

North Carolina Multiple Measures

Implementation and Outcomes Study: Final Report

Rev. June 29, 2017

Sue Clery, Bill Munn, & Melissa Howard
Coffey Consulting, LLC



Contents

Acknowledgements.....	i
Executive Summary.....	ii
Project Activities.....	ii
Evaluation Findings	iii
Introduction	1
Research Questions	3
Organization of this Report	3
Research Design and Methodology	4
Study Timeline	4
Quantitative Research	4
Data Collection Process.....	5
Analysis.....	6
Qualitative Research.....	7
Data Collection Process.....	8
Analysis.....	9
Study Scope	9
Overview of Colleges' Strategies	11
Math and English Skills Support Classes.....	11
<i>SPARK for Statistics</i> Supplemental Instruction	12
<i>Let's Go Racing</i> Remediation Modules.....	12
Key Findings: Student Outcomes, Targeted Math Courses	14
Targeted Course: Attempts	15
Student Outcomes: Targeted Math Courses	17
Average Grade Achieved	17
Students Achieving a C or Better in Targeted Math Courses.....	20
Students with D/F/W Grades	22
Summary of Student Achievement in Targeted Courses	23
Uneven Success for Student Groups	24
Profile: Wake Technical Community College.....	25
Key Findings: Overview of the Academic Support Strategies and Drivers of Effectiveness	27

Co-Requisite Skills Support Classes	27
Learning Support Methods and Practices	27
Skills Support Class Participation Policy	35
Remediation Modules: <i>Let's Go Racing</i>	34
Knowledge and Skill Focus of the Remediation	35
<i>Let's Go Racing</i> Participation Policy	36
Promoting Engagement and Completion of the Intervention	36
Supplemental Instruction: <i>SPARK for Statistics</i>	37
Academic Support Practices and Strategies	37
Role of the SPARK Leaders and SPARK Coordinator	38
Participation and Attendance Policy	39
Benefits of the Academic Support Strategies	40
Key Findings: Implementation Overview and Assessment of the Implementation Process	43
Implementation Overview	43
General Assessment	46
Key Supports for the Implementation Process	46
Challenges Encountered During the Implementation Process	47
Key Findings: Student Perspectives on the Academic Support Strategies	52
Concluding Remarks	57
Recommendations	58
Future Analysis	60
Appendix: Multiple Measures Research Study, College Intervention Strategies	61

Acknowledgements

The Coffey research team would like to express our gratitude to the college personnel at each of the six colleges who took time from their busy schedules to participate in this study. These individuals shared valuable insights, information, and ideas throughout the study period, guided the research team around their college campuses when we were visiting, and willingly invited team members into their classrooms for observations and to talk with students. The openness with which they discussed their initiatives made it possible for the researchers to develop this report. Our appreciation is also extended to the individuals who spent many hours coding and analyzing data. We thank them for their time in responding to our relentless questions about the data.

We hope the commentary within this report is of value to all personnel at the participating colleges, and other interested readers, as a contribution to understanding the implementation and outcomes of the student support strategies adopted as part of the North Carolina Multiple Measures Research Study. Our anticipation is that this report will complement information that the colleges' project teams are gathering using their own internal processes.

Executive Summary

In 2013, the North Carolina Community Colleges adopted the Multiple Measures for Placement policy that established the use of high school grade point average (GPA) as a key measure for placing incoming students in developmental or college-level coursework. This new policy represented a significant departure from the state's long-standing placement practice, which relied on standardized assessments to determine a student's need for remedial education. The reform raised numerous concerns among members of the postsecondary education community in the state, chief among them that some students who are eligible to move directly into college-level courses may, in fact, be underprepared and at-risk of not succeeding. The view was that these students, without additional academic support, might fail to successfully complete crucial gateway courses and face challenging barriers to college completion.

In response to this college readiness concern, Guilford Technical Community College (GTCC) joined with five other community colleges in the state, and with researchers at Coffey Consulting, LCC (Coffey), in launching a multi-year research study that involved the implementation of student support programs aimed primarily at multiple measure waiver students eligible to enroll in college-level courses upon first entry, but who were considered potentially at-risk academically. The target population consisted of students who met the new placement policy's high school GPA threshold to by-pass developmental education (2.6), but whose high school GPA indicated they may have deficiencies in core competency areas, or students whose high school GPAs fell between 2.6 and 3.0. As part of this study, each of the six participating colleges developed and implemented interventions aimed at boosting the chances of target student success in key gateway math and English courses. The Coffey research team was tasked with monitoring the implementation process at each of the colleges and evaluating the effects of the supplemental supports on course outcomes.

Project Activities

Among the colleges participating in the study, four selected to implement a co-requisite model of academic support in math, or both math and English – these colleges included Central Piedmont Community College, Davidson County Community College, Gaston College, and Wake Tech Community College. Strategies at these colleges took the form of weekly, instructor-led skills support classes that were facilitated by an instructor and aligned closely with the students' learning in their gateway coursework. The semester-long interventions provided students with just-in-time support that tracked their learning in the gateway course, along with as-needed practice and review of foundational or core academic concepts and skills. Each of the colleges provided learning assistance to students enrolled in pre-calculus and statistical methods, and one provided support for those taking quantitative literacy. The English interventions were provided to students taking the gateway writing and inquiry course.

The team at GTCC took a similar approach, but selected to implement a Supplemental Instruction (SI) model, *SPARK for Statistics* (SPARK), as their delivery framework and focused on students enrolled in their college-level statistics course. Similar to the support classes, SPARK sessions were designed and operated to provide timely recaps and extra practice opportunities to help students master key

concepts, vocabulary, and problem-solving techniques introduced in their statistic class. Time was also devoted to building student competency in foundational knowledge and skill areas that underpinned current learning. SPARK sessions met weekly and were facilitated by student leaders rather than college instructors.

The sixth college, Stanly, developed an innovative remediation program called *Let's Go Racing* that focused on strengthening students' basic, or prerequisite, knowledge and skills in math or English. The on-line intervention was conducted for two weeks at the start of the semester. Students were asked to complete a series of assessments and learning modules that were designed to identify strengths and weaknesses in core competency areas and provide learners the chance to strengthen their deficiencies prior to full engagement in their curriculum math or English coursework. Instructors facilitated the support process, but students were tasked with the responsibility of completing the assignments independently.

Although the interventions developed and implemented by the six colleges were different in character, they were unified in their core objective: to provide students with a relevant and meaningful academic support experience that would bolster their chances for success in their gateway math or English courses. They were designed and operated at the grassroots level and were developed to address not only students' academic needs, but also their cognitive needs, confidence, and motivation. The strategies were aimed to help students integrate into the college learning experience and promote student engagement.

Colleges piloted their interventions during the Spring 2016 semester. Since then, the colleges have broadened their reach and increased the number of sections and courses where the academic supports were made available; consequently, the number of students touched increased. The student-level data provided by the six colleges to the research team for this study reflects, in sum, nearly 10,000 multiple measure waiver students over five semesters studied, with about 3,500 students in the pre-intervention cohorts, or Spring and Fall 2014 semesters, and just over 6,000 in the post-intervention cohorts, or Spring and Fall 2015 and Spring 2016 semesters. On average, 44 percent of multiple measure waiver students in both the pre- and post-intervention cohorts had high school GPAs of 2.6 to 3.0, or were in the target student group.

Evaluation Findings

The implementation analysis showed that the six colleges' initiatives were based on sound principles of program design and implementation and each made use of proven practices in the delivery of academic support. They were well-designed and grounded in quality pedagogy. The initiatives were also backed by a strong commitment from key college personnel, including administrators and faculty members. The evidence was clear that practitioners were focused on providing target students with the type of guidance and learning support environment that could generate meaningful learning outcomes.

As would be expected, each of the colleges had their own particular implementation experience, and they all encountered challenges that were common as well as unique. For example, ensuring alignment between the academic support and the gateway course instruction was a common challenge. Noteworthy is the fact that none of the initiatives were derailed over the course of the implementation

period by the challenges or disruptions encountered, and when challenges did arise, college personnel mobilized to address the issues in an effective manner.

Each of the six initiatives was also bolstered by a set of supporting factors or conditions that have been demonstrated to be drivers of program effectiveness. Consistent with the research, motivating supports for implementation success evidenced via this evaluation include the following:

- ❖ College practitioners who were in charge of operations and delivered the support to students were, overall, well-qualified and strongly committed to the goals of the initiative.
- ❖ The initiatives were grassroots developments and were operated in a manner to empower staff engaging with students.
- ❖ Value was placed on instructor autonomy, and delivery flexibility was encouraged to best meet the needs of the students as they emerged and evolved.
- ❖ High levels of collaboration and communication among members of each college team existed.
- ❖ College and departmental cultures were supportive of the strategies and their implementation.

Across the colleges, the emphasis was on creating value for the students and bettering their chance for success in their college-level courses. In this regard, the interventions were designed to place little-to-no extra burden on the students in terms of time or cost; practitioners were sensitive to not weighing-down students with additional assignments that competed with their college-level coursework.

Consensus emerged among the practitioners over the course of the implementation that their college's effort provided real return for students. And, students appeared to agree; responses to this study's student surveys and interviews indicated that students felt the academic assistance they received was beneficial and a good use of their time, and most indicated they would recommend the experience to others. When students were asked to share how the student support could be improved, the most common response was that "it was good as it is."

The analysis of student outcomes data supported the conclusion that the academic support strategies had a positive effect on course outcomes. Focused on target students' first semester of enrollment at the participating colleges, the data evidenced that the potentially academically-underprepared students benefitted and were more successful in the targeted math courses when receiving the supplemental academic support. The following are among the key findings of the student outcomes analysis:

- ❖ The average grade attained by target students increased by nearly one-half of a grade when pre- and post-intervention student cohorts were compared, from 1.4 to 1.9, respectively.
- ❖ When the academic achievement of students in the target population was compared to a control group of students before and after implementation of the supplemental supports, the achievement gap between the two closed noticeably with the introduction of the intervention—the grade difference narrowed from 1.3 grade points pre-intervention to 0.6 grade points post-intervention.
- ❖ A majority of the colleges experienced a drop in the withdrawal rate of target students from their gateway math course during the three semesters in which the interventions were in operation. One possible takeaway from this finding is that students participating in the learning supports experienced a boost in confidence and a subsequent drop in anxiety of not succeeding.

Introduction

Innovative in their development of responses to an array of challenges facing developmental education, the North Carolina State Board of Community Colleges approved a policy change that, in 2013, made them the first state to widely adopt high school grade point average (GPA) as a primary placement measure and an alternative to traditional diagnostic testing.

North Carolina's Multiple Measures for Placement policy was first approved by the North Carolina State Board of Community Colleges in 2013. The policy establishes a hierarchy of measures to assess the readiness of recent high school graduates for credit-bearing, college-level courses and to place students into developmental education.¹ The 58 community colleges in the state system began implementing the placement policy in Fall 2013, with a required implementation date by the Fall 2015 semester.

Under the multiple measures policy, students are exempt from diagnostic placement testing if they meet certain criteria. These criteria include graduation from a North Carolina-licensed high school within the previous five years, a minimum 2.6 unweighted high school GPA, and completion of four specific math courses: Algebra I, Geometry, Algebra II (or its Common Core equivalent) and one additional math course. For those students who do not meet the high school GPA standard, community colleges use subject-area ACT or SAT scores to determine their math and English college readiness. Those who do not meet any of the criteria are directed to take the diagnostic placement test to determine whether they need to be placed in remedial courses as a first step into college.

The state's shift away from relying solely on diagnostic placement tests to determine student eligibility for college-level courses to the use of multiple measures to place students represented a significant and untested policy reform initiative. The change was met with questions and broad concern, from members of the state's two year college community, that some students who are eligible for placement testing waiver may, in fact, not be college-ready in mathematics, reading, and English. These students may need some type of supplemental academic support to help them succeed. Accelerating or eliminating remediation, it was argued, does not mean that all students are prepared for the demands of college or that students will not need additional support to better position them for achieving their academic goals. Of particular concern were students who might be on the margin of preparedness, such as those with high school GPAs between 2.6 and 3.0. The question was whether such potentially at-risk students would have the type and level of assistance they might need to successfully complete high-

¹ http://www.nccommunitycolleges.edu/sites/default/files/state-board/program/prog_04_multiple_measures_2-12-15.pdf

stakes, gateway courses and move forward toward a credential. As the new policy was phased-in across the state's community colleges beginning in Fall 2013, colleges welcomed the promise of a more efficient placement process but also braced for the possibility that some students might begin their first semester of college-level learning in need of additional academic support to be successful in their college-level coursework.

For this initiative, a group of six North Carolina community colleges, led by Guilford Technical Community College (GTCC), teamed with researchers from Coffey Consulting, LLC (Coffey), to undertake a research study aimed at understanding what types of supplemental academic supports may be effective for students who come into college with a multiple measure waiver but who also fall within the potentially at-risk group of students with a high school GPA between 2.6 and 3.0. The colleges selected for participation were considered to be well-prepared and ready to implement, and represented diversity with respect to size, locale (urban/rural), and student enrollment (part-time/full-time students). The six colleges include:

- ❖ Central Piedmont Community College (CPCC)
- ❖ Davidson County Community College (DCCC)
- ❖ Gaston College (Gaston)
- ❖ Guilford Technical Community College (GTCC)
- ❖ Stanly Community College (Stanly)
- ❖ Wake Technical Community College (WTCC)

Each of the colleges was provided a grant from the Bill & Melinda Gates Foundation to develop and implement an academic support strategy that was targeted at this potentially academically at-risk student group. The colleges were allowed to implement the support strategy of their choosing, and all focused their efforts on students enrolled in select gateway math courses. Three colleges also chose to implement a support for their gateway English courses.

Four of the colleges—CPCC, DCCC, Gaston, and WTCC—implemented co-requisite math skills support classes, which relied on college-level and developmental education instructors to provide just-in-time academic assistance to students while they were learning gateway course content in the same subject area. DCCC and WTCC also offered students English skills support classes. GTCC turned to Supplemental Instruction (SI) as their model for academic support. The peer-assistance initiative, named *SPARK for Statistics* (SPARK), was aimed at improving retention and success among students taking college-level statistics. Stanly developed an on-line remediation program for students, *Let's Go Racing*, which systematically guided students through a process of assessment and review that was aimed at enhancing their readiness for college-level learning. The remediation program was conducted during the first two weeks of the semester and focused on building foundational, or prerequisite, skills and knowledge considered key to success in the core academic courses. While the colleges implemented

If students who are placed into curriculum courses based on their high school GPA succeed, the number of students placed into developmental education will be dramatically reduced.

their academic support strategies, Coffey monitored and analyzed their implementation processes and tracked the curriculum course outcomes of target students who participated in the strategies.

