



BEST PRACTICES IN DEVELOPMENTAL EDUCATION

October 2020

In the following report, Hanover Research presents the results of an analysis of best practices and effective strategies for developmental education.



TABLE OF CONTENTS

3 / Executive Summary

5 / Research Questions and Methodology

6 / Best Practices in Developmental Education

12 / Case Studies

EXECUTIVE SUMMARY

RECOMMENDATIONS

Based on an analysis of best practices in developmental education, Hanover recommends the following:

Employ a multiple measures approach to placing students in developmental education.

By considering measures beyond standardized test scores, institutions can more accurately predict student success in college-level courses. Measures recommended by the Kansas Board of Regents include high school transcript information and non-cognitive tests.

Offer compressed courses and use alternative delivery modalities for developmental courses.

Compressed courses enable students to pursue more than one course per semester, which allows them to complete developmental education requirements more quickly. Prioritize offering enrollment in compressed courses to students who are close to the placement threshold. Across all developmental course offerings, institutions should pilot alternative delivery modalities, such as self-paced courses and flipped classrooms, each of which would allow the institution to deliver at least some instruction virtually.

Offer multiple math pathways that align with the academic needs of different groups of students.

To provide students enrolled in developmental math with different course options, Offer a quantitative reasoning-focused pathway for students pursuing study in fields that do not require upper-level math courses, in addition to an algebra-focused pathway for students intending to major in math-reliant fields such as chemistry and economics. Institutions can develop these pathways internally or implement third-party pathways such as the Dana Center Mathematics Pathways (DCMP) and the Carnegie Math Pathways.

Develop out-of-class support services specifically for developmental education students.

Out-of-class supports – which should include services such as tutoring, student success coaching, and personal counseling – should serve both the academic and non-academic needs of students enrolled in developmental courses. Additionally, institutions should consider offering small monetary incentives to encourage developmental education students to engage with support services outside of the classroom.

EXECUTIVE SUMMARY

KEY FINDINGS



Most four-year public institutions in the United States deliver developmental courses.

Although many institutions are reforming their developmental education programs, some traditional elements are still common such as the use of multi-semester, prerequisite sequences.



Institutions can more accurately determine which students require developmental education by employing a multiple measures approach.

Beyond standardized tests, measures that institutions can use include high school transcript information, writing assessments, years since high school graduation, and non-cognitive assessments.



Compressed courses enable students to complete developmental education requirements more quickly.

Structural reforms that can lead to improved student outcomes include making courses self-paced and flipping the classroom, both of which enable institutions to deliver some instruction virtually.



Through multiple math pathways, students take developmental math courses that align with their intended course of study.

Institutions often have a quantitative reasoning-focused pathway and an algebra-focused pathway.



Support services, including tutoring and student success coaching, are essential components of developmental education.

Further, monetary incentives can encourage developmental education students to engage with support services outside of the classroom.

OVERVIEW OF BEST PRACTICES

Best Practice	Description
Multiple Measures	Use of two or more measures to determine placement in developmental education
Corequisite Remediation	Students enroll in a college-level course while receiving additional support
Compressed Courses	Developmental courses that are compressed into a shorter time period
Self-Paced Courses	Students complete courses at their own pace, often using computerized instruction
Flipped Classroom	Students complete activities traditionally completed in the classroom online, enabling class time to focus on learning and application
Multiple Math Pathways	Students take developmental math courses that align with their intended course of study
Integrated Reading and Writing	Developmental reading and developmental writing courses are combined to form one course
Support Services	Students receive supports such as tutoring outside of the classroom
Monetary Incentives	Students receive monetary incentives for engaging with support services

RESEARCH QUESTIONS AND METHODOLOGY

METHODOLOGY

To assist institutions seeking to identify effective, research-based strategies for developmental education, Hanover conducted an analysis of best practices in developmental education for math and English. The analysis aims to provide insight into interrelated research questions about best practices for developmental education, services available outside of the classroom that support developmental education, and strategies that can shorten the time-to-completion of the first credit-bearing course.

Hanover based the following analysis on a review of information drawn publicly available data sources such as the Center for the Analysis of Postsecondary Readiness (CAPR), the National Center for Education Statistics (NCES), and institutional websites. Hanover also included case studies of developmental education practices at four institutions.

