculty member stated, we are "*moving towards more of an evidence-based culture*." This faculty member then asked us, "*How do we really collect more data on what we're doing…?*" Faculty were excited about the changes, but their bottom line was finding out whether the changes were, in fact, making a difference to their students' long term success.

In the next section, we report outcomes from the redesign across three semesters (fall 2013, spring 2014, and fall 2014).

Outcomes data analysis has been a priority activity for EERC. Using Banner data from the 13 colleges that comprise the Colorado Community College system, EERC has compared data from a historic cohort of students (summer 2007 to fall 2008) with a cohort of students enrolled in redesigned courses (fall 2013 to fall 2014). It has used descriptive statistics and logistic regressions for this analysis.

The focal questions for analysis include:[30]

English/College Composition and Reading

- How does the redesigned cohort compare with the historic cohort in regard to English?
    - What is the time to enrollment in English 100 level course, or the student's first General transfer (GT) course, from the first DE course?
    - What is the percentage of enrollment for different pathways in English 100, General transfer, and English 121 courses?
    - What is the rate of passing English 121, or the student's first GT course with a C or better?
- What factors affect differences in enrollment and time to enrollment in English 121?
- What factors affect differences in final grades in English 121?
- What factors affect differences in enrollment in a student's first GT course?
- What factors affect differences in passing a student's first GT course?

[30] See EERC's Quantitative Report (June 2015) for specific outcome data for the TAA consortium and by college, and, for additional analyses, see EERC's Quantitative Report (June 2015).

Math

- How does the redesigned cohort compare with the historic cohort in regard to math?
    - What is the time to enrollment in 100 level math from the first DE course?
    - What is the percentage of enrollment for different pathways in a 100 math course?
    - What is the rate of passing a 100 level math course with a C or better?
- What factors affect difference in enrollment in math 100 level courses?
- What factors affect differences in final grades in math 100 courses?

Wages

There has been relatively little time (fall 2013 to spring 2015) to track the impact of the DE redesign on employment and wages. EERC includes comparative wage data to date in its full quantitative report, but given the censoring (effect of time of roll out and implementation on data collection) on outcomes, we do not include the results in this executive summary.

DESCRIPTIVE DATA ANALYSIS

English/College Composition and Reading

Percentage of enrollment of DE students in English 121: Overall, about 54 percent of students across different pathways in the redesigned cohort enrolled in a college level English course (English 121). Similarly, close to 50 percent enrolled in a General transfer course. Enrollment in English 121 was highest (98 percent) among CCR094 pathway students, while enrollment in a general transfer course was highest (94 percent) among students in the CCR093 pathway. *See Appendix A.*

Time to enrollment in English 121:[31] Eighty-two percent of the redesigned cohort took zero terms to enroll in English 121 as compared to 4.7 percent of the historic cohort.[32] An additional 12.4 percent of redesigned students enrolled in English 121 in one term, compared to 46.1 percent of the historic cohort. In sum, 94.4 percent of the redesigned DE cohort enrolled in English 121 within one term of completing a CCR course versus only 50.8 percent of the historic cohort. *See Appendix B.*

Passing English 121 with a C or higher: There was little difference between the historic and redesigned cohorts with respect to their earning a C or higher in English 121—82.8 percent vs. 75.5 percent respectively. However, 24.5 percent of redesigned students who

[31] The analysis includes only those students who went on to enroll in an English 121 course, not all students in DE.
[32] We recognize that students in CCR 094 concurrently enroll in English 121; however, even with that caveat, the percentage of enrollments are significantly different.

enrolled in English 121 received a D or an F vs. 17.1 percent of students in the historic cohort. *See Appendix C.*

Time to enrollment in student's first general transfer (GT) courses: Only 55.1 percent of students in the historic cohort enrolled in their first GT course within zero semesters compared to 74.7 percent of students in the DETF cohort. An additional 19.6 percent of the historic cohort took one term to enroll in their first GT course as compared to 18.2 percent of students in the DETF cohort. In sum, 92.9 percent of students in the DETF cohort enrolled in at least one GT course within one semester in contrast to 74.7 percent of students in the historic cohort. *See Appendix B.*

Rates of passing student's first GT course: The rates of passing their first GT course for students in the historic cohort and students in the DETF were almost the same, 73.7 percent and 75.5 percent respectively. *See Appendix C.*

Comparison of Outcomes across the CCR Options: We compared CCR options in the study as well. We note below the passing rate for English 121.