RESEARCH QUESTIONS

This study was designed to gain an understanding of the implementation processes, including methods used to deliver academic assistance, key supports for implementation, and challenges encountered; the factors that may have contributed to the ability of the supports to promote student achievement; and the effects of the interventions on student curriculum course outcomes. To these ends, Coffey's evaluation focused on the following research questions:

1. Did target students benefit from participating in the supplemental academic supports?
2. Are there outcome differences by specific student groups, among the targeted student group, and are these the same differences seen with non-targeted students?
3. What conditions provided support for the implementation processes or presented challenges to goal achievement?
4. What factors pertaining to the design and delivery of the academic supports positively impacted student achievement?
5. Where may adjustments be made to the design and implementation of the academic supports to promote greater efficacy?

Midway through the study, Coffey prepared an interim report which focused on the early implementation experience at five of the six participating colleges. The interim report indicated that the initiatives, overall, were well-designed, successfully implemented, and effectively delivered. For details, please see *Interim Report on the Implementation of Learning Support Strategies: Review of the Activities of Colleges Participating in the North Carolina Multiple Measures Research Study*, prepared in September 2015.

This report focuses on the experiences of the colleges during their second and third semesters of academic support implementation. During this time, the colleges moved from piloting their initiatives to broader implementation as the initiatives expanded in scope to reach more students, added delivery support personnel, and experienced greater levels of academic support activity.

ORGANIZATION OF THIS REPORT

This report begins with an overview of the research study and the analytical methodology, including both the quantitative and qualitative research and related analytical procedures. This is followed by a presentation of Coffey's findings from the analysis of the quantitative research, which is based on student-level data provided by the participating colleges to Coffey over the course of this study and examines student outcomes in targeted gateway math courses, specifically pre-calculus and statistics. The proceeding three sections present a discussion of the findings from the qualitative research, including an analysis of the methods and practices used to deliver academic support at each of the colleges, an overview and assessment of the implementation processes, and a summary of findings related to student perspectives on their academic support experience. Concluding remarks are followed by an appendix containing an overview of each college's supplemental support strategy.

Research Design and Methodology

STUDY TIMELINE

The North Carolina community colleges began phasing in multiple measures to determine student placement in Fall 2013. Figure 1 provides a display of the timeline of activities, as related to this study. All colleges participating in this study were expected to begin implementing their related academic support strategies during Spring 2015. To kick-off the work, the colleges attended a Strategy Institute in Fall 2014. Organized by the Coffey research team in conjunction with the study's Project Manager in North Carolina, the Institute provided the colleges with an opportunity to work within and across college teams, and with both subject matter experts and the research team, to model their initiative, construct an action plan for development and implementation, and share ideas to enhance the efficacy of planning and implementation. Note that WTCC came into the study late, and implemented both multiple measures for placement and the related student support during Fall 2015.

FIGURE 1. NORTH CAROLINA MULTIPLE MEASURES STUDY TIMELINE

Pre-Intervention Cohorts		Post-Intervention Cohorts			
Fall 2013	Spring 2014	Spring 2015	Fall 2015	Spring 2016	Fall 2016
CPCC, DCCC, Gaston, Stanly: <i>Implement Multiple Measures Policy</i>	GTCC: <i>Implements Multiple Measures Policy</i>	CPCC, DCCC, Gaston, Stanly, GTCC: <i>Implement student supports</i>	WTCC: <i>Implements both Multiple Measures policy and student supports</i> All other colleges: <i>Make adjustments & broaden scope of student supports</i>	All colleges: <i>Continue adjustments & broadening scope of student supports</i>	All colleges: <i>Continue adjustments & broadening scope of student supports</i>

For the purposes of this analysis, the target student group is defined as those who enter the college with a multiple measure waiver and who have a high school GPA between 2.6 and 3.0. The control student group consists of students with high school GPAs over 3.0.

QUANTITATIVE RESEARCH

Research shows that first semester and first year student outcomes are positively related to longer term success; stronger student momentum early in academics is related to increased chances for completion. Important here is the relationship of gateway course completions, especially in math and English, to credential completion.² As such, the quantitative research effort brings into focus the target students' outcomes in the gateway courses targeted at each of the six colleges, during students' first semesters of enrollment. This analysis captures student outcomes from the study's launch, including two semesters of baseline data through two semesters of intervention strategy operation. In conjunction with the qualitative research and analysis, the quantitative research helps to document program results and

² Leinbach, T., & Jenkins, D. (2008, January). Using longitudinal data to increase community college student success: A guide to measuring milestone and momentum point attainment. *CCRC Research Tools*, 2. Available at: <http://ccrc.tc.columbia.edu/media/k2/attachments/longitudinal-data-momentum-point-research-tool.pdf>.

factors for success, inform decision-making and planning at the colleges regarding the use of various practices to support academically at-risk students, and offer a window into the college-going experience of students. Over the course of this study, Coffey tracked students' outcomes in the targeted gateway courses for students attempting the courses during their first terms of enrollment.

Data Collection Process

The colleges participating in this study were selected from a set of colleges that also participate in the Completion by Design (CBD) initiative funded by the Bill & Melinda Gates Foundation. As part of the CBD initiative, colleges provide student-level data to Coffey; only slight changes were needed to the CBD data structures to support this study.

Student-level data were collected for cohorts of students first enrolled at the participating institutions during each semester and consisted of students' academic activity during each term beginning in Fall 2013 and continuing through Fall 2016. Students who first enrolled during the Fall 2013 and Spring 2014 semesters were considered to be pre-intervention, or baseline, cohorts; these students were subject to the multiple measures policy but did not have the benefit of extra student support strategies. First-term outcomes for the baseline cohorts were compared with those of students who enrolled between Spring 2015 and Spring 2016^{3,4}--post-intervention students who benefited from the implemented student supports.

The quantitative data used in this analysis reflects only the first-term activity of students who enter the college for the first time and does not include continuing students. That is, students who first enrolled prior to the Fall 2013 semester and subsequently attempted the specific targeted courses developed as a result of the multiple measures policy are not included in this quantitative analysis. This is important to note because the numbers of first-time students at each of the colleges does not encompass all students who attempted the targeted courses studied in the analysis herein. However, the study's quantitative methodology was designed as such to allow for the examination and comparison of outcomes of students beginning their academics at the most similar starting lines as possible.

Two of the four targeted courses for this study are included in this quantitative analysis: pre-calculus (MAT 171) and statistics (MAT 152). Quantitative literacy (MAT 143) and an English course, writing and inquiry (ENG 111), were not included; only one institution (Stanly) offered MAT 143 and ENG 111 during Fall 2014 and Fall 2015, the two terms used in these analyses.

³ Compared to the fall terms, fewer students are in the spring cohorts, and because the colleges submitted data for five terms total, an equal number of spring and fall terms occurs in the pre- and post-intervention periods: The pre-intervention period includes one spring term and one fall term, whereas the post-intervention period includes two spring terms and one fall term. Including all five terms in the analyses would not produce robust analyses because of differences in academic performance between fall-entry and spring-entry students. Thus, for the purposes of this analysis, the pre-intervention time period includes spring and Fall 2014 and the post-intervention time period includes Fall 2015 and Spring 2016.

⁴ Data from the 2016 Fall semester will be collected early in 2017 and reported in an addendum to this report with an expected release date of August 2017.

Analysis

The quantitative analysis examines whether the target group students, with the available student supports, had similar or different outcomes as compared with students who are better academically prepared and if the target group students that benefitted from student support strategies achieved higher academic success as compared with target group students who did not benefit from intentional student supports.

Through the quantitative analysis, target and control group students' early outcomes across various dimensions were compared and contrasted.⁵ Coffey gathered data from the colleges to support descriptive and regression analysis of student outcome metrics such as:

- ❖ Whether the student attempted the targeted first college-level math courses during the first term.
- ❖ Success in the targeted first college-level math courses.
- ❖ Whether the student withdrew from the first targeted college-level math course attempted.

Descriptive analysis does not identify causal links between the interventions and outcomes, but allows for understanding the contribution and possible impacts of the interventions on students' academic achievement and persistence. The regression analysis allows for attributing outcome differences to the instructional support strategies and determining if the implemented instructional supports facilitated increased academic success of students in the targeted group.

DESCRIPTIVE ANALYSIS: Coffey conducted a comparison of target and control group student outcomes within and across colleges. Working under the assumption that the target student group is comprised of students for which the strategies are designed to support, a comparison of the outcomes of these two student groups yields the ability to determine if outcomes of students potentially at-risk are similar or different from those who are better prepared academically and other similar at-risk students who did not benefit from the supplemental support.

REGRESSION ANALYSIS: Regression analyses were conducted to support the findings of the descriptive analysis and to examine the effects of the student support strategies. The Fall 2014 and Fall 2015 semesters were included (pre- and post-intervention periods, respectively).⁶ One ordered logistic and four logistic regression models were developed to analyze the effects of the student support strategies on multiple measures waiver students. The five models represent five outcomes in the targeted courses. These outcomes serve as the dependent variables in the regression models. The five models are listed below, along with the independent and control variables:⁷

⁵ Note: Interim student outcome reports were provided to each of the colleges to enable them to monitor their progress along the way and help to determine where adjustments may need to be made in their strategies or their implementation to improve outcomes.

⁶ Spring terms were purposefully excluded from the analyses because incorporating both fall and spring cohorts presents seasonality issues that may confound the results. And, much larger numbers of students first enroll during the fall semester as compared with the spring semester.

⁷ WTCC was not included in the regression analysis because they do not have a pre-intervention time period.

Models	Independent variables	Control variables
<ul style="list-style-type: none"> •Grade attained •Success (achieving an A, B, or C) •Achieving a D- or F-grade •Achieving an F-grade •Withdrawing 	<ul style="list-style-type: none"> •Time period (Pre- and post-intervention) •Institution (CPCC, DCCC, GTCC, Gaston, Stanly) 	<ul style="list-style-type: none"> •Gender •Race •Age •Income level •Poverty level •Enrollment intensity (full-time or part-time)

The institutions and time period variables were recoded as dichotomous variables and the control variables were recoded as dummy variables. Regressions were conducted for target and control group students separately to analyze the effects, which in this case are the odds of student achievement, for the pre- compared with the post-intervention time period for each of the student groups.

QUALITATIVE RESEARCH

The purpose of the qualitative research and analysis was to track the implementation process of each of the six college's learning support strategies, with particular emphasis on:

- ❖ Identifying the methods used to deliver academic assistance and the focus of the support.
- ❖ Documenting the value of the assistance and its benefit to students' gateway coursework performance from the perspective of the students and the instructors.

The research included investigating program activities, impacts, challenges, and factors viewed as supportive of implementation and the attainment of program objectives. The motivation behind the qualitative research was threefold:

1. To learn about what was happening at each of the colleges at the point where the learning support was being delivered to multiple measure waiver students. Key areas of inquiry included the methods and practices used by instructors to deliver support and help students strengthen their skills, knowledge, and confidence and the skill and learning areas that were the principal foci of the supports.
2. To identify the factors that were perceived as supporting effective program operation, and the delivery of assistance, and the challenges encountered by the colleges during implementation.
3. To understand the value attributed to the supplemental supports by students and instructors tasked with delivering assistance. Key areas of inquiry included: the benefits instructors associated with the supports for both subject matter learning and general college success; the value attributed to the instructional and academic supports by the students; the activities and tools perceived by students as most helpful for math or English learning; and the ways in which the interventions might be improved to enhance effectiveness.

The qualitative research effort was also aimed at informing analysis of the findings of the quantitative research that centered on student outcomes. Lastly, the qualitative research sought to shed light on the academic-related challenges faced by students in the target population that may impact their ability to succeed. For this, the inquiry relied on the perspectives of instructors who worked closely with the target students. Data for this analysis was gathered from college administrative personnel, curriculum

course faculty members, supplemental support instructors, and students who participated in the interventions.

Data Collection Process

The Coffey research team conducted one-day site visits to each of the six institutions between March and April 2016. The team conducted interviews with relevant stakeholders at the colleges, observed classes, administered surveys, and collected and reviewed applicable documents prior to and during the site visits. Two members of the research team visited each college campus; each college's project team lead assisted the researchers with the logistics of the visit, including scheduling interviews and class observations, soliciting participants for the group interviews, and securing on-campus space for the discussion sessions.

Group Interviews: The Coffey research team conducted a total of 28 semi-structured group interviews during the site visits, each lasting between 30 and 60 minutes. The group interviews included between three and 10 individuals. In sum, across the cohort of six colleges, the research team interviewed 26 college administrators, 32 skills support instructors and curriculum course faculty members, three SPARK Student Leaders, and 25 target and non-target students participating in the skills support classes and SPARK sessions. This resulted in data collected from 86 interview participants. Also, researchers led two, 30-minute discussions with Stanly's students during their regularly scheduled gateway math class, each with about 25 students. Interview protocols were developed by the research team and used to guide the data collection process. All group interviews were audio-recorded with the consent of the participants.

Instructor Survey: A four- to six-page survey was distributed to instructors at each college during the site visits. Instructors were asked a range of questions pertaining to topics such as learning support delivery, challenges experienced by the target students, and perceived benefits of the learning support for student achievement and persistence. The surveys served the purpose of focusing practitioner attention on key themes and were complementary to the group interviews. The surveys were customized to respond to the respective feature of each college's strategies. A total of 44 instructor surveys were collected and processed.

Student Surveys: The research team administered surveys to target and non-target group students during the 2015-16 academic year. While each survey was customized to the college, they covered a similar set of key themes pertaining to college readiness, perceived value of the intervention, student experience with the support, and assessments of the support strategy. Overall, 14 total surveys were processed and data was collected from 1,050 students participating in the support strategies in the Fall 2015 semester and 544 math and English students during the Spring 2016 semester. During administration of these surveys, students' multiple measure waiver status was not disclosed. However, the assumption was that the majority of the respondents were from the target group (waiver students) due to the student support implementation methodologies employed.

Classroom Observations: The Coffey research team conducted classroom observations at five of the colleges offering co-requisite supports, eight math skills support classes, two math supplemental

instruction sessions, one English skills support class, in addition to two class sessions at Stanly to discuss the prerequisite intervention with students.

College Intervention Updates: Coffey participated in group telephone discussions and conducted interviews with the college project leads during the Fall 2015 and Spring 2016 semesters. Key elements of the implementation processes were covered along with discussions regarding program activities and outcomes. A total of 12 telephone interviews were conducted, with each lasting approximately 30 to 45 minutes.

Analysis

A digital recording of each group interview conducted during Coffey's site visits was used to generate a verbatim transcript. The transcripts were coded and sorted based on a framework developed as part of the original qualitative study plan and refined based on phase one research and site visits in Spring 2015. Survey data, field notes, and information collected from program leads during phone interviews and discussions were also coded and sorted using the same guide. The framework included several primary sections:

- ❖ Concerns that drove the college's intervention.
- ❖ Key elements of the intervention.
- ❖ Skills and learning area needs of the target students.
- ❖ Instructional and support practices of the academic support strategies.
- ❖ Supporting factors and challenges in the implementation process.
- ❖ Practitioners' views on the benefits and strengths of the intervention.
- ❖ Student perspectives on the value of the intervention.