RESEARCH QUESTIONS



CASE STUDIES

Institution	Location	Undergraduate Students	Best Practice(s) Employed	Strategy
University of Akron	Akron, OH	14,794	Tutoring and monetary incentives	Tutoring services and a scholarship for outstanding developmental education students
University of Nevada, Reno	Reno, NV	17,297	Corequisite remediation	"Stretch" corequisite developmental courses in math and English
University of Texas at El Paso	El Paso, TX	21,427	Self-paced courses and integrated reading and writing	Self-paced, web-based developmental math courses and an integrated reading and writing course
University of Wisconsin-Milwaukee	Milwaukee, WI	21,107	Multiple math pathways and flipped classroom	Math pathways in a corequisite model and use of a flipped classroom/web-based learning

Sources: [College Navigator](#) and institutional websites (see embedded hyperlinks)

BEST PRACTICES IN DEVELOPMENTAL EDUCATION

CURRENT STATE OF DEVELOPMENTAL EDUCATION

TRENDS IN DEVELOPMENTAL EDUCATION

Most institutions in the United States offer developmental courses.

As of the 2015-16 academic year, approximately [83 percent](#) of public four-year institutions offer developmental education, up from [80 percent](#) during the 2000-01 academic year. Whereas [6.6 percent](#) of students at public four-year institutions nationwide are enrolled in one or more remedial courses, [10.5 percent](#) of students at public four-year institutions in Kansas are enrolled in developmental courses as of 2018. In Kansas, students enrolled in developmental education are [disproportionately](#) 25 years or older, African American, and recipients of Pell Grants.

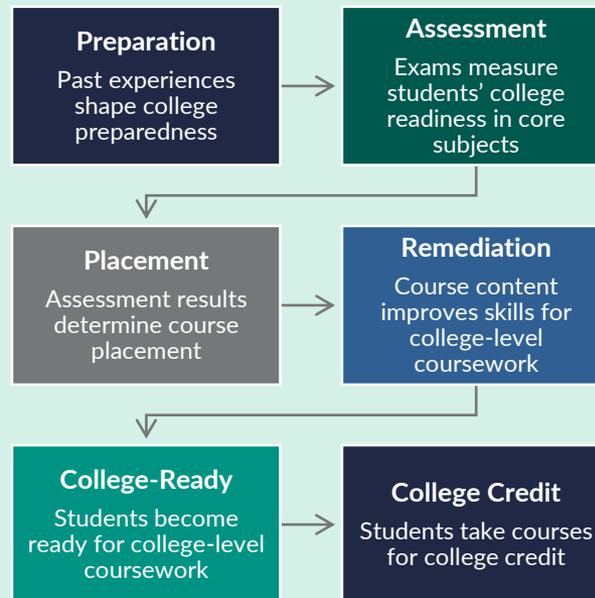
Many institutions use standardized tests to place students in developmental education.

During the 2015-16 academic year, nearly [40 percent](#) of public institutions nationwide used only one measure to place students in developmental education. Of these institutions, over [90 percent](#) exclusively used standardized tests, including college entrance exams such as the ACT or SAT as well as college placement exams such as [ACCUPLACER](#).

Many institutions are implementing complex reforms to their developmental education programs.

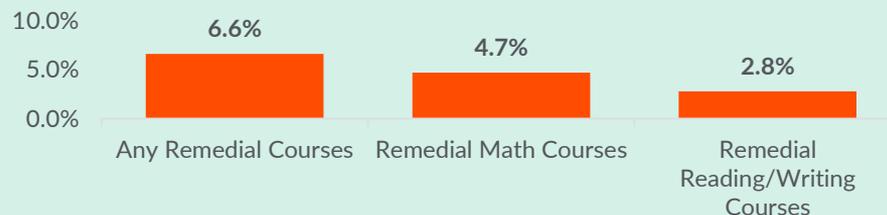
[Reforms](#) recommended by the Institute of Education Sciences (IES) include using multiple measures to place students in developmental education, redesigning developmental courses, and implementing comprehensive support structures. Despite recent pushes for reform, some elements of traditional developmental education remain. For example, most public institutions still offer their developmental courses as [multi-semester, prerequisite sequences](#).