> **Passing English 121 with a C or higher**: Students enrolled in CCR 092, 093, and 094 had similar rates of passing English 121, 76.3 percent, 75.9 percent, and 75.3 percent respectively. Of interest is that the 15 students from CCR 091 had the highest rate of success in English 121, 93.30 percent passing with a C or better. This should be looked at further as more students enroll in 091. *See Appendix A.*

Math

Percentage of enrollment of DE students in a 100 level math course: Overall, enrollment in 100 level math courses was relatively low at 12 percent. Students in the MAT091 pathway had the highest enrollment rate (89 percent) among others. Note however, that this percentage may be affected by time censoring—the limited time students had to progress from DE to math 100 during the study period. Further tracking of the redesign cohort needs to be done to see changes over time.

Time to enrollment:[33] Nearly nine percent of the redesigned cohort, compared to one percent of the historic cohort, took zero terms to enroll in a 100 level math course. An additional 51 percent of redesigned students enrolled in a 100 level math course within one term, compared to 28.2 percent of the historic cohort. In sum, 59.7 percent of the redesigned cohort enrolled in a math 100 course within one term of completing Math 050 or Math 55 versus only 29.2 percent of the historic cohort. *See Appendix D.*

[33] The analysis includes only those students who went on to enroll in a Math 100 course, not all students in DE.

Passing 100 level math with a C or higher: There was a slightly better rate of success for historic students passing a 100 level math course: of those students who enrolled in a 100 level math course, 82.8 percent of the historic cohort passed compared to 76.4 percent in the redesigned cohort. *See Appendix E.*

Comparison of outcomes by math pathway: EERC also compared student enrollment and outcomes for the two math pathways courses, Math 050 and Math 055. We also looked at outcomes for students enrolled in the math labs associated with their pathway courses, Math 025, 091, 092, and 093. *See Appendix F.*

Enrollment in a 100 level math course: Students enrolled in Math 050 had the lowest rate of enrollment in math 100 level courses—8.9 percent of Math 050 students as compared to 16.2 percent in Math 055.

Passing 100 level math with a C or higher: Of those enrolled in a 100 level math course, students from Math 050 and 055 did almost equally well, passing with a C or better—79.6 percent for Math 050 students and 73.6 percent for Math 055 students.

Summary of descriptive data analysis: The above data indicates that already within the first three semesters of the redesigns, students are doing significantly better in terms of time to enrollment in college level courses, and are experiencing better academic success, than they did during the comparative historic period.

LOGISTIC REGRESSION

The above analysis did not control for independent variables such as age, gender, ethnicity, Accuplacer scores, enrollment status, and employment, which could affect outcomes. We therefore engaged in logistic regression analysis to better understand if and how these different variables affected outcomes, and if they had more power than the redesign itself.[34]

The key findings from EERC's analysis are as follows:

Overall, independent variables, including Accuplacer arithmetic score, employment status, and veteran status, have a significant effect on outcomes—but the strongest effect comes from being part of the redesigned cohort versus the historic cohort.

College Composition and Reading/English

Enrollment in English 121: As expected, given that students are co-enrolled in CCR 094 and English 121, the highest probability for enrollment in English 121 was for CCR 094

[34] Please see EERC's full quantitative report (June 2015) for more details on regression analysis, and outcomes by specific variables, for the consortium.

students. The lowest probability for enrollment was for students enrolled in the CCR 091 lab associated with CCR 092. *See Full Quantitative Report.*

Time to enrollment in English 121: The probability of enrolling in English 121 within zero or one terms was much higher (37 percent) for the redesigned cohort than for the historic cohort (one percent). Other factors that were significant in terms of higher rates of enrollment included being white and having full time student status. *See Full Quantitative Report.*

Passing with a C or better in English 121: The redesign was not related to passing English 121. Instead, being white and being female increased the probability of a student passing English 121. *See Full Quantitative Report.*

Enrollment in first GT course: Enrollment in the student's first GT course was related to redesign as well as to other student characteristics. Here, however, only those students in CCR093 and in CCR094 had higher odds, compared to CCR092, of enrollment in college. Employed students had twice the odds of enrolling in a GT course compared to those who were not employed. *See Full Quantitative Report.*

Passing first GT course with a C or better: Passing a GT course was related to the redesign as was ethnicity and student enrollment status. In particular, students in CCR093 had lower odds of passing a GT course than students in CCR092. The probability of students in CCR093 passing the course was 73 percent, compared to 80 percent for CCR092. In addition, blacks and American Indians had lower odds of passing a GT course than whites. *See Full Quantitative Report.*

Math

Time to enrollment in a math 100 level course: The probability of enrolling in a math 100 level course within zero to one term was 44 percent for the redesigned cohort versus only 8 percent for students in the historic cohort. *See Full Quantitative Report.*

Enrollment in 100 level math: Enrollment in Math 091 had the largest effect on a student enrolling in a 100 level math course, increasing the chance of enrollment by 76 percent. Those employed increased enrollment by 13 percent. A full time student was more likely to enroll in college than a student in half time status**.** *See Full Quantitative Report.*

Summary of Logistic Regressions: The redesigns positively impacted the probability of students enrolling in college level courses in English and math. The redesigns, however, had less of an effect on students' success in these courses. Instead, demographic factors contributed to variations in outcome, specifically gender and race/ethnicity. This suggests the need to attend

to classroom and college culture, and to advising, to improve the success rates of males and minority students.