Multiple analysts coded the data to help establish reliability, and validity was addressed by triangulating data sources including survey data, group interviews, field notes, and pre-site visit updates from program leads.

STUDY SCOPE

The student-level data provided by the participating colleges to the Coffey research team for this study reflected, in sum, nearly 10,000 first-time multiple measure waiver students over the six colleges, with about 3,500 students in the pre-intervention cohorts and just over 6,000 in the post-intervention cohorts. Figure 2 displays the number of students in each cohort at each of the participating colleges. On average, 44 percent of multiple measure waiver students in both the pre- and post-intervention cohorts had high school GPAs of 2.6 to 3.0, or were in the target group; the balance had high school GPAs higher than 3.0 and were in the study's control group.

FIGURE 2. NUMBER OF FTIC MULTIPLE MEASURE WAIVER STUDENTS, BY SEMESTER OF FIRST ENROLLMENT AND COLLEGE

	Pre-Intervention			Post-Intervention			
	Spring 2014	Fall 2014	Total	Spring 2015	Fall 2015	Spring 2016	Total
Total, Number	543	2,948	3,491	702	4,279	1,130	6,111
CPCC	282	1,306	1,588	377	1,438	422	2,237
DCCC	73	339	412	20	289	99	408
GTCC	121	856	977	205	853	231	1,289
Gaston	57	345	402	69	328	56	453
Stanly	10	102	112	21	69	25	115
WTCC	‡	‡	‡	10	1,302	297	1,609

‡ Not applicable.

Overview of Colleges' Strategies

MATH AND ENGLISH SKILLS SUPPORT CLASSES

CPCC, DCCC, Gaston, and WTCC selected to implement co-requisite skills support classes as their primary vehicles for providing academic assistance to the target student population. The classes were aimed at promoting success among students enrolled in targeted gateway courses. All four of the colleges provided math skills support classes and two, DCCC and WTCC, provided skills support classes for gateway English. Each of the colleges offered math skills support classes for students enrolled in pre-calculus, and three—CPCC, DCCC, and Gaston—provided support for students taking statistical methods. DCCC also introduced a pilot skills support class in Spring 2016 for students taking quantitative literacy. In English, DCCC and WTCC provided co-requisite support for students enrolled in writing and inquiry.

Led by a college-level or developmental education instructor, skills support classes were held weekly and aligned closely with the requirements of the gateway course. The characteristics of the support classes were similar across the colleges:

- ❖ Support classes provided students the opportunity to review foundational knowledge and skills, recap content taught in the gateway classes, ask questions, and practice problem-solving or writing techniques.
- ❖ Instructors used a variety of teaching and review strategies to promote subject matter learning, confidence-building, engagement, and effective study strategies.
- ❖ Collaborative or group learning was a common approach and emphasis was placed on sustaining a relaxing, one-on-one environment in which students could feel comfortable to reach out to their instructor and peers for support.
- ❖ Instructors regularly integrated worksheets and other supplemental learning material into the lessons.

At CPCC, students were also required to complete out-of-classroom activities using *NROC Homework Online*, a learning management system built by CPCC's mathematics instructors, which guided students through a comprehensive review of prerequisite material for pre-calculus and statistics and linked to topics covered each week in the gateway math course.

At each of the four colleges, target students enrolling in the targeted gateway courses were required to enroll in a co-requisite support class. Although the class was not mandated for non-target students, colleges actively encouraged all students to enroll in the support course. In fact, WTCC delayed the start of their support classes for two weeks in order to maximize enrollment. The other colleges relied primarily on academic advisors and messaging strategies to inform non-target students of the supplemental classes. Generally, stopping-out of the supplemental classes was not an option, and students who stopped attending the support classes were also withdrawn from the respective gateway

courses. Students enrolled in the math skills support classes received a pass or fail grade. Students received letter grades (A-F) in DCCC's and WTCC's English support courses.

SPARK FOR STATISTICS SUPPLEMENTAL INSTRUCTION

GTCC selected to offer peer-assisted SI sessions to target students enrolling in the gateway statistical methods course. Students Providing Alternative Resources for Knowledge, or *SPARK for Statistical Methods* (SPARK), was designed and operated to provide students with ongoing review of foundational knowledge and skills and a timely recap and extra practice opportunities to help them master key concepts, vocabulary, and problem-solving techniques introduced in their statistics class. SPARK was also designed to help students develop effective study strategies, such as note-taking and exam review, which could apply to any college-level course. SPARK sessions were held weekly, ran concurrently with the statistics course, and focused primarily on providing academic support using individual and group study, instruction, collaboration, and engagement activities and techniques.

The SPARK model relied on peer-assisted rather than instructor-based academic support whereby academically successful students facilitated the learning sessions. The SPARK Leaders were current or former GTCC students, or students from other area colleges or universities, who had successfully completed the gateway statistics course, or its equivalent, and earned a final grade of "B" or better in the course. SPARK Leaders received training in facilitating collaborative study and review sessions prior to delivering support to students. The SPARK Leaders had multiple responsibilities, including: attending all curriculum class lectures and taking notes; communicating regularly with college course instructors and the SPARK Program Coordinator; attending weekly meetings with other SPARK Leaders; and participating in course planning sessions and holding office hours outside of session time. Some SPARK Leaders also took it upon themselves to hold study and review sessions off-campus during exam times.

GTCC mandated that all students, target and non-target, enrolled in statistical methods also had to register for a SPARK session. Most sessions were seated, although a few on-line sessions were held to accommodate students who had scheduling difficulties. Students did not receive a grade for the SPARK session, and it was left to the respective curriculum statistics instructor to determine how attendance would impact a student's curriculum class grade; however, the general rule was that a student could miss two SPARK sessions without penalty, but after two absences most instructors deducted points from the statistics curriculum course grade.

GTCC's initiative included an opt-out provision whereby all students, target and non-target, had the option to stop attending the support sessions based on their performance in their concurrent curriculum course; students achieving an average course grade of 75 percent could opt-out of the SPARK sessions beginning the ninth week of the semester and after the midterm examination. After that, an average grade dropping below this threshold resulted in a return to the SPARK sessions.

LET'S GO RACING REMEDIATION MODULES

Stanly implemented a remedial academic support strategy for students enrolling in gateway math and English courses. The online program, named *Let's Go Racing* to reflect the popularity of NASCAR in North Carolina, was provided to students at the beginning of each semester and ran for two weeks.

Stanly's intervention was different from the other colleges' interventions in that it was not designed to track with the gateway course over the balance of the semester. As a prerequisite, the focus of the support was on identifying and strengthening weaknesses in core academic skill and knowledge areas at the start and provided students the chance to become better prepared academically before fully engaging in the challenges of college-level courses. The intervention provided students with time and space to brush-up on concepts, directly apply the knowledge to problems, review problem solving strategies and techniques, and bolster their study skills and knowledge of resources to support success in their gateway coursework.

Stanly's strategy was comprised of a three-step process of assessment and review:

1. Students started by taking a pretest, *Start Your Engines*, which identified academic strengths and weaknesses across the core subject matter. The assessment was designed to benchmark the student's level of competency in foundational areas and to help students and instructors understand students' readiness for college level coursework.
2. Based on the pretest results, students were directed to complete a series of targeted review modules, or *Pit Stops*. The number of questions within the modules reflected each student's assessed grasp of core concepts.
3. When students satisfactorily completed their assigned *Pit Stops*, they moved on to the *Winners Circle* and completed a second assessment, or post-test, which assessed improvement and flagged areas of continued weakness.

All students enrolled in the targeted gateway courses were required to take the *Start Your Engines* pretest. However, although highly recommended, they were not required to complete the review modules or the post-test. Students received a grade in the curriculum course for participating in the intervention, based on the better of their score on the pretest or the post-test. Students completed the remediation activities on their own time and concurrently with the gateway class. Course instructors monitored student engagement with the support and allocated in-class time for helping them access and navigate the assessments and modules.

The intervention was initially available for students enrolling in pre-calculus and writing and inquiry courses and then expanded to include statistical methods and quantitative literacy. The remediation modules were developed by Stanly's faculty using the multimedia resources *MySkillsLab Plus* and *MyMathLab*. Students had the option of purchasing the support materials or they could have free access for a period of three weeks; the latter of which provided enough time for the students to complete the modules, while the modules remained open throughout the semester for students who purchased access.

Key Findings: Student Outcomes, Targeted Math Courses

Overall, target group students appear to have benefited from the learning support strategies that were implemented, and the learning supports are related to a leveling of the playing field between the target and control student groups' academic achievement in the targeted math courses.

Participating colleges focused on developing student supports for targeted courses with a particular focus on pre-calculus and statistics. Three of the six colleges implemented the strategy for both courses, while the other three implemented supports for one of the two courses. This analysis examines the outcomes of students who attempted either of the two targeted math courses.

This analysis spans the semesters prior and subsequent to the colleges' implementations of the identified student supports: the pre-intervention student cohorts are those who first enrolled in Spring 2014 or Fall 2014, and the post-intervention cohorts include Fall 2015 and Spring 2016. The Spring 2015 semester is not included in this analysis for two reasons:

- ❖ Past research indicates that students who first enroll during the fall semester, on average, perform better academically than those who first enroll during the spring semester. Thus, comparing outcomes from Spring/Fall cohorts with Spring/Fall/Spring cohorts would result in unequal study groups and adversely affect the results.
- ❖ Colleges' implementations of their strategies were better-designed and more robust after the initial Spring 2015 implementation semester. As such, the related effects on student outcomes were expected to be better-founded beginning with Fall 2015.

Additional notes regarding the analyses:

- ❖ The focus of this study is on first-time in college multiple measure waiver students (FTIC) who attempted the targeted courses during their first semesters of enrollment. However, it is important to note that many more students enrolled in the courses studied herein—both continuing students and first-time students, with or without multiple measure waivers—and, thus, all were eligible to receive the benefits of the implemented student supports.
- ❖ For some colleges, the number of first-time students attempting the targeted courses was small, particularly for spring cohorts. When computing the overall outcomes for the six colleges, each college's outcomes were given the same weight, regardless of enrollment. In this case, where student groups are small, a difference of a handful of students can have a strong mathematical influence on the overall average. Such cases are noted herein, and these data should be used with caution.
- ❖ Given that this analysis includes the entire population of first-time students at the participating colleges, differences between groups of students or across the pre- and post-intervention time

periods are “real” differences. When such differences are identified, what is actually a “meaningful difference” needs to be considered. For example, a 0.1 difference between average grades attained may not be noteworthy or actionable, while a difference of 0.5 is meaningful.

- ❖ Although not necessary when evaluating populations, all comparisons made herein were tested for statistical significance to facilitate the evaluation of “meaningful” differences or changes. But, when student groups are small, as is the case of this research, statistical significance is difficult to achieve. Statistical significance is noted in this report when achieved.
- ❖ WTCC entered the study after the other participating colleges and during the first post-implementation semester. Analysis for WTCC is restricted to an examination of post-intervention outcomes for target students compared to control group students.

TARGETED COURSE: ATTEMPTS

This analysis focuses on the gateway math courses with the largest enrollment and on which the colleges focused their efforts—pre-calculus and statistics. Over the course of the study, some colleges increased the number of sections of these courses that received the support, and several colleges instituted more pointed advising of their first-time students to encourage enrollment in the targeted courses upon students’ first semesters of enrollment. Thus, it is not surprising that the number of first-time multiple measure waiver students enrolling in the targeted math courses increased from 669 to 869 first-time students between the pre- and post-implementation semesters studied herein, for a 20 percent increase. Note that some of the colleges are also piloting the support strategy to other math courses, and in three colleges, an English course.

During the semesters studied, the percentage of first-time students attempting the targeted courses ranged from a low of two to three percent for GTCC to a high of 30 to 35 percent for CPCC (Figure 3). DCCC, GTCC, and Stanly all have relatively small numbers of students attempting the targeted courses during pre- and post-intervention time periods for both the target and control groups—approximately 30 students or less. As stated, these small student groups pose analytical problems, as a difference of one or a handful of students can have a strong mathematical influence. Thus, examination of the resulting outcomes of these students needs to be conducted with caution. Where student group size allows for analysis, additional noteworthy findings regarding student attempts in the targeted courses follow.

- ❖ At CPCC, although for the target group overall there was no discernable change in the proportion of students attempting the targeted courses during their first terms, the percentage of targeted students in the 2.60 to 2.79 high school GPA range attempting the courses increased slightly, from 28 to 31 percent, while the percentage of targeted students in the higher high school GPA range attempting the courses declined slightly, from 34 to 32 percent. Although these changes are slight, they raise a couple of considerations:
 - Fewer lower high school GPA students (2.60-2.79) in the pre-intervention group attempted the targeted math courses upon first enrollment as compared with students with higher high school GPAs (2.80-3.00)—a six percentage point difference; by the post-intervention semesters this gap nearly closed.

- If the academic performance of the two high school GPA groups differs, this may have implications for the college's future strategies.
- ❖ The percentage of target group students attempting the targeted courses during their first term of enrollment at Gaston decreased across the two time periods (24 and 19 percent), while the percentage of control group students attempting increased (31 and 40 percent).
- ❖ DCCC experienced small but similar increases in the share of target and control group students attempting the targeted courses during their first term between the pre- and post-intervention time periods of three percentage points.

FIGURE 3. NUMBER AND PERCENTAGE OF TARGET AND CONTROL GROUP, FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES: PRE- AND POST-INTERVENTION

		Number		Percentage	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Total, All colleges	Total, All students	669	869	19	20
	Target group, Total	301	351	18	17
	2.60 to 2.79	134	172	16	17
	2.80 to 3.00	167	179	19	17
	Control group, Total	368	518	20	23
	3.01 to 3.50	282	381	20	22
	Over 3.51	86	137	18	26
CPCC	Total, All students	471	649	30	35
	Target group, Total	237	283	31	32
	2.60 to 2.79	105	142	28	31
	2.80 to 3.00	132	141	34	32
	Control group, Total	234	366	29	38
	3.01 to 3.50	187	282	30	39
	Over 3.51	47	84	25	35
DCCC	Total, All students	39	49	9	13
	Target group, Total	11	13	7*	10*
	2.60 to 2.79	+	+	+	+
	2.80 to 3.00	+	+	+	+
	Control group, Total	28	36	11*	14
	3.01 to 3.50	+	23	+	13*
	Over 3.51	+	13	+	16*
GTCC	Total, All students	15	32	2*	3
	Target group, Total	+	17	+	4*
	2.60 to 2.79	+	+	+	+
	2.80 to 3.00	+	+	+	+
	Control group, Total	+	15	+	2*
	3.01 to 3.50	+	+	+	+
	Over 3.51	+	+	+	+

FIGURE 3. NUMBER AND PERCENTAGE OF TARGET AND CONTROL GROUP, FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES: PRE- AND POST-INTERVENTION

		Number		Percentage	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Gaston	Total, All students	116	120	29	31
	Target group, Total	36	31	24	19
	2.60 to 2.79	16	12	25*	17*
	2.80 to 3.00	20	19	24*	22*
	Control group, Total	80	89	31	40
	3.01 to 3.50	54	58	32	36
	Over 3.51	26	31	30*	50
Stanly	Total, All students	28	19	25*	20*
	Target group, Total	11	+	25*	+
	2.60 to 2.79	+	+	+	+
	2.80 to 3.00	+	+	+	+
	Control group, Total	17	12	25*	20*
	3.01 to 3.50	+	+	+	+
	Over 3.51	+	+	+	+

*Represents a small group, use data with caution.
+Student group size below reporting threshold.