Traditional Developmental Education Sequence



Source: [U.S. Department of Education](#)

Percentage of Students at Public 4-Year Institutions Enrolled in One or More Remedial Course, 2015-16



Source: [NCES](#)

ASSESSMENT AND PLACEMENT IN DEVELOPMENTAL EDUCATION

ASSESSMENT AND PLACEMENT

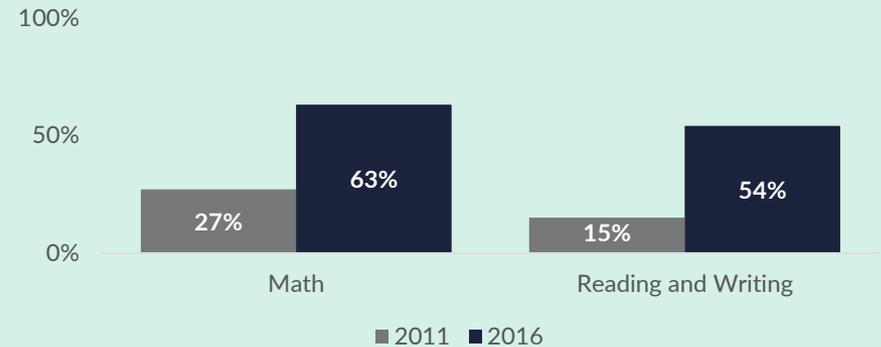
A multiple measures placement approach can more accurately predict student success in college-level courses.

Beyond standardized test scores, [additional measures](#) considered in multiple measures placement include high school GPA and other high school transcript information, writing assessments, years since high school graduation, and non-cognitive assessments. As part of its [Foresight 2020](#) plan to increase higher education attainment, the Kansas Board of Regents [recommends](#) that institutions should “use at least one other measure in addition to placement testing” to determine students’ fitness for developmental education. Measures recommended by the Kansas Board of Regents include high school transcripts and non-cognitive tests. Although the Kansas Board of Regents allows institutions to consider multiple measures when placing students in developmental education, [eight states or state university systems](#) do not allow the use of multiple measures to determine placement as of 2018.

Institutions should not necessarily place students assessed as unprepared for college-level coursework in developmental courses.

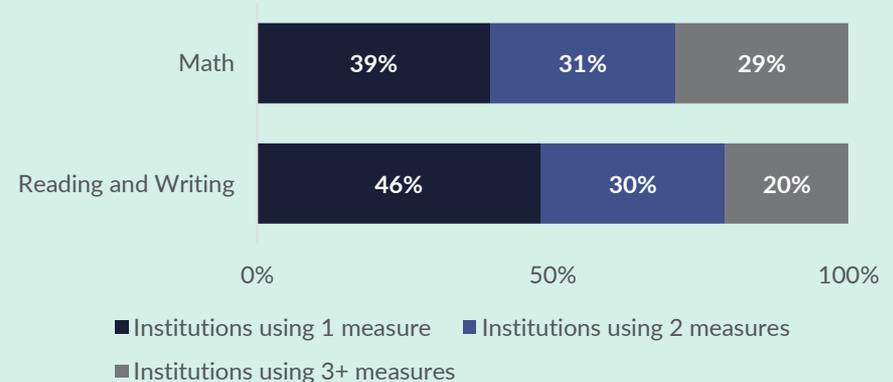
Several studies demonstrate that students who score [close to the placement threshold](#) are more likely to succeed when placed in a college-level course while receiving extra help, a process known as [corequisite remediation](#). Additionally, preliminary studies indicate that despite requiring more resources, corequisite remediation is [significantly more cost-effective](#) than traditional developmental education. [Successful corequisite remediation programs](#) align developmental education with college-level coursework, tailor instruction to the individual student, draw on the strengths of each student, and build skills needed for success outside of math, reading, and writing.