GOALS FOR FUTURE RESEARCH

- Track what happens with students who test at the lower levels of the Accuplacer or its replacement**.**

- Identify and track the development of soft landing options and their use by potential students as well as students' matriculation into DE cours**e**s or college level courses.

- Engage in deeper exploration of advising services—the how, when, and why.

- Examine differences in the models and pedagogy used for courses, e.g. the types of learning communities that are created for linked courses such as CCR 093 and CCR 094 (e.g. sequential team, co-teaching in the classroom, different faculty members, multiple sections), use of modular units for math, and conceptual vs. procedural math courses.

- Track the nature and extent of on-going professional development and other activities around the redesign implementation.

RECOMMENDATIONS

- Establish post DETF forums for faculty and staff, including adjunct faculty, to share experiences and lessons learned.

- Conduct a three year follow-up study for the redesign fall 2014, and then for the 2017–2018 terms.

APPENDIX A

ENROLLMENT AND COMPLETION BY REDESIGN (STATE REDESIGNS ONLY)

	Enrolled in College-Level Course			Passed College-Level Course		
	Total	**Enrolled**	**Not enrolled**	**Total**	**Pass**	**No Pass**
DE		**Enrolled in ENG 121**			**Passed ENG 121**	
CCR 091	153	11.10%	88.90%	15	93.30%	6.70%
CCR 092	4611	16.70%	83.30%	671	76.30%	23.70%
CCR 093	790	27.20%	72.80%	187	75.90%	24.10%
CCR094*	4617	98.20%	1.80%	4162	75.30%	24.70%
DE		**Enrolled in GT Course**			**Passed GT Course**	
CCR 091	153	48.40%	51.60%	71	64.80%	35.20%
CCR 092	4611	39.10%	60.90%	1829	76.20%	23.80%
CCR 093	790	94.40%	5.60%	725	69.50%	30.50%
CCR 094*	4617	52.00%	48.90%	2472	77.10%	22.90%

*Students in CCR 094 were co-enrolled in ENG 121.

APPENDIX B

TIME TO ENROLLMENT IN ENG100+, GENERAL TRANSFER (GT), AND ENG121

	Historic	State Redesign
Time to ENG 121	**4809**	**5539**
Zero Terms	4.70%	82.00%
One Term	46.10%	12.40%
Two Terms	16.30%	5.00%
Three Terms	13.80%	0.50%
Four or More Terms	19.20%	N/A
Time to First GT	**6859**	**5024**
Zero Terms	55.20%	74.70%
One Term	19.60%	18.20%
Two Terms	8.00%	6.50%
Three Terms	7.00%	0.60%
Four or More Terms	10.20%	N/A

APPENDIX C

ENGLISH HISTORIC AND STATE REDESIGNED COURSE GRADES

Grade in ENG 121	**4270**	**5035**
F	10.60%	18.80%
D	6.50%	5.70%
C	21.40%	18.80%
B	34.90%	30.60%
A	26.50%	26.10%
Grade in First GT	**6475**	**5097**
F	19.10%	18.30%
D	7.20%	6.20%
C	18.90%	19.10%
B	25.50%	26.40%
A	29.30%	30.00%

APPENDIX D

TIME TO ENROLLMENT IN MAT 100+ COURSE

	Historic	*State Redesign*
Time to MAT 100+ course	***1462***	***1900***
Zero Term	1.0%	8.7%
One Term	28.2%	51.0%
Two Terms	13.7%	28.8%
Three Terms	18.5%	11.5%
Four Terms or More	38.5%	0%

APPENDIX E

COURSE GRADES IN MATH 100

Course Grade	HISTORIC	STATE REDESIGN
Grade in Math 100+	N=1276	N= 1557
F	11.4%	14.0%
D	5.8%	9.6%
C	23.6%	26.3%
B	30.8%	28.2%
A	28.4%	21.9%

APPENDIX F

ENROLLMENT AND COMPLETION BY NEW DE MATH PATHWAYS (STATE REDESIGN ONLY)

	Enroll MAT 100+			Pass MAT 100+		
	Total	**Enrolled**	**Not enrolled**	**Total**	**Pass**	**No Pass**
MAT 050	9436	8.90%	91.10%	697	79.60%	20.40%
MAT 055	4478	16.20%	83.80%	583	73.60%	26.40%
MAT 055/MAT 025	1260	14.90%	85.10%	140	75.00%	25.00%
MAT 091	164	89.00%	11.00%	137	73.00%	27.00%