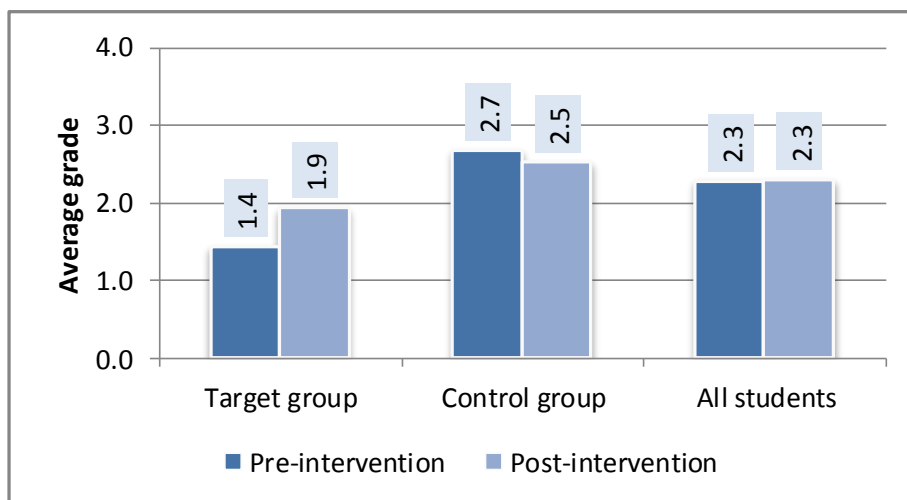
STUDENT OUTCOMES: TARGETED MATH COURSES

Average Grade Achieved

Measuring the grade attained and not just whether the student passes a course is important because the actual grade achieved indicates strength of knowledge and understanding of the subject area. On average, there was no change from pre- to post-intervention in the grade attained by first-time students who attempted the targeted math courses during their first term—students achieved, on average, a C+, or 2.3 grade points (Figure 4). However, achievement differences existed for target and control group students in terms of grade attained. During the pre-intervention semesters, control group students' average grade was over an entire grade higher than target groups students—the difference of a D+ to a B-, or 1.3 grade points. However, target students in the post-intervention student cohorts attained an average grade of 1.9, for a **one-half grade increase** over the pre-intervention cohorts. At the same time, the grade achieved by control group students in the pre- and post-intervention time periods declined very slightly and remained in the B- range (2.5 to 2.7). The result is a closing of the achievement gap between target and control group students: Pre-intervention, control group students' average grade in the targeted courses was 1.3 grade points higher than that of the target group; this gap decreased to 0.6 grade points post-intervention.

The result is a closing of the achievement gap between target and control group students...

FIGURE 4. AVERAGE GRADE ATTAINED BY FTIC MULTIPLE MEASURE WAIVER TARGET AND CONTROL GROUP STUDENTS: PRE- AND POST-INTERVENTION



Interestingly, not only did the average grade attained in targeted math classes increase for target students between the pre- to post-intervention semesters, the improvement was pronounced and statistically significant for students with the lowest policy-accepted high school GPA, 2.60 to 2.79, showing an increase of nearly an entire grade from D+ to C+, or an average of 1.4 to 2.3 (Figure 5). A very slight decline of no meaningful importance or statistical significance was seen for the balance of the multiple measure waiver students, including those with a high school GPA of 2.80 to 3.00 (also in the target student range). This finding could be the result of the diminishing returns principle. That is, when students with deeper academic needs are provided support, there is room for larger gains to be achieved; however, providing better-prepared students with additional support does not result in large gains, as there is not as much room available for improvement. The diminishing returns idea is seen at CPCC, where the average grade difference between the pre- and post-intervention time periods closes from 0.5 grade point for the lowest high school GPA group to no difference or a slight, insignificant decline for the highest GPA groups.

DCCC experienced an increase in average grade attainment for both the target and control group students so that, overall, students achieved over a half of a grade higher post-intervention as compared with pre-intervention cohorts—C- to C+, or 1.8 to 2.6 average grade. Also noteworthy at DCCC is not only that target students' average grade increased from D-range to C-range pre- and post-implementation (1.3 and 2.1 average grades, respectively), but also the closing of the achievement gap: The post-intervention average grade for the target and control groups differs by 0.4 grade points, compared with a 0.7 grade point difference pre-intervention, the difference being statistically significant.

...the student supports implemented are related to a leveling of the playing field between the target and control student groups' outcomes in the targeted math courses.

The variations in Gaston's average grade attainment in the targeted courses are not statistically significant nor for the most part are they meaningful. However, Gaston should continue to monitor this

downward tendency to ensure that this does not become a statistically relevant downward trend. Overall, GTCC's average grade attainment in the targeted course declined between the pre- and post-intervention time periods; however, the number of students attempting the course at GTCC during the studied period was extremely small and these data should be used with extreme care. Similarly, at Stanly, the number of students attempting is too small to warrant a valid analysis.

FIGURE 5. AVERAGE GRADE OF TARGET AND CONTROL GROUP, FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES: PRE- AND POST-INTERVENTION

		Pre-intervention	Post-intervention
Average, All colleges	Total, All students	2.3	2.3
	Target group, Total	1.4	1.9
	2.60 to 2.79	1.4	2.3
	2.80 to 3.00	1.6	1.4
	Control group, Total	2.7	2.5
	3.01 to 3.50	2.5	2.1
	Over 3.51	3.2	3.1
CPCC	Total, All students	2.1	2.3
	Target group, Total	1.6	2.0
	2.60 to 2.79	1.5	2.0
	2.80 to 3.00	1.8	2.1
	Control group, Total	2.5	2.5
	3.01 to 3.50	2.4	2.3
	Over 3.51	3.2	3.3
DCCC	Total, All students	1.8	2.4
	Target group, Total	1.3 *	2.1 *
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	2.0 *	2.5
	3.01 to 3.50	1.8 *	2.1 *
	Over 3.51	+	3.1 *
GTCC	Total, All students	2.5 *	1.2
	Target group, Total	+	0.9 *
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	+	1.6 *
	3.01 to 3.50	+	1.3 *
	Over 3.51	+	+
Gaston	Total, All students	2.8	2.7
	Target group, Total	2.4	2.2
	2.60 to 2.79	2.3 *	2.2 *
	2.80 to 3.00	2.5 *	2.2 *
	Control group, Total	3.0	2.8
	3.01 to 3.50	2.7	2.5
	Over 3.51	3.4 *	3.3
Stanly	Total, All students	2.3 *	2.8 *
	Target group, Total	0.0 *	+
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	2.9 *	3.1 *
	3.01 to 3.50	2.9 *	+
	Over 3.51	+	+

*Represents a small group, use data with caution.

+Student group size below reporting threshold.

Over all of the colleges, the ordered logistic regression analysis indicated that the odds of achieving an A-grade, compared to a B-, C-, D-, or F-grade⁸, were 1.5 higher for target group students in the post-intervention cohort compared with the pre-intervention cohort. Interestingly, for the control group, the odds of achieving an A-grade, compared to a B-, C-, D-, or F-grade, did not change pre- to post-intervention. The regression findings are consistent with and validate that the student supports implemented are related to a leveling of the playing field between the target and control student groups' outcomes in the targeted math courses.⁹

Students Achieving a C or Better in Targeted Math Courses

The student support strategies implemented were designed to provide students with academic learning, support and confidence beyond the classroom so that they are better-able to succeed in their coursework. Thus, the hope is that failure and withdraw rates decline and the share of students succeeding in their coursework—defined here as attaining an A-, B-, or C-grade—increases.

Over all colleges, a slightly larger percentage of post-intervention students in the participating colleges' target groups achieved a C-grade or better in the targeted classes as compared with those in the pre-intervention group, 48 percent compared with 45 percent (Figure 6); although this finding is not statistically significant, it is promising and should be monitored by the participating colleges to ascertain whether this upward trend continues and is statistically meaningful. Interestingly, among the control group, a smaller share of students were successful in the targeted courses after intervention implementation as compared to pre-intervention, 71 percent compared with 62 percent. Care needs to be taken in interpreting these results as several of the participating colleges' results are based on relatively small groups, as noted in Figure 6; the respective success rates based on the difference of just a few students can influence the overall average, and these results are not statistically significant.

FIGURE 6. PERCENTAGE OF TARGET AND CONTROL GROUP FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES AND ACHIEVING A C-GRADE OR BETTER,: PRE- AND POST-INTERVENTION

		Pre-intervention	Post-intervention
Average, All colleges	Total, All students	61	57
	Target group, Total	45	48
	2.60 to 2.79	33	61
	2.80 to 3.00	58	38
	Control group, Total	71	62
	3.01 to 3.50	65	49
	Over 3.51	92	89
CPCC	Total, All students	61	66
	Target group, Total	47	58
	2.60 to 2.79	40	57
	2.80 to 3.00	52	59
	Control group, Total	74	73

⁸ Using an ordered logistic regression, this can be interpreted as the odds of receiving an A- or B-grade compared to a C-, D-, or F-grade; A-, B-, or C-grade compared to a D- or F-grade; and A-, B-, C-, or D-grade compared to an F-grade.

⁹ A positive odds ratio represents higher odds of the outcomes studied (e.g., “success”) for students in a particular group. For example, if the odds ratio is a positive value for a student group, e.g., full-time students, then the odds of success in the targeted math course are higher for full-time students than part-time students.

FIGURE 6. PERCENTAGE OF TARGET AND CONTROL GROUP FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES AND ACHIEVING A C-GRADE OR BETTER,: PRE- AND POST-INTERVENTION

		Pre-intervention	Post-intervention
	3.01 to 3.50	70	68
	Over 3.51	94	90
	Total, All students	51 *	51 *
	Target group, Total	+	+
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	54 *	56 *
	3.01 to 3.50	48 *	43 *
	Over 3.51	+	77 *
	Total, All students	67 *	31 *
	Target group, Total	+	+
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	+	+
	3.01 to 3.50	+	+
	Over 3.51	+	+
	Total, All students	75	73
	Target group, Total	64	65
	2.60 to 2.79	63 *	+
	2.80 to 3.00	65 *	68 *
	Control group, Total	80	76
	3.01 to 3.50	72	66
	Over 3.51	96 *	97
	Total, All students	50 *	63 *
	Target group, Total	-	+
	2.60 to 2.79	+	+
	2.80 to 3.00	+	+
	Control group, Total	82 *	+
	3.01 to 3.50	77 *	+
	Over 3.51	+	+
*Represents a small group, use data with caution.			
+Student group size below reporting threshold.			

CPCC and Gaston are the only colleges with statistically sizable student groups to allow for examination, both pre- and post-intervention. CPCC's target group students experienced a significant 11 percentage point increase in targeted course success: 47 percent and 58 percent of students achieved a C-grade or better pre- and post-intervention, respectively. Noteworthy is that all students in the target group—those with high school GPAs in the 2.60-2.79 and 2.80 – 3.00 ranges—appear to have benefited from the implemented student support, with success rates that are seven percentage points higher for the post-implementation period as compared with the pre-implementation period. With no statistical difference between pre- and post-intervention success rates for CPCC's control group of students, CPCC experienced a closing of the disparity between the target and control group of students by 10 percentage points, with the achievement gap declining from 27 to 17 percent of students.

At Gaston, the success rates in the targeted courses did not statistically differ between the pre- and post- intervention groups for the target or control student groups. Although, the seemingly downward

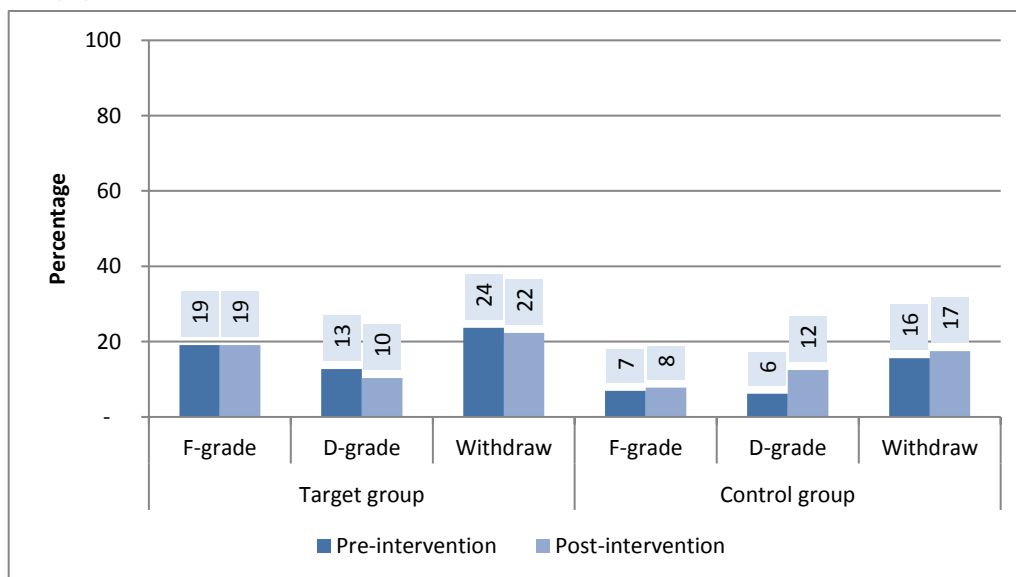
trend in success rates for various student groups (those in the 3.01-3.50 and 2.60-2.79 high school GPA ranges) should continue to be examined for potential downward significant trends.

The regression results for the participating colleges overall, which measured the change in odds for student success in the targeted courses – or achieving an A-, B- or C-grade—were similar to the results for the odds of students achieving an A-grade: The odds of target students succeeding in the targeted math courses were 1.5 times higher post-intervention than pre-intervention. Again, the odds of success were not significantly different for control group students, pre- and post-intervention, indicating a closing of the achievement gap over all of the participating colleges.

Students with D/F/W Grades

Of particular note here is the decline in D-grades and withdraws for the target group, by three and two percentage points, respectively. The trends are in the desired direction as a larger share of students may be feeling more confident in their academics and are thus not withdrawing from the courses and are achieving higher grades than did those in the post-intervention group (a five percentage point difference; Figure 7a and Figure 7b).