Percentage of Public 4-Year Institutions Using Processes Beyond Standardized Tests to Determine College Readiness, 2011 and 2016



Source: [CAPR](#)

Percentage of Public 4-Year Institutions Using Multiple Measures to Determine College Readiness, 2015-16



Source: [CAPR](#)

STRUCTURE OF DEVELOPMENTAL EDUCATION

STRUCTURE

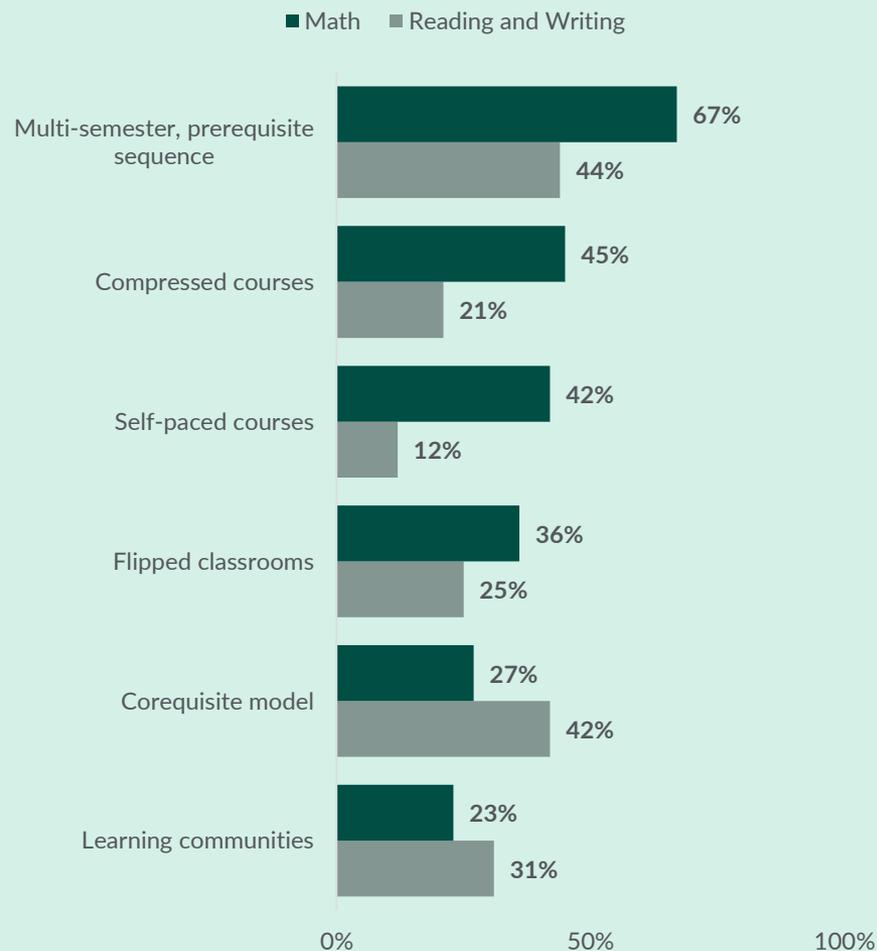
Compressed courses can lead to improved outcomes for students placed in developmental education.

By [compressing](#) courses traditionally offered in a multi-semester, prerequisite sequence, institutions enable students to pursue more than one course per semester. In turn, students can complete developmental education requirements [more quickly](#), sometimes in as little as one semester. Although most institutions [restrict enrollment](#) in compressed courses to students who are close to the placement threshold, some institutions instead [require](#) that students meet with a counselor to ensure that they understand the rigors of an accelerated course. Studies demonstrate that students enrolled in compressed courses have [increased](#) pass rates, grades, and rates of persistence into college-level courses.

Self-paced courses and flipped classrooms enable institutions to deliver at least some developmental education virtually.

Self-paced courses and flipped classrooms are among the [most prevalent](#) developmental education reforms, particularly for math courses. CAPR notes that instruction in [self-paced courses](#) is often “technology-driven, with students completing smaller computer-based mini-lessons or modules and instructors acting as facilitators to individual students.” Similarly, in a [flipped classroom](#), activities traditionally completed in-class, such as lectures, move online, “allowing students to spend class time on learning and application.” Virtual developmental education can also be [particularly beneficial](#) to working adults and students who need to improve their technological skills. Additionally, preliminary studies demonstrate [positive student outcomes](#) in self-paced courses and flipped classrooms. However, some scholars [argue](#) that the traditional face-to-face classroom remains the optimal environment in which institutions can prepare students for college-level courses.