FIGURE 7A. PERCENTAGE OF FTIC MULTIPLE MEASURE WAIVER STUDENTS ATTEMPTING TARGETED COURSES AND ATTAINING A D, F, W: PRE- AND POST-INTERVENTION



In contrast, the proportion of D-grades for control group students increased six percentage points, from six to 12 percent between the pre- and post-intervention outcomes. Only a very slight increase in the percentage of students withdrawing existed, 16 to 17 percent of attempts over the two time periods.

Because of the small populations of students at the individual colleges, particularly for those who attained D- and F-grades, or withdrew from the course, detailed data for individual colleges cannot be reported here due to the terms of Coffey’s data sharing agreements with the colleges. However, we can provide trends and information regarding noteworthy findings without detailing the data. Of particular interest is the phenomena of increased shares of students attaining F- or D-grades while the share of withdraws declined. For example, both the percentages of Gaston’s target students achieving D- and F-

grades in targeted courses increased, which was offset by a declining share of target students withdrawing. This may be attributed to an increased confidence among students resulting from attendance in the student support intervention, as students may feel more confident in their likelihood to complete and persist throughout the course rather than withdrawing early. Gaston's target students also saw an increasing share of students with D- and F-grades but a declining share of withdraws. And, at CPCC the story is stronger with a decline in the percentage of target students withdrawing and achieving F-grades, coupled with an increase share of students succeeding (or, achieving an A-/B-/C-grade); the share of target students at CPCC achieving D-grades pre- and post-intervention did not differ significantly. The population of DCCC target students attempting the targeted courses was particularly small and, as such, any outcomes should be interpreted with extreme care. However, it is worth noting that the share of DCCC's target students withdrawing from the targeted courses increased between the pre- and post-intervention time periods; this finding should be monitored. It should be noted that DCCC's findings are not statistically significant but are promising in that they are in the desired direction and should continue to be monitored.

FIGURE 7B. PERCENTAGE OF FTIC MULTIPLE MEASURE WAIVER TARGET AND CONTROL GROUP STUDENTS ATTEMPTING TARGETED COURSES AND ACHIEVING AN F- OR D-GRADE OR WITHDRAWING: PRE- AND POST-INTERVENTION

		Percent attaining F-grade			Percent attaining D-grade			Percent withdrawing		
		Pre-intervention	Post-intervention		Pre-intervention	Post-intervention		Pre-intervention	Post-intervention	
Total	Total, All students	11	12		9	11		19	19	
	Target group, Total	19	19		13	10		24	22	
	2.60 to 2.79	18	9 *		12 *	12 *		37 *	18 *	
	2.80 to 3.00	19	28		7 *	8		16 *	25 *	
	Control group, Total	7	8		6 *	12		16	17	
	3.01 to 3.50	9	9		8 *	17		19	24	
	Over 3.51	+	+		0	+		+	+	
*Represents a small group, use data with caution.										
+Student group size below reporting threshold.										

Summary of Student Achievement in Targeted Courses

Figure 8 displays a summary of the all colleges' progress—whether in the desired direction and the magnitude of change in students' outcomes—between the pre-intervention and post-intervention cohorts. The initial evidence pointed to the desired outcomes as related to the target students and the student support interventions: Overall, the average grade attained by students attempting the targeted classes increased, which goes hand-in-hand with an increasing trend in the share of students attaining A-/B-/C-grades and a declining share of D-grades. While overall grade attainment increased, the share of target students who withdrew from the targeted courses also declined, indicating that students' confidence levels may have been given a boost as a result of the implemented student supports. By college:

- ❖ CPCC experienced that strongest success. All but the percent of students attaining D-grades trended in the desired direction; however, the increased D-grades could be a result, as discussed, of the declining share of students who withdraw or achieve F-grades. Although an increased share of students received D-grades, in the past these students may not have had the

confidence to continue in the course and may have withdrawn. Additionally, the decline in the share of F-grades may be balanced by the increase in D-grades. Thus, the increased share of D-grades is not necessarily a negative finding. Further monitoring will reveal additional changes and trends in student outcomes.

- ❖ DCCC's number of students attempting the targeted classes during the time periods studied were very small (11 and 13 target group students for the pre- and post-intervention time periods, respectively), and the results need to be used with extreme care. Furthermore, a large share of target students withdrew from targeted classes making meaningful analysis even more difficult.
- ❖ Gaston's outcomes represented the hypothesized occurrence of decreasing withdraws balanced with an increase in F- and D-grades. A larger share of target students did attain A-/B-/C-grades during the post-intervention period, but not enough to offset a decline in the overall average grade attained. However, these trends are encouraging and should continue to be monitored.
- ❖ GTCC and Stanly did not have enough target students attempting the targeted courses to conduct meaningful analyses at this time.

FIGURE 8. SUMMARY OF CHANGE IN STUDENT OUTCOMES FOR FTIC MULTIPLE MEASURE WAIVER TARGET STUDENTS ATTEMPTING TARGETED COURSES: PRE- AND POST-INTERVENTION

	Average grade	Percent success (A/B/C-Grade)	Percent F-grade	Percent D-grade	Percent withdraw
Average	↑	↑	—	↓	↓
CPCC	↑	↑	↓	↑	↓
DCCC	↑	↓	↓	↓	↑
GTCC	+	+	+	+	+
Gaston	↓	↑	↑	↑	↓
Stanly	+	+	+	+	+
+Student group size below reporting threshold.					
Notes: Green = desired direction, red = undesired direction. Dark shade = statistically significant. Light shade = not statistically significant change. (Note: None of the changes in the undesired direction were statistically significant.) — = No change					

UNEVEN SUCCESS FOR STUDENT GROUPS

The regression analysis facilitated examination of the research question: Are there outcome differences by specific student groups, among the targeted student group, and are these the same differences seen with non-targeted students? Interestingly, the regression results revealed that, among the target student groups, white students' odds for achieving an A-/B-/C-grade in the targeted courses were higher than those of black students; however, a significant difference was not seen in the success rates of white and black students in the control group. Furthermore, following an historical trend, target group

students from the lowest income levels had higher odds of attaining D- or F-grades as compared with those from the highest income levels. Again, this achievement difference was not seen for students in the control group. The hypothesis here is that students with stronger academic backgrounds, regardless of demographic backgrounds, will succeed at similar rates, yet demographics may come into play for students who are more academically at-risk.

Also noteworthy is the fact that part-time target students' odds for attaining D- or F-grades in the targeted courses were greater than that of full-time students, and the odds for a part-time student's chance of withdrawing from the targeted course were greater than those of a full-time student. These differences were not seen in the control group. This finding carries implications for student advising, perhaps scheduling, and providing targeted support services to part-time students in the target population.

PROFILE: WAKE TECHNICAL COMMUNITY COLLEGE

WTCC joined the study after the initiative started and implemented the multiple measures policy and student supports during the same semester; thus, a pre-intervention cohort is not present for WTCC. During the Fall 2015 and Spring 2016 semesters, about 1,600 students first enrolled at WTCC with multiple measure waivers; 43 percent were in the target group (698 students) and 57 were in the control group (911). Of students with multiple measure waivers, about one-quarter attempted the targeted math course, pre-calculus, during their first semester of enrollment, and the shares attempting were similar for target and control group students. About one-third of target students enrolled in the targeted English course during their first semester, while very few (one percent) of control group students attempted the English course (Figure 9).

FIGURE 9. NUMBER OF FTIC MULTIPLE MEASURE WAIVER STUDENTS AND PERCENTAGE ATTEMPTING TARGETED COURSES: POST-INTERVENTION, WTCC

	Number of students			Percent attempting		
	Fall 2015	Spring 2016	Total	Math	English	
Total, All students	1,302	297	1,609	26	16	
Target group, Total	574	120	698	26	35	
2.60 to 2.79	260	47	310	27	38	
2.80 to 3.00	314	73	388	26	33	
Control group, Total	728	177	911	26	1	*
3.01 to 3.50	546	129	680	29	1	*
Over 3.50	182	48	231	20	+	+
*Represents a small group, use data with caution.						
+Student group size below reporting threshold.						

Target students attempting the targeted math course achieved, on average, a C-grade (2.0), and 46 percent of targeted students were successful in the targeted math course, or attained an A-/B-/C-grade (Figure 10). Control group students' achievement was significantly better, with an average grade of B- (2.7) and 54 percent of students being successful in the course. WTCC's control and target groups' average grades were similar to the overall average for the other five colleges' post-intervention average grades (2.5 and 1.9, respectively). Noteworthy is the larger withdraw rate for WTCC's target students who attempted the targeted math course as compared with the control group, 34 compared with 22

percent of students.¹⁰ WTCC's withdraw rate, particularly for target group students, was higher than that of the other five colleges. WTCC should consider the reasons for this relatively high withdraw rate; this may be addressed via their student support strategy.

FIGURE 10. OUTCOMES OF FTIC MULTIPLE MEASURE WAIVER ATTEMPTING TARGETED MATH COURSE: POST-INTERVENTION, WTCC

	Average grade	Percent successful	Percent F-grades	Percent D-grades	Percent withdraws
Total, All students	2.4	58	9	7 *	27
Target group, Total	2.0	46	13	7 *	34
2.60 to 2.79	1.8	38	15 *	+	37
2.80 to 3.00	2.1	54	10 *	+	31
Control group, Total	2.7	66	6 *	6 *	22
3.01 to 3.50	2.5	63	7 *	8 *	22
Over 3.50	3.2	78	+	-	+
*Represents a small group, use data with caution.					
+Student group size below reporting threshold.					

WTCC was the only college included in the study that implemented the student support strategies for an English course and enrolled a fairly large number of target students in the targeted course (Figure 11). On average, students in the target student group achieved a C+ (2.4) in the targeted English course—a similar average grade to that of the control student group—and about two-thirds were successful with only seven percent receiving F-grades. Fewer target students withdrew from the English course than did from math, 20 percent and 34 percent, respectively.

FIGURE 11. OUTCOMES OF FTIC MULTIPLE MEASURE WAIVER ATTEMPTING TARGETED ENGLISH COURSE: POST-INTERVENTION, WTCC

	Average grade	Percent successful	Percent F-grades	Percent D-grades	Percent withdraws
Total, All students	2.4	66	7 *	8 *	19
Target group, Total	2.4	65	7 *	7 *	20
2.60 to 2.79	2.4	65	4	+	24 *
2.80 to 3.00	2.3	65	10 *	8 *	17 *
Control group, Total	2.5 *	+	-	+	-
3.01 to 3.50	2.5 *	+	-	+	-
Over 3.50	+	+	+	-	-
*Represents a small group, use data with caution.					
+Student group size below reporting threshold.					

¹⁰ Findings are statistically significant.

Key Findings: Overview of the Academic Support Strategies and Drivers of Effectiveness

This analysis found that the academic support strategies implemented by the North Carolina colleges provided the target group students with an opportunity to better their chances to succeed in their linked gateway math or English course and, more broadly, to build a stronger foundation for success in college.

CO-REQUISITE SKILLS SUPPORT CLASSES¹¹

As discussed, four of the six colleges opted to develop and implement co-requisite skills support classes. All of the colleges provided assistance to students taking college-level math—pre-calculus and statistics—and two included gateway English students. The skills support classes were designed to provide target students, and their non-target peers, with the type of academic assistance that can have positive impact across a range of abilities and levels of student-preparedness.

Learning Support Methods and Practices

The skills support classes were designed to place students at the center of the learning experience. The classes focused on students' individual needs as they worked through the challenges of their college-level coursework. Students were typically asked to be active rather than passive in their learning, and it was not uncommon for them to be asked to reflect on what they were learning, its value and application, and on the learning process.

The learning supports these classes provided came in various forms, from mini-lectures and worksheets to coaching and conducting group problem-solving exercises and games. The instructors provided support that was relevant to the students' current learning demands and the requirements of their gateway courses. Operationally, this translated into students being offered just-in-time support that concentrated on the mastery of new concepts and techniques – those that the students may be wrestling with in their curriculum course, along with reviews and brush-ups of foundational knowledge to help students shore-up their base for building new competencies.

¹¹ The analysis in this section pertains only to in-classroom courses and does not cover online co-requisite support classes. Among the colleges that offered online support sessions, most did so as an exception and it was not a main component of the intervention. (There was widespread agreement that the on-line environment was not an optimal space for the potentially at-risk target students to receive learning support.) Also, target student group enrollments in the online courses were too small for analysis. The instructor interviews and surveys focused on in-class delivery.

Full-time or adjunct college instructors ran the support courses. It was also common for the skills support class instructors to teach the gateway course, although not always during the semester they were involved with the learning support. Several of the colleges also drew upon the skills and experience of their developmental education instructors to lead the math-focused supplemental supports.

Across the colleges, the instructors were given broad autonomy in designing and operating their classroom experience. As would be expected, this instructional autonomy brought into the classroom a mix of ideas about how best to operate a learning support class, different approaches to pedagogy, varied perspectives on what students might need, and different types and levels of professional experience.

Classroom observations and interviews with faculty and students indicated that the skills support instructors across the four colleges adhered to quality instructional practices and were actively committed to helping their students succeed in their curriculum class. Instructors conveyed that they sought to create and sustain a learning environment that was responsive to the different learning styles and preparedness levels of the students; instructors actively sought out and focused on what worked for their students, as remarked by one DCCC instructor: “[E]ach semester we have had totally different groups of student. You just find what works for them and go with that.” Another shared:

[T]here really is not a typical day. I try to be flexible and respond to what the students need....I try to pull out how much they remembered from their curriculum class, and then if it seemed like they did not remember a lot, then I would do lesson on that, depending on how much they did or did not know.

Collectively, the skills support instructors used a range of instructional practices, activities, and strategies to help students succeed in their gateway coursework.

A Practical Spotlight on Student Engagement

As part of the focus on student engagement, students were encouraged to get involved, or be engaged, with the ideas, concepts, theories, and strategies that were being discussed in the class.

- ✓ Students were provided with activities to urge them to tackle their learning in interesting ways such as real world applications, collective problem solving, or subject-related games and puzzles.
- ✓ Math instructors worked through problems on the whiteboard with the entire class while actively reaching out to students to involve them in solving the problem. In this setting, students watched and listened to the instructor to analyze the problem alongside peers, and were able to ask and respond to questions within a group setting as a way to deepen their understanding of process and concepts.

Instructors used a variety of methods and tools to create “people pockets” to encourage student engagement. Instructors spoke to the value of walking around the class and engaging students while they worked together or individually; they noted that this offered them the chance to connect with students on a more personal, less didactic, level.

- ✓ One-on-one interaction between instructor and student occurred when students worked individually on worksheets and the instructor acted as a coach. This also provided the opportunity to bring to the attention of the whole class a question a single student might ask and coaching moments that might have not arisen if they had not stopped to talk with a student.
- ✓ Students worked together in small groups to complete required worksheets, compare and share class notes, and collaboratively review for exams.

A Practical Spotlight on Skill and Learning Area Needs

- ✓ Via surveys of instructors, this research evidenced that students struggled the most with synthesizing information and making connections, confidence in taking-on difficult or non-familiar problems, managing time and prioritizing tasks, studying and note-taking, and completing tasks promptly. The two areas where they found students to be relatively less challenged were participating in class discussions and working effectively with others in group settings.
- ✓ Instructors identified a range of skill and learning areas in which they felt their students were challenged, including quantitative literacy, critical thinking, problem solving, information literacy, reading comprehension, confidence, tenacity, productivity, and accountability.

Most of these practices have been shown in the research literature to be effective at strengthening students' academic and affective skills. The following instructional practices were among the more commonly cited by the instructors interviewed or observed during fieldwork:

- ❖ Student-centered instruction.
- ❖ Coaching/mentoring.
- ❖ Active learning.
- ❖ Paired problem solving/think aloud.
- ❖ Critical thinking.
- ❖ Group/collaborative learning.
- ❖ Peer-to-peer tutoring and mutual support.
- ❖ Peer problem solving lessons.
- ❖ One-on-one instructor feedback.
- ❖ Whole-class problem solving.
- ❖ Reading and marking the textbook.
- ❖ Real world application.
- ❖ Low stakes quizzes.
- ❖ Embedded study skills lessons.
- ❖ Frequent feedback.
- ❖ Verbalized problem solving and analytical processes.
- ❖ Timely and relevant learning.

Instructors indicated that they routinely used active learning, group work, and peer review to foster collaboration, confidence-building, and critical thinking. Meaningful engagement with the course material, peers, and the instructor was also routinely emphasized. "We believe successful students are engaged students," stated one skills support class instructor, echoing the sentiment of most of the others. Instructors reported regularly asking open-ended questions to generate student discussion and encouraging students to talk through the problem-solving process for their own benefit and that of their peers. They also made frequent use of group-study and collaborative learning and one-on-one interaction with students. A CPCC math instructor frequently intentionally shifted the role from student to instructor as a way to promote peer learning and build confidence; she explained:

If a student is getting the concepts then you turn them into a helper; you get them to teach their group. By strategically changing-up the group, you're going to build their confidence. By having them teach, they are going to learn more.

The primary aim of the skills support classes was to provide timely and relevant support. This meant giving students the opportunity to review and practice concepts and problem-solving strategies as they were introduced in their gateway classes. A key feature of the skills support classes was the strong emphasis on providing students with just-in-time support that focused on what the learners were currently doing—and needed to master—in their academic classes. A WTCC instructor explained her approach to offering just-in-time support:

The students come in, and I say, 'What are your questions for today?' and we go from there. I spend probably 90 percent of my time answering their questions. That's pretty much the makeup of our days.

Emphasis was also placed on ensuring students had the necessary prerequisite knowledge and skills in place to take on more advanced learning. The manner in which this foundational support was provided varied across the colleges and by instructor.

- ❖ Most relied on mini-lectures, class discussion, and worksheets conducted within the classroom setting to address the students' remedial needs.
- ❖ Gaston's math workshops were offered over the course of the semester to supplement the in-class work.
- ❖ CPCC was the most comprehensive in integrating remediation into their support classes with the use of National Repository of On-line Courses (NROC), an on-line learning support tool which uses assessments and learning modules designed by CPCC math faculty to create what college personnel referred to as a "practice and refresh" experience for both pre-calculus and statistics students. NROC's content was, according to one of its designers, "all developmental math." The tool tracked the lessons being taught in the curriculum class and linked the student pre-requisite knowledge and skills with curriculum class demands. The students worked on NROC outside of the classroom, leaving the in-class sessions for focusing primarily, although not exclusively, on the immediate demands of the gateway course.

Skills Support Class Participation Policy

"We knew that students don't do optional. So, we knew we had to put in place something that required them to do some additional support," stated a CPCC administrator. For college personnel, it was obvious that if their implementation was going to be effective, and if they were going to drive positive student outcomes with the learning

"We knew that students don't do optional. So, we knew we had to put in place something that required them to do some additional support."

--Administrator, CPCC

support, it not only had to be relevant to the students, but it had to be required. While participation in the learning support was mandated for target students at each of the colleges, skills support class attendance policies at the colleges did vary. Gaston, for example, implemented a rather strict attendance policy: if a student misses more than three math support classes, he or she may be withdrawn from the class, and removal from this class leads to automatic removal from the curricular math class. However, instructors did note that the policy was to work individually with the student to keep them in the support class, as the goal was each student's success, not the implementation of an accountability system that worked contrary to this goal. Attendance in the math skills support class at CPCC was neither required nor factored into a student's grade, but one instructor noted that non-attendance did have direct implications for the students.

Practical Spotlight on Learning Support Activities

WORKSHEETS: Supplemental worksheets were an important tool used in the co-requisite learning supports, particularly for math. They supported practicing problem solving skills and reviewing concepts. They were designed to closely track the subject matter being covered in curriculum courses. The worksheets closely tracked the curriculum course textbook and referenced the related chapter and section in the textbook. The format of the tool varied depending on the preferences of the instructors and the perceived needs of the students. Typically, students were provided a problem set covering a particular lesson. In some cases, the worksheets also included a summary of the lesson, guided examples, problems already worked out as examples, and practice problems. The one-page worksheets were completed individually or in a group, during a single class session. Worksheets were typically used as a focus for the learning support class or to blend with mini-lectures or other strategies and practices. Instructors provided tutoring or coaching while the students completed the worksheets individually or in small groups. The worksheets were also a resource during exam preparation.

The cited disadvantage of the worksheets was the amount of time it takes to create them. But, the instructors pointed out that the many benefits to their use made the time invested worthwhile. Worksheets were seen as:

- ✓ An effective tool for learning both in-class and outside of class.
- ✓ An effective prompt for students to work together and a means of engagement.
- ✓ Takeaways that can be used over again across the semester as a reference and resource.
- ✓ Encouragement for students to focus on the material and to apply a concept just learned in their curriculum class.
- ✓ Helping students to absorb new concepts and formulas.
- ✓ Allowing students to work at their own pace, which kept the more advanced students from becoming disengaged.
- ✓ Tools to be shared, customized, and improved upon by colleagues.
- ✓ Positively effecting collaboration and generating conversations about teaching and learning, goals for the skills support class and how best to achieve them, and identifying student needs, gaps, and weaknesses.

MATH WORKSHOPS: A few of the colleges offered supplemental, instructor-led workshops as an enhancement to the skills support class. Gaston was the most active in this area, where the emphasis was on providing additional learning support that focused on topics the math department considered as “historically challenging” or “common weak points” in student knowledge and skills. The workshops were also offered for examination review. Most workshops were one hour in length. Although they were optional, instructors encouraged students to attend, offering extra credit or allowances for absences, or taking their section to the workshop for an entire meeting. The popularity of the workshops indicated to the Gaston college project team that the additional assistance was viewed positively by students.

OTHER ACTIVITIES AND PRACTICES: Colleges used additional activities to assist students in mastering their gateway requirements and to develop skills to enhance their self-efficacy.

- ✓ CPCC required students in the math skills support courses to keep a notebook containing their notes and worksheets from the skills support class; the notebook was graded at the end of the semester. The rationale was to develop a resource that would benefit students throughout the course and at exam time and to encourage good study skills practice for any college course.
- ✓ CPCC required students to prepare their own final exam review guide—individually or in a group—to support performance in the gateway class and to build broader competencies and mindsets to benefit across their classes.
- ✓ Ice-breaker activities conducted on the first day of math skills support class were held at both CPCC and Gaston. The purpose was to facilitate peer relationship-building and engagement, and encourage students to feel comfortable working in groups.
- ✓ Through scavenger hunts, CPCC students gathered information about learning support resources available on campus—i.e., the Academic Learning Center and their instructor’s office—and how to access them. Students had to take a “selfie” to confirm that they had found the site, and submit a brief report of their.
- ✓ WTCC and DCCC English instructors emphasized writing at the paragraph level rather than composing major essays and conducting supportive research. This approach allowed for detailed learning and enabled students to see more clearly specific writing and grammar weaknesses.

“Ultimately, if a student is not attending class and completing the assignments it will have an impact on their ability to pass the course.... They have to come to class to do the assignments or worksheets. They can’t get the assignments or worksheets outside of class. When a student misses a class he or she is also missing the opportunity to get the worksheets completed. Not only don’t they have the chance to practice and learn, but they don’t have the chance to complete the assignments that constitute the majority of their MAT001 grade.”

REMEDICATION MODULES: *LET’S GO RACING*

Stanly’s *Let’s Go Racing* offers students an efficient, comprehensive, and directed way to strengthen their core knowledge and skills in numeracy and grammar, which in turn boosts their confidence, builds learning momentum, and, to borrow from the words of a math instructor, gets students “into a more positive and prepared learning mode or mindset” in order to better position them for success in their college-level course. The overall remediation strategy provided students with a self-empowering experience that was centered on the activities of assessment, review, rehearsal, and feedback. A key feature of the system was that it enabled students to clearly and quickly see their weaknesses and to focus directly on strengthening their specific knowledge and skill needs.

Curriculum course instructors played an important role in facilitating delivery of *Let’s Go Racing* to their students. Math instructors typically introduced the remediation package and served as a resource to help students navigate the assessment and learning process. Most instructors reported that they set aside class time to ensure students understood the remediation tools and what was expected of them. Many also said they reduced the work-load during the first two weeks of the semester to give students ample time, and some incentive, to engage the remediation activities. Some instructors also provided in-class time for students to discuss the intervention and to complete the first segment of the remediation, the *Start Your Engines* pretest. Math instructors also reported extending their role as a point person to being an advocate for the intervention—a front-line supporter and promoter—and actively encouraged students to complete the tasks. In sum, math instructors identified their involvement as including:

- ❖ Helping students access and navigate the learning management system.
- ❖ Providing in-class time for students to get started on and complete their assessment and review.
- ❖ Being available during office hours and in-class for questions pertaining to the remediation modules.
- ❖ Monitoring students’ progress and sending email reminders to ensure they complete the activities.
- ❖ Being an advocate for the intervention and actively encouraging students to complete the tasks.
- ❖ Entering the students’ quiz grades for the remediation into the grade book.

PRACTICAL SPOTLIGHT ON PREREQUISITE LEARNING
SUPPORT STRATEGY: *START YOUR ENGINES*

All students at Stanly enrolled in the targeted gateway math and English courses were required to participate in the first component of the strategy, the *Start Your Engines* pre-test. They were under no obligation to work beyond the first component and had the option to stop-out at any point beyond the pre-test, even if remediation was recommended based on their pre-test, diagnostic scores. Instructors at the college indicated that they did not “prominently discuss” with their students that they were only required to complete the first part of the learning support; they let them know the option was available, but messaging was otherwise aimed at encouraging students to complete the full complement of review tools and at guiding them through the process to completion. Most students in both math and English selected to stay until the end. Students received—a small percentage of their overall curriculum course grade (three percent for math and five percent for English)—that was based on performance on either the pre- or post-test, depending on which grade was better.

The NASCAR-themed support strategy provided students with a practice-based set of review and remediation tools that were designed by math and English faculty at the college and delivered using the familiar Pearson learning management tools, *MyMathLab Plus* and *MySkillsLab*. With *Start Your Engines*, students were delivered a low-stress way to self-assess their level of preparedness for college coursework and to identify deficiencies that might serve as barriers to learning. The *Pit Stops* provided them with structured learning and practice opportunities, and links to resources, they could use to strengthen weaknesses and close gaps and also to build confidence and learning momentum. The *Winners Circle* gave students a tool to measure their improvement from the initial assessment. In this they were able to see where, and how much, they had progressed in their readiness. If a student performed poorly on the review and remediation exercises, an instructor would contact the student and often recommended tutoring or other academic support resources at the college. Also, in some cases, an *Early Alert* might be triggered and an academic coach from the college would contact the student.

The English department took a different approach to instructor involvement with the implementation of *Let's Go Racing* and relied primarily on a single English instructor to act as the lead point person for the delivery of the intervention. This person was tasked with being the primary go-to person for students with questions or concerns and for trouble-shooting difficulties students had with navigating the learning system. The lead sent reminders to all students to keep them moving along in the intervention and was responsible for triggering *Early Alerts* (the college's counseling service) for any students who gave indication they may not complete the support. The instructor was also tasked with entering each student's *Let's Go Racing* grade into the course instructor's grade book. According to the English department chair, centralizing assistance increased efficiency at the point of support delivery and enabled the gateway instructors to focus primarily on teaching composition from the start of the semester, rather than delaying instruction or being diverted with overseeing and tracking their students' grammar review experience. This is not to say that the English course instructors were disengaged from their students' interaction with *Let's Go Racing*, as they provided assistance and set-aside class time to address questions. But, this role was kept to a minimum, and they neither served as the “face of the intervention” to students nor tracked engagement and outcomes related to the intervention.

Knowledge and Skill Focus of the Remediation

MATH: The topic areas covered within the context of *Let's Go Racing* for math included a wide range of concepts, principles, relationships, and problems considered to be core academic building blocks for achievement in college-level math. By design, the knowledge areas the students were asked to engage tracked the college's developmental math sequence. Students participating in the remediation encountered problems and questions related to: integers and integer operations; fractions and decimals; proportions, ratios, rates, and percentages; linear expressions, equations, and inequalities; graphic and algebraic representations of lines; and exponents, factoring, and quadratic equations.

According to Stanly's math department head, who was also one of the developers of the supplemental support, the principle

source of the problems used on both the assessments and review modules was the college's developmental education textbook. She noted that every problem included in the remediation unit was reviewed in detail to ensure that it matched the relevant developmental math prerequisite module and aligned with the curriculum math course.

ENGLISH: *Let's Go Racing* for English was designed to help strengthen student readiness in the gateway composition course. The focus was to bridge the distance between any remedial information the students may have received in high school and the foundational knowledge and skills needed to produce clear college-level writing. The content spotlight for the English intervention was English grammar. Students were asked to complete a self-assessment, and the program would then help strengthen their weak areas, such as their understanding of core grammatical concepts and their ability to think critically about grammatical structures as part of the writing process. Emphasis was also placed on students' ability to apply the conventions of standard written English, to distinguish between informal language and standard written English, and to use appropriate technology when composing texts.

***Let's Go Racing* Participation Policy**

All students at Stanly enrolled in designated gateway math and English courses were required to take the pretest. Students had the option to stop-out at any point beyond the pretest, even if remediation was recommended based on their pretest, diagnostic scores. Instructors at the college indicated that they did not "prominently discuss" with their students that they were only required to complete the first part of the learning support. Most students selected to stay with the support from start to finish. Students received a grade for participation in the intervention based on their performance on either the pre- or post-test, depending on which grade was better. And, the grade constituted a small percentage of their overall curriculum course grade--three percent for mathematics and five percent for English.