Approaches to Developmental Education at 4-Year Public Institutions, 2015-16



Source: [CAPR](#)

MATH- AND ENGLISH-SPECIFIC APPROACHES

MULTIPLE MATH PATHWAYS

Multiple math pathways enable developmental education students to take different math courses depending on their intended course of study.

As of the 2015-16 academic year, approximately [39 percent](#) of public four-year institutions in the United States have multiple math pathways. Institutions tend to have a [quantitative reasoning-focused pathway](#) for students pursuing study in fields that do not require upper-level math courses, in addition to an [algebra-focused pathway](#) for students intending to major in math-reliant fields such as chemistry and economics. Studies [indicate](#) higher completion rates, increased subsequent math course enrollment, and faster credit accumulation rates among developmental education students who followed a math pathway.

Prominent examples of multiple math pathways include the DCMP and the Carnegie Math Pathways.

The [DCMP](#) works with institutions seeking to develop math pathways based on [four principles](#):

1. “All students, regardless of college readiness, enter directly into mathematics pathways aligned to programs of study.”
2. “Students complete their first college-level mathematics requirement in their first year of college.”
3. “Strategies to support students as learners are integrated into courses and are aligned across the institution.”
4. “Instruction incorporates evidence-based curriculum and pedagogy.”

Alternatively, the [Carnegie Math Pathways](#) consist of two pathways: Quantway and Statway. [Quantway](#) is “a set of quantitative reasoning course options designed to promote success in mathematics and to develop quantitatively literate students,” whereas [Statway](#) is “a set of accelerated statistical reasoning course offerings designed to teach mathematics skills essential for a growing number of occupations and needed for decision-making under conditions of uncertainty.”

INTEGRATED READING AND WRITING

Courses that combine the study of reading and writing can accelerate progression into college-level courses.

As of the 2015-16 academic year, approximately [51 percent](#) of public four-year institutions in the United States deliver integrated reading and writing courses. Following evidence-based practices, [effective integrated reading and writing courses](#) feature varied instructional activities, such as “contextual learning activities, collaborative learning activities, active learning, and limited use of computer-assisted tutorials.” Recent studies demonstrate that students in integrated reading and writing courses are [more likely](#) to advance into college-level courses, and participation in integrated reading and writing courses corresponds with [better performance](#) in subsequent courses.

Many institutions incorporate technology into their integrated reading and writing courses.

Technology is the third most cited [instructional strategy](#) by instructors of integrated reading and writing courses, after group work and applying the same topic for reading and writing. Examples of [technologies](#) employed as part of integrated reading and writing courses include:

Computer software that provides supplemental grammar instruction	Computerized support systems	Open labs for students needing extra help
Computer lab tutoring	Online lab components	Work produced in print, audio, video, graphics, and animation

Source: [Journal of Developmental Education](#)

OUTSIDE SERVICES THAT SUPPORT DEVELOPMENTAL EDUCATION

SUPPORT SERVICES

Comprehensive support services can promote positive outcomes among students in developmental education.

[Support services](#) are “an essential practice for developmental education programs,” as they help to improve course performance and encourage persistence into college-level courses. [Academic-related services](#) frequently offered to students enrolled in developmental education include tutoring, individualized instruction, student success coaching, and academic advising. Additionally, [computer-based learning sessions](#) and [pre-matriculation boot camps](#) are widely-employed supports for students enrolled in developmental math courses.