All students, target and non-target, were required to participate in the pretest and the opt-out provision was available to every student. The decision to not target the intervention, according to college personnel, reflected a strong preference to avoid the possibility of "stigmatizing" the target students and to ensure that every student had an equal chance to participate in the review and got a solid start in their gateway math or English course.

Promoting Engagement and Completion of the Intervention

Of course, ensuring that students completed the full complement of academic support was key to the effectiveness of Stanly's intervention. However, several conditions were present that could derail a student from completing the support. For example, the intervention was only partially mandated and students could opt-out. The remediation activities were also completed on-line by the students on their own time and at their own pace, which may have been a barrier for students needing more structure or classroom interaction. In addition, *Let's Go Racing* was not directly linked to the students' gateway courses and thus did not support what they were learning in real-time in their college-level classes. Lastly, the grade attained for participating in the supplemental support was only the equivalent of a minor quiz grade and not a significant motivator.

Stanly administrators and instructors used a range of strategies and tactics to encourage students to complete the assessments and modules:

- ❖ Because the intervention was designed to highlight a student's strengths and to draw their attention to specific areas of weakness, students knew they only had to focus on particular areas where their level of preparedness was weak and warranted enhancement. The intervention was structured to provide students with a clear path from start to finish, frequent feedback and rewards, identifiable outcomes, and easy access and navigation.
- ❖ Intervention developers made the intentional decision to use a NASCAR racing theme in an effort to spark student interest and redirect their understanding of the intervention toward a more positive frame. The mathematics Program Head remarked:

We purposely chose to brand our module with a NASCAR racing theme and try to only use the terms 'Start Your Engines', 'Pit Stops', and 'Winner's Circle' with the students. We did not want to use terms with negative connotations, such as pretest, remediation, and post-test (which respectively align with the aforementioned terms) with our students. This branding of the module has helped to sell the module to the students and to create excitement.

- ❖ Instructors blended the learning support into their gateway courses. It was masked within the setting of the class experience so that students were often not aware that *Let's Go Racing* was a supplemental support. As one instructor noted, "It just falls into place for the students and seems like part of the class."
- ❖ Students were regularly reminded to complete the assessments and modules. Math faculty reported frequently reaching out to the students regarding their progress, reminding them of the closing date for the activities, and providing encouragement. Math students who did not start their assignments early received emails or phone calls from their instructor. Instructors also posted grades from the pretest quickly so students were able to get timely feedback for beginning the review modules.

SUPPLEMENTAL INSTRUCTION: SPARK FOR STATISTICS

The SPARK sessions provided academic support for all students taking GTCC's gateway statistical methods class. The aim of the intervention, as noted in the college's research study action plan was "to improve student learning strategies and student success by utilizing the active and collaborative learning techniques and principles of supplemental instruction."

Academic Support Practices and Strategies

The SPARK sessions provided students with guided practice time and extra instruction that helped improve problem-solving and math comprehension skills. The sessions were student-centered and served as encouraging environments for students to detangle statistical concepts and to have fun learning. The SPARK sessions were led by a Student Leader who took on the roles of instructor, coach,

and learning-facilitator. SPARK Leaders reported using a variety of individual and collaborative strategies to support learning:

- ❖ Mini-lectures to re-cap curriculum course lectures and to review foundational concepts
- ❖ Problem-solving worksheets
- ❖ Peer tutoring and mutual support
- ❖ One-on-instructor feedback and coaching
- ❖ Verbalized problem solving and analytical processes
- ❖ Study skill lessons
- ❖ Whole class discussions of concepts
- ❖ Math-oriented games and other skill developing activities into the learning process, such as Jeopardy and College Bowl, concept cards, note cards, and note review.

We had this big bag of M&Ms, and everybody got to get a cup of M&Ms. They then had to count out, and separate it by color, and then we would calculate the probability of a certain color from either a certain individual's cup; or if we took everybody's and theoretically dumped them all into one bowl, what's the probability of getting one that belongs to Ashley and is yellow, or one that belongs to Ashley or James and is blue. I just tried to give them an application exercise.

--SPARK Leader

The SPARK Leaders ensured that the sessions were relevant and meaningful and that they served as focused settings for work and engagement. While typically new to their role of delivering academic support, the SPARK Leaders were dedicated to and thoughtful in their tasks. Several reported that they frequently met with students after class, during office hours, and even held off-campus review sessions with students. One SPARK Leader shared:

We went to Panera bread sometimes, and a lot of people showed up. Those were the people who, well you know, if they are putting that effort in, if they're coming when they could be doing something else, you know they're putting in effort and most of them do good. I offered this to everyone.

Role of the SPARK Leaders and SPARK Coordinator

SPARK Leaders were either GTCC students or students from nearby four-year institutions and were required to have demonstrated skills in statistics. SPARK relied on peer-led assistance and the value of student role models as a basis for its learning support. The success of SPARK depended greatly on the quality and skills of the Leaders. The SPARK Program Coordinator stated:

The Student Leader is a critical piece of the model's effectiveness. You need a readily available talent pool, effective recruitment process, good training, and capable and well-informed Student Leaders who are willing to create and maintain an engaging learning environment for students.

While GTCC experienced challenges in finding an adequate number of well-qualified SPARK Leaders, it did succeed each semester in developing an effective team. The SPARK Leaders were given broad

autonomy in designing the environment for their learning support sessions, while working in close communication with the Project Coordinator and curriculum course faculty. As expected, the individual Leaders personalized the delivery of the material and their communications with students, all with a common goal to provide their peers an affirming, productive learning environment.

The SPARK Coordinator, a GTCC statistics faculty member, displayed strong dedication to ensuring the effectiveness of SPARK. She was responsible for implementing the selection, recruitment, and training process for the Leaders and monitored delivery on a daily basis. The Coordinator's active engagement and strong relationship with the Student Leaders and math faculty was identified as a key factor for the intervention's effectiveness; she took a hands-on, engaged approach and was instrumental in strengthening the intervention as it moved into broader implementation. Among the Coordinator's activities were the following:

- ❖ Meeting regularly with the SPARK Leaders to monitor their class experience and provide guidance.
- ❖ Working closely with the SPARK Leaders to create worksheets and math learning activities.
- ❖ Attending SPARK sessions and off-campus support sessions.
- ❖ Developing resources for statistics students as a supplement to SPARK.
- ❖ Frequently communicating with math faculty to gather feedback and ensure close coordination between the curriculum classes and the supplemental instruction sessions.

Participation and Attendance Policy

At GTCC, all students taking college-level statistics were required to participate in *SPARK for Statistics*. Students with an average curriculum course grade of 75 percent at week nine of the semester, and after the mid-term examination, could opt-out of the SPARK sessions. Noteworthy is the fact that these opt-out criteria represented an important change from the original implementation in the Spring 2015 semester, during which students needed an average grade of 70 percent and could opt-out after the third or fourth week of the semester. The initial requirements were changed due to concerns that the grade threshold was too low, and the point at which it could be exercised was too early in the semester.

[W]e felt like 70% is too low, because you may have a student who is sitting on the borderline of passing and failing. If they are that low in average, chances are that when they get to the chapter eight examination and the final, they are not going to pass. They do not need to be that close. Some people thought 80% was too high, because it is the lowest B you can make... we compromised and made it 75%.

--GTCC Team Member

The change in the opt-out policy resulted in a relatively large change in the number and share of students eligible to opt-out. During the Spring 2015 semester, attendance in the SPARK sessions dropped sharply when 134 students (or 58 percent of initial SPARK enrollment) met the cut-off score of 70 percent at the opt-out period. After the policy change, there was noticeably less impact: only 36 students (17 percent of students) were eligible to opt-out after week nine of the Fall 2015 semester and only; 60 students in Spring 2016 (almost 25 percent). Data tracking the number of students who had to

return to the sessions due to a decline in their average course grade below the threshold were not available

BENEFITS OF THE ACADEMIC SUPPORT STRATEGIES

This research indicated that the academic assistance provided to the target students was beneficial. The six teams reported improved academic performance in the targeted gateway math or English courses, noted that students were persisting with the learning supports and using the experience to their advantage, and remarked on observing student confidence levels grow and anxiety levels decline over the course of the intervention. Many of the students became better learners within the setting of the academic support: they learned how to ask better questions, to focus more fully on a task, to self-assess their own skills levels, and to work collaboratively with others to find answers and manage problems.

College personnel at all the colleges shared that they were encouraged—excited—to be able to provide an intervention that did not slow down the ability of students to take the required curriculum course or to advance toward a credential. Quite the contrary, the intervention was designed to help students build learning momentum in tandem with succeeding in their gateway class.

SUPPORT CLASSES AND SPARK FOR STATISTICS: The interventions offered an array of benefits to students. A Gaston instructor noted, “Students get a lot.... They get personalized support, engagement opportunities, chances to be heard, opportunities to ask questions, and practice at working-through problems with each other and the instructor.” From the perspective of a CPCC instructor, students received the type of academic support experience that they could leverage to strengthen not only their academic skills but also their self-assurance. She remarked:

In the class, the students are made to feel comfortable asking me questions, participating in the mini-lectures, and working in groups. I have seen each of my students be a leader in the group activities and also look to other students for guidance and help. The challenges the students came-in with improved throughout the semester as we worked together in a stress-free environment.

The following list presents the benefits available to students participating in the co-requisite supports and SPARK sessions most frequently mentioned by the college teams. Many practitioners noted that these benefits represented the key strengths that drove the effectiveness of their learning support initiative.

- ❖ Just-in-time academic assistance that was continuous across the semester
- ❖ Dedicated study and practice time where support was easily accessible
- ❖ Additional and guided practice time with ready access to an instructor
- ❖ Academic assistance that was linked directly to the curriculum course
- ❖ Comfortable and stress-free space for learning and peer engagement
- ❖ Judgment-free zone within which to ask questions and make mistakes
- ❖ A space to experiment with concepts and processes

- ❖ Small class size and a slower-paced curriculum
- ❖ Opportunity to review foundational as well as new concepts
- ❖ Ongoing chances to strengthen critical thinking and problem solving skills
- ❖ Frequent and meaningful interaction with an instructor
- ❖ One-on-one coaching and guidance
- ❖ Opportunity to learn from different instructors and different teaching methods
- ❖ Exposure to proven practices that enhance student achievement
- ❖ Peer engagement and relationship-building opportunities
- ❖ Opportunity to receive support from peers and to provide support to peers
- ❖ Chance to strengthen group learning skills
- ❖ Access to comprehensive and quality learning support materials
- ❖ Opportunity to strengthen study skills and academic practices
- ❖ Awareness of learning support resources at the college

...students in the college's math skills support classes "are advancing their own position toward their credential much more positively than they would have had they been in developmental education or been attempting to be successful without the additional support."

College personnel conveyed that they were encouraged and excited to be able to provide interventions that did not slow the ability of students to take the required gateway course or to advance toward a credential. They noted that interventions were designed to help students build learning momentum in tandem with success in their gateway classes. Interestingly, several instructors drew a contrast between the skills support class and developmental education on this issue. A DCCC instructor, for example, felt that students in the college's math skills support classes "are advancing their own position toward their credential much more positively than they would have had they been in developmental education or been attempting to be successful without the additional support." A faculty member at CPCC shared a similar view:

We also recognized there is value for students be able to say, 'I'm taking pre-calculus,' versus, 'I'm taking this developmental math class so I can take pre-calculus.' So, there is value just in the sense of the confidence of a student to be able to take their curriculum course, even though there may be a support course, but it's not this linear track they have to follow.

REMEDIATION MODULES: The sentiment shared across members of the Stanly team was that *Let's Go Racing* made a difference for students, was a positive and generative experience, and helped them at the critical launch point of their gateway course to bolster their level of academic preparation and confidence for their college-level learning. The following list highlights the more widely cited benefits and strengths as shared by those at the college directly involved with the intervention:

- ❖ Academic assistance that is purposeful and relevant.
- ❖ Immediate feedback for students on their level of preparedness for college learning.
- ❖ An early alert opportunity to flag potential problem areas.
- ❖ An opportunity to strengthen core competencies necessary for college-level success.

- ❖ Comfortable and stress-free setting for assessment and learning.
- ❖ Individualized support that addresses the needs and weaknesses of each student.
- ❖ Modular learning that allows for targeted review and improvement.
- ❖ Self-paced brush-up and anytime on-line access to learning modules.
- ❖ Access to comprehensive and quality learning support materials.
- ❖ Ability to use learning modules as a resource across the semester.
- ❖ Does not require students to come to campus to complete the intervention.
- ❖ Review doesn't compete with curriculum course assignments.
- ❖ Enables student to develop the vocabulary to describe problems they are experiencing.
- ❖ Motivation to get additional help within the college's learning support network.

IN SUMMARY, instructors and administrators at each college expressed a sense of accomplishment and satisfaction with their initiative. The interventions made a difference for students of varying needs and abilities and helped enhance their proficiency in their gateway courses. Several practitioners were eager to point out that the intervention met the key goal of leveling the playing field among differently-prepared students. The learning support, they contended, helped bring the target students up to the level of other students who had the prerequisite knowledge in place and were generally prepared for college-level learning. A CPCC math instructor conveyed:

I feel like this one course has closed the gap of four years of high school of a 2.6 to 3.0. Because of the skills support class, the target students are on the same playing field of their peers and the 3.0 and higher, or students who have taken developmental math.

College personnel commented that their students were not always keen on taking the supplemental course, doing worksheets, listening to mini-lectures re-capping lectures they had listened to in their curriculum class, or having to do remediation modules. They noted an “inevitable pushback,” but the pushback was minimal, usually short-lived, and overshadowed by the positive sentiment that emerged among students as they moved along in their support experience.

I think one of the biggest successes is that morale among the students goes up in the class. They come in kind of annoyed, I've noticed, they're frustrated, but then we do a class survey to see how students are feeling about the support class come midterm or final time, and they're pretty thrilled with it.

--WTCC Instructor

Key Findings: Implementation Overview and Assessment of the Implementation Process

Looking across the arc of the implementation period, the six colleges had a generally positive, effective implementation experience. Of course, they each had their hurdles and bumps to manage.

IMPLEMENTATION OVERVIEW

Project teams at five of the six colleges launched their supplemental supports at the beginning of the Spring 2015 semester. The sixth, WTCC, initiated their intervention Fall 2015. As was discussed at length in the research study's interim report, the initial five colleges were challenged to get their programs developed and in place by the beginning of the 2015 Spring semester given the time-line of the research project. The colleges had to quickly identify and secure resources, identify personnel, organize internal support, put operating and administrative structures into place, and prepare learning support materials. Each site approached this first semester of implementation as a pilot period. The focus was to get the intervention out to the students as quickly and effectively as possible and then use feedback and close review as a guide to make necessary adjustments for subsequent semesters when the initiatives moved to full implementation.