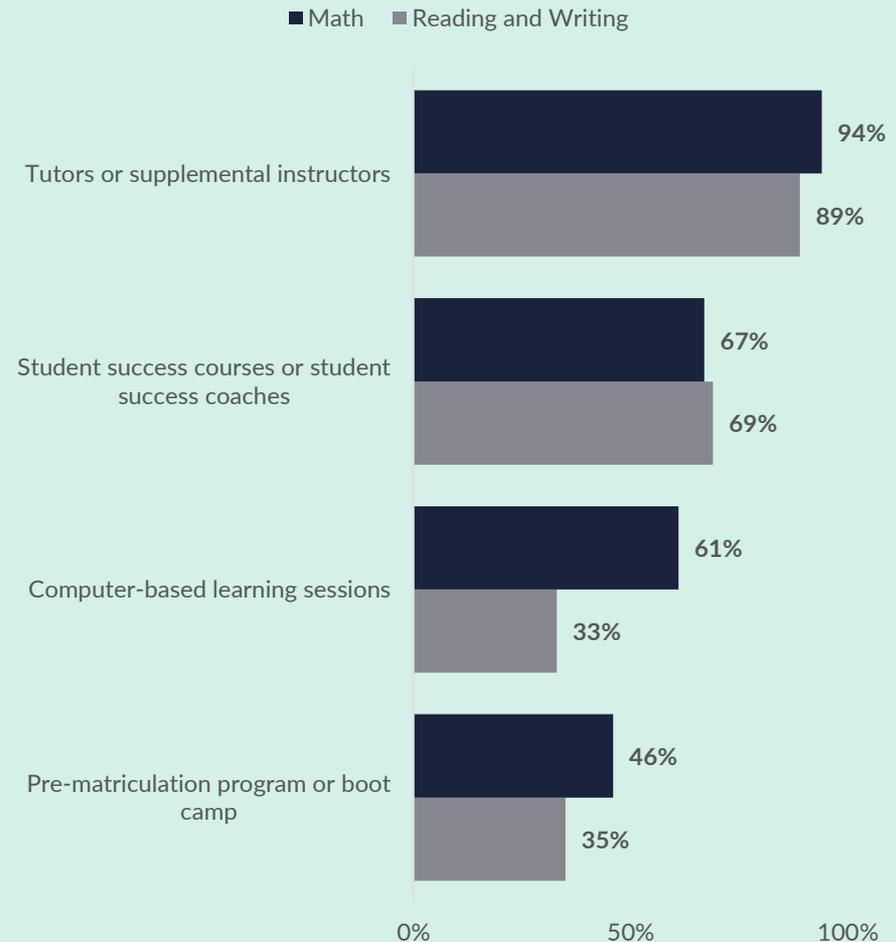
Institutions should ensure that their support services cater to the specific needs of students enrolled in developmental education.

In addition to academic needs, support services should reflect the [non-academic and material needs](#) of developmental education students, such as personal counseling and transportation.

Incentives may encourage developmental education students to engage with services outside of the classroom.

Given that many developmental education students must balance work, family, and academic demands, it may be [difficult](#) for them to find time to engage with support services. The IES remarks that [monetary awards](#) “can help incentivize students to take advantage of support services (e.g., academic advising, tutoring, mentoring) that will help them succeed.” Monetary incentives, which typically range from [\\$600 to \\$1,500 per semester](#), should be [performance-based](#) and distributed [incrementally](#) to encourage continued engagement with support services.

Percentage of 4-Year Institutions Where Underprepared Students Use Support Services, 2015-16



Source: [CAPR](#)

CASE STUDIES

TUTORING

The University of Akron (UA) offers learning labs to students enrolled in select developmental courses.

The learning labs are open to students enrolled in [Basic Mathematics](#), [Basic Writing](#), and [College Reading & Study Skills](#). Each lab involves one-on-one tutoring sessions that last between [25 and 30 minutes](#). Learning lab [tutors](#) include faculty members with a master's degree or higher in their subject area as well as UA students (math and writing only) "who have met high standards and have excellent qualifications and achievements in their subject area." UA [recommends](#) that developmental education students begin attending learning labs as soon as their courses start, as "students who begin tutoring from the beginning of the semester typically do better than those who wait."

Basic Mathematics

"An intensive review of arithmetic and an introduction to the concepts of elementary algebra. Emphasis is placed on developing learning strategies and controlling anxieties."

Basic Writing

"Provides intensive practice in the process of writing, in sentence structure and punctuation, and in correct written expression."

College Reading & Study Skills

"Practice of comprehension strategies with emphasis on textbook reading, and implementation of effective study strategies such as note-taking, test-taking, and memory techniques."

Source: [UA](#)

MONETARY INCENTIVES

THE DONALD TAYLOR SCHOLARSHIP

"The Department of Developmental Programs chooses students for the Outstanding Student Award Ceremony which takes place yearly. These awards are given to students with outstanding academic achievement, exemplary attendance, and exceptional participation and contributions to the classroom learning environment."

Source: [UA](#)

UA annually awards a scholarship to outstanding developmental education students.

UA [established](#) the scholarship in 2015 through a gift from the Department of Developmental Programs faculty. Awardees [must](#) "have taken at least one Developmental Programs course, demonstrated outstanding academic achievement, exemplary attendance, and exceptional participation in class, particularly in relation to consistently contributing to the learning environment of the class." Each winner gets a [\\$150 scholarship](#), and one student selected as "the OVERALL Outstanding Student" receives a [\\$200 scholarship](#). Additionally, students nominated for the award but not selected each receive a [\\$25 gift card](#).

COREQUISITE “STRETCH” COURSES

The University of Nevada - Reno (UNR) delivers “stretch” courses, which are corequisite English and math courses that combine an introductory college-level course with additional lecture time.

UNR’s stretch courses [do not replace](#) its traditional developmental courses; instead, they “bridge” students whose test scores are too high for placement in developmental courses but insufficient for placement in standard college-level courses. UNR began [piloting](#) two sections of stretch Math 120 during the 2011-12 academic year, one with three contact hours per week and one with four contact hours. [Final grades](#) (see table below) from students who took stretch Math 120 in Fall 2011 and Spring 2012 demonstrate that students benefitted from the extra hour of instruction each week, leading UNR to develop additional stretch courses that involve four or five weekly contact hours.

Format	A, B, or C	D	F	Number of Students
4 hours per week	97%	3%	0%	43
3 hours per week	90%	5%	5%	34

Source: [NSHE](#)

Whereas UNR offers English 100J as a single course, students in UNR’s three stretch math courses must also enroll in a Learning Support course.

The [Learning Support](#) courses, which are worth either one credit (Math 120) or two credits (Math 124 and Math 126), provide supplementary instruction but do not count toward a student’s GPA.

CURRENT STRETCH COURSES

Course Title	Total Credits	SAT and ACT Scores	Description
English 100J: Composition Studio	5	18-20 ACT English score or 44-500 SAT Verbal/ Critical Reading score	“This course focuses on intensive instruction and practice in writing the expository essay; supplemental practice in analyzing scholarship for audience, purpose, thesis, support, logic, style, conventions and workshop in revising and editing for style, grammar and usage.”
Math 120E: Fundamentals of College Mathematics Expanded	3 + 1	Minimum 19 ACT Math score or 510 SAT Math score	“Basic properties of the real numbers, problem solving, linear equations, graphing functions.”
Math 124E: College Algebra Expanded	3 + 2	Minimum 19 ACT Math score or 510 SAT Math score	“Exponents rules, radicals, interval notation, factoring, rational expressions, Pythagorean theorem, rationalization.”
Math 126E: Precalculus I Expanded	3 + 2	Minimum 20 ACT Math score or 520 SAT Math score	“Multiplying, dividing and factoring polynomial expressions. Solving polynomial and rational equations. Algebraic techniques involving exponents and radicals.”

Source: UNR ([1](#), [2](#), [3](#), [4](#))

WEB-BASED MATH COURSES

The University of Texas at El Paso (UTEP) uses ALEKS, a web-based application, to teach its developmental math courses.

[ALEKS](#) is a McGraw Hill product that “uses adaptive questioning to quickly and accurately determine exactly what a student knows and doesn’t know in a course.” UTEP’s developmental math courses meet in a computer lab, where students must spend at least [eight hours per week](#) on the ALEKS system. UTEP cites [seven benefits](#) of the ALEKS system:

- 1 It is mastery-based; students must show mastery of a topic before moving to the next topic
- 2 It is individualized; students begin the program with an assessment that places them at different levels based on ability
- 3 It is very fluid; it is not a linear program in which students must cover one topic before moving on to the next
- 4 It contains assessments and practice; students receive explanations while working on practice problems, and during assessments they must work through the problem without help
- 5 It will not let students work on material that they are not ready to learn
- 6 Its assessments contain questions on two types of content: content students have already practiced and questions on content they have not yet practiced to see if they already know it
- 7 It enables students to complete up to two courses during one semester

Source: [UTEP](#)



INTEGRATED READING AND WRITING

ENGLISH 0312: INTEGRATED READING AND WRITING

“Students will learn to investigate academic texts, construct supported interpretations and arguments for an authentic audience, and acquire academic habits of thought. Reading instruction will focus on developing critical reading skills for comprehension, interpretation, and analysis. In writing, students will develop skills through composing with specific purpose, situation, genre, and audience in mind. Students will write a variety of effective formal and informal texts. To learn to integrate reading and writing, students will use an inquiry approach to analyze, synthesize, and make value judgments regarding text and writing. The focus of the course will be on applying critical reading skills for organizing, analyzing, and retaining material and developing written work appropriate to the audience, purpose, situation, and length of the assignment. This course is designed to prepare students for college-level reading and writing intensive courses.”

Source: [ESC19](#)

In addition to its stand-alone reading and writing developmental courses, UTEP delivers an Integrated Reading and Writing course.

UTEP’s 16-week Integrated Reading and Writing course, which is available [online](#), meets the reading and writing requirements of the [Texas Success Initiative \(TSI\)](#). The course [aims](#) to prepare students for college-level courses “with no additional remediation in reading and writing.”

MATH PATHWAYS

The University of Wisconsin - Milwaukee (UWM) offers three math pathways for developmental math students.

The math pathways have three goals: (1) to “address the mathematical needs of ALL students,” (2) to “reflect the accumulated wisdom about why (and what) mathematics is important for academic and life success,” and (3) to “reflect the accumulated wisdom about mathematics, including what is known about students as well as what it means to ‘learn.’” UWM’s pathways follow a corequisite model, as students must enroll in two math courses concurrently. Whereas the [Mathematical Literacy Pathway](#) and the [Flipped/ALEKS Pathway](#) cater to all students placed into developmental math, the [Algebraic Literacy Pathway](#) specifically targets students planning to study in a STEM or business field that requires calculus. As all three pathways satisfy UWM’s [General Education Quantitative Literacy Part A](#) requirement for graduation, students who complete the math pathways are not required to enroll in subsequent college-level math courses aside from [one quantitative course](#) completed in their major.

One of UWM’s math pathways utilizes a flipped classroom.

In the [Flipped/ALEKS Pathway](#), students watch video lectures outside of the classroom and participate in in-class discussions. Online components of the pathway make use of ALEKS, which enables students to [accelerate](#) their studies and move to college-level courses within one semester. When UWM first employed a flipped classroom approach for its developmental math courses in Fall 2014, the overall pass rate among 440 students increased by [19 percent](#) (21 percent for minorities) relative to historic developmental education completion rates. Additionally, the first cohort of students in the flipped classroom completed their first credit-bearing math course at a rate of [62 percent](#), relative to the 38 percent completion rate of a prior cohort in the traditional classroom.

CURRENT MATH PATHWAYS

Mathematical Literacy Pathway

Math 92 and Math 102

“The Mathematical Literacy Pathway is a two-semester math experience appropriate for any college student testing into developmental math. At the end of the pathway, you’ll have completed your General Education/Quantitative Literacy Part A requirement. The content of the pathway prepares you for quantitative demands you will encounter in future math and science classes, the rest of your academic career, and your life.”

Algebraic Literacy Pathway

Math 98 and Math 108

“The Algebraic Literacy Pathway prepares you for mathematics futures that include business calculus (Math 211), pre-calculus (Math 116/117) leading to calculus (Math 231), 100-level Chemistry courses, and other courses requiring a background beyond the Mathematical Literacy Pathway.”

Flipped/ALEKS

Math 94 and Math 103 or 105

“This pathway, developed as a collaborative effort between UW-Colleges and UWM, utilizes a flipped-classroom design that requires students to watch YouTube lectures at home, with in-class time devoted to discussions and practice of material.”

Source: UWM ([1](#), [2](#), [3](#))