The compressed ramp-up to launch was effectively managed and the project teams had their intervention strategies up and running on time. Key outputs and early milestones were achieved and the students were supported as planned. Each college reported being fully-to-somewhat satisfied with the implementation experience. The limited student sentiment data collected during the first semester was positive at most of the colleges. There were disruptions and challenges, which is to be expected in implementing a new program, especially so quickly. However, from an operational standpoint, the colleges built momentum for the Fall 2015 semester. The exception was GTCC's SPARK program, whose initial efforts clearly struggled. A supplemental instruction program in a subject area such as mathematics can be complicated for any community college to deliver effectively, and GTCC's implementation was hampered by several key challenges that included last-minute hiring of the program coordinator, recruiting and training qualified student leaders, receiving ample college-level faculty support, and ensuring that the delivery of the academic support within the context of the SPARK model was relevant to participant needs.

When the Fall 2015 semester was underway, all five colleges were on stronger footing with their initiatives and were moving toward full implementation. At this time, GTCC initiated what amounted to a successful re-launch of their SPARK program. WTCC also successfully started their skills support class. As is shown in Figure 12, several of the colleges expanded their intervention to cover additional types of curriculum classes: CPCC added pre-calculus to complement their support for students taking college-level statistical methods; DCCC introduced coverage for both statistics and the gateway English

composition classes; and Stanly expanded *Let's Go Racing* to include students enrolled in the college's quantitative literacy course.

FIGURE 12: CURRICULUM COURSES SUPPORT BY A SUPPLEMENTAL LEARNING SUPPORT BY SEMESTER

	Spring 2015	Fall 2015	Spring 2016
CPCC	▪ Statistics	▪ Pre-calculus ▪ Statistics	▪ Pre-calculus ▪ Statistics
DCCC	▪ Pre-calculus	▪ Pre-calculus ▪ Statistics ▪ Writing and Inquiry	▪ Pre-calculus ▪ Statistics ▪ Quantitative Literacy ▪ Writing and Inquiry
Gaston	▪ Pre-calculus ▪ Statistics	▪ Pre-calculus ▪ Statistics	▪ Pre-calculus ▪ Statistics
GTCC	▪ Statistics	▪ Statistics	▪ Statistics
Stanly	▪ Pre-calculus ▪ Statistics ▪ Writing and Inquiry	▪ Pre-calculus ▪ Statistics ▪ Quantitative Literacy ▪ Writing and Inquiry	▪ Pre-calculus ▪ Statistics ▪ Quantitative Literacy ▪ Writing and Inquiry
WTCC	▪ None	▪ Pre-calculus ▪ Writing and Inquiry	▪ Pre-calculus ▪ Writing and Inquiry

Overall, between Spring 2015 and Fall 2015, the number of touch points for the interventions grew at five of the colleges to accommodate larger fall enrollments and additional curriculum courses:

- ❖ Stanly expanded the number of gateway math classes offering the remediation modules from three to 13. The college also added three English classes, going from 10 to 13 offering *Let's Go Racing*.
- ❖ DCCC launched their English skills support effort as a pilot with one class.
- ❖ The new entrant, WTCC, initiated their coverage of the target students with 23 math skills support classes and 27 support classes for students taking the gateway English class.
- ❖ GTCC reduced the number of SPARK sessions operated for students in statistics.

Additionally, the project teams made slight-to-significant changes to their interventions for the new academic year based on what they learned from their implementations during the pilot phase in Spring 2015. Changes made at the colleges are described below.

GASTON made a key shift toward more extensive use of developmental math instructors to facilitate the skills support classes, and by the Spring 2016 semester developmental math instructors facilitated all the skills support classes at Gaston. The reason for the shift was two-fold:

1. The math skills support classes constituted a prime setting to use the skills and experience of developmental education instructors. As was noted by one college-level instructor: "The developmental education instructors whole life is to encourage students to do better...All of them give that extra little push, and I think the students in the skills support classes need that."

2. The adoption of the Multiple Measures for Placement Policy led to a decline in the number of students being placed in developmental education. The skills support classes offered a way to re-purpose and retain the remedial math instructors.

CPCC opened their second implementation semester by raising the profile of several academic support activities offered within their skills support classes. For example, the use of scavenger hunts and ice-breaker activities were expanded to help students build their level of college awareness and to promote peer engagement and relationship-building among students. Skills class instructors also took a more intentional stance toward using the math practice time in the classes to build college study skills. The college also instituted a formal training and review session for all skills support instructors in order to improve support delivery, collaboration, and the student experience. Lastly, the college began offering students the option of a blended skills support class and brought both pre-calculus and statistics students together into one learning support class; while seated together, they did not co-mingle. The classes were co-led by a curriculum course instructor and a teaching assistant. The two-in-one classroom approach received mixed reviews from instructors but was continued in Spring 2016. A key factor in support of the approach was that it offered the college a way to help manage the costs associated with keeping the learning support class sizes small.

GTCC undertook a broad range of changes to its SPARK initiative in an effort to place the supplemental instruction initiative on stronger footing for the second term of implementation. Among the more notable modifications, the college brought a statistics faculty member onboard as program coordinator, which led to improved communication and coordination between curriculum math instructors and SPARK Leaders and acted as a catalyst for improved faculty buy-in for the learning support initiative. The math department also consolidated the college-level statistics instructor team from five to three in an effort to strengthen the linkage between the SPARK sessions and the statistics classes. A third change was a re-vamp of the recruitment, selection and training process for the SPARK Leaders. This generated a more effective team and led to higher quality SPARK sessions. As mentioned above, adjustments were made to SPARK's opt-out policy, and SPARK Leaders reported altering their general approach to delivering support which, effectively, moved SPARK away from a supplemental instruction model toward the just-in-time co-requisite support.

ALL COLLEGES: An important development across all colleges at the start of the 2015-16 academic year was an increase in the collection of data regarding student participation and sentiments. At each college, project teams, either independently or in collaboration with Coffey, administered student experience surveys. More than 1,500 math and English students at the six colleges participated in the surveys over the course of the two semesters and shared their opinions on a range of pertinent topics.

No significant changes were reported during the Spring 2016 semester, the third semester of operation. However, two colleges, DCCC and Stanly, piloted the supports in their quantitative literacy curriculum courses. The focus across all six colleges remained providing support for student success in pre-calculus and statistics, and three colleges continued to offer academic assistance for their gateway English composition courses.

GENERAL ASSESSMENT

Looking across the arc of the implementation period of Spring 2015 to Spring 2016, the six colleges had a generally positive, effective implementation experience, despite encountering their own sets of challenges. For the most part, as the colleges moved into broad implementation, they strengthened their support, expanded the scope of their initiatives and provided coverage to more target group students. GTCC struggled the most, but the college's program was not derailed and it grew stronger as the implementation period progressed.

At each of the colleges, the leadership teams operated the initiatives in adherence to their original designs as framed in their action plans and in concert with the core objectives of this study. Ample capacity and supports were in place at each college, including people, resources, process, strategies, and data collection, to achieve key objectives and milestones. College personnel worked to ensure the interventions were positioned to have a positive impact on participants' outcomes, and they placed emphasis on helping students develop study skills and routines that would benefit them across their college experience. The practitioners brought evident commitment and a seriousness of purpose to the implementation, as well as a concern for addressing the academic needs of students.

The leadership teams at all the colleges expressed an intention to sustain their supplemental support and integrate it into the longer-term operations of the departments and colleges. Consequently, they worked to normalize the interventions and to make them a part of their institution's learning support system. The majority of the participating colleges made clear at the end of the third semester of implementation that their initiatives would have a life beyond this research study; the only exception was GTCC, where there was uncertainty as to whether the SPARK initiative would continue to be implemented in its current form or at all.

KEY SUPPORTS FOR THE IMPLEMENTATION PROCESS

The participating colleges each had their own particular experience with developing and implementing their interventions. However, a variety of conditions consistently rose to the surface as supports for implementing and sustaining the interventions. As would be expected, not all the colleges experienced the same set of supportive conditions, nor did all practitioners put the same weight on each factor. The key support factors that were frequently mentioned include:

- ❖ College personnel tasked with leading the interventions were committed and engaged.
- ❖ Leadership teams used good management strategies to guide operation of the support.
- ❖ Sufficient buy-in and commitment from key internal stakeholders.
- ❖ Bottom-up and inclusive decision-making processes.
- ❖ Regular communication and collaboration.
- ❖ Frequent idea and resource sharing among academic support providers.
- ❖ Academic support providers had the necessary subject matter knowledge, experience, and commitment to deliver meaningful assistance.

- ❖ Instructors and student leaders were empowered with autonomy and flexibility in delivering the learning support and assisting students.
- ❖ Development and review of the learning support materials by faculty members, who were compensated for their time and effort.
- ❖ Students were adequately informed about the learning support and associated requirements.
- ❖ Advisors and academic support center personnel were sufficiently informed of the interventions.
- ❖ The culture of the college and that of the department were supportive of the interventions.

CHALLENGES ENCOUNTERED DURING THE IMPLEMENTATION PROCESS

The college team members at the six colleges were not without their challenges over the course of the implementation period. Some of the challenges encountered were specific to individual interventions and their operating environment, while others were more common across the colleges. A significant challenge experienced by all the project teams was the short time-line to develop and launch their initiatives. So too was deciding how best to “target” the interventions to the desired population without setting them apart from their peers. Getting target students properly registered into the supplemental support classes was quite challenging cross the colleges. For those providing co-requisite math classes, a key issue was syncing the curriculum courses with the learning support classes.

Noteworthy is that, for the most part, the challenges neither derailed the actual provision of service to students, nor was service impaired. The exception may have been GTCC’s SPARK intervention during its first semester of operation, when the college encountered several significant difficulties that caused SPARK to have a tenuous start. Difficulties ranged from limited support from gateway statistics faculty members to the lack of adequate time and process to effectively recruit and train SPARK Leaders. The collection of challenges the project team had to juggle may have adversely impacted the delivery and effectiveness of their learning support in Spring 2015.

The project teams at all six of the colleges, to their credit, proved adept at working to address and mitigate program challenges as they emerged. They made design changes and operational adjustments, found workarounds that addressed the problems, strengthened communication and collaboration processes, and otherwise took necessary action to ensure their initiatives ran closely to plan and sufficiently served their students’ needs. Each of the teams were able to move their interventions to a more confident and effectual operational state for the second and third semesters of implementation.

The following is a brief discussion of four challenges that were considered among the more important. It should be noted that the order in which they are presented does not imply a weighting of their importance.

COURSE REGISTRATION PROCESS: Nearly across the board, the colleges struggled with registering target students for the interventions due to technical limitations with their automated Datatel registration systems. The difficulty encountered was with ensuring students were fully informed of the requirement to enroll and that they were properly registered. In some cases, college administrators had no means to easily verify whether students had actually signed-up for the supplemental support, as required. In an

interview with researchers, a Gaston team member framed their challenge with the registration process in the following way:

The message [to the students] said ‘call the Dean’s office, you’re in the target population for the multiple measures and placement.’ It was a short message when they were informed they were in the target population. There were a few people we could opt out, in addition to being placed by multiple measures they were also placed by a placement test. But the Datatel [registration system] doesn’t know the difference...Even if they got pulled or flagged we had to make sure they weren’t flagged for another reason... So I had to manually check and let the instructors know who was in their curriculum class that needed [the skills lab]. It’s been a very manual process to do that and very time consuming.

Most of the college teams instituted some type of manual process to register students or relied on technical workarounds to address the problem. At Gaston, in order to facilitate the skills class registration and address any possible confusion about signing up for the course, the college allowed the students to drop or add the supplemental course after classes had begun. College personnel also visited the gateway math classes to speak with students. They found that when they reached out to the students, a number of those who were not required to take the math skills support class decided to enroll.

SUSTAINING SMALL CLASS SIZES: Although the size of the learning support classes varied, ranging from low single digits to more than twenty students per class, the average classes were small. It was widely agreed by practitioners that small class sizes were optimal. Small class sizes were also driven, in a few cases, by the low number of multiple measure students enrolled at the institutions. In these cases, the colleges were faced with few options but to operate support classes with low enrollments or to offer only a limited number of classes. “Enrollment size is a cost issue...Right now, we’re letting low numbers run. But this could be an issue going forward,” remarked a Gaston project lead. A project team member from DCCC noted:

I worry about the numbers. If you have got a whole bunch of these labs, but they have only got three, five students in them and you have got to pay somebody to teach that class, it feels like eventually you are going to get to the point where you cannot afford to run it.

The positive aspects of small class sizes were roundly agreed upon by college personnel and enabled instructors to work with students individually and to form a bond with students as they provided instruction, tutoring, and coaching. Fewer students in a class also fostered student engagement and peer-group work. However, how best to balance the costs with the benefits of the small classes – and to ensure that classes did not get small enough to weaken the group-based learning environment – represented a difficult choice for the college teams. This was clearly portrayed by a DCCC administrator.

We can’t run the skills support classes with too few students because we can’t afford it, but we cannot run them with too many students because it won’t be effective. So,

from a cost effective standpoint how many labs do you schedule to accommodate a small number of students? Labs of one or two people aren't going to work. It seemed like it'd be easy to manage until we did it.

ALIGNMENT AND PACING: One of the more difficult issues faced by the colleges offering co-requisite math support was ensuring the skills support classes was aligned with the curriculum math classes. The co-requisite interventions were designed to offer just-in-time support and to be in-sync with what the students were studying in real time in their gateway classes. In a traditional learning community setting, when a co-requisite support class is fully linked to a curriculum class, the two are synchronous. However, with these colleges, where there were multiple curriculum classes feeding into a single co-requisite support class and the curriculum classes were taught by different instructors, syncing the two can be a formidable challenge.

For a variety of reasons, none of the colleges decided to fully link sections of the math skills support and the gateway courses. GTCC team members came the closest when they connected each section of SPARK to no more than two college-level statistics classes. Otherwise, the supplemental supports were open for students enrolled in any of the curriculum math classes, and students had the flexibility to register for the skills support classes that conformed best with their schedules. For example, at WTCC, in the Spring 2016 semester, there were 52 sections of gateway pre-calculus feeding into 23 sections of the math skills support class.

The obvious problem is that students sitting next to each other in the support class may not be at the same place in their textbooks and lessons. They may be a week ahead or behind each other at any given point in the semester, as it is typically the case that different instructors move at a different pace, cover material at slightly different times, may place more emphasis on one area than another, may vary when they talk about particular issues, and their specific timeline for activities may differ. As several members of the different project teams noted, even when faculty members try to coordinate, it can still be difficult to have similar pacing across the course of a semester, and drift often occurs.

The first semester of implementation [coordinating] was very difficult, the curriculum instructors were teaching in whatever order they wanted, but this year the pre-calculus teachers, they got together and agreed to pacing this semester... So, as the implementation has moved across semesters, there was better alignment of curriculum material and tests. However, even though there was better coordination there was still drift.

Although many practitioners framed the challenge as a potential disruption to providing effective learning support to the students, they emphasized that the degree of difficulty it presented depended on the number of curriculum classes feeding into the skills support classes and the extent to which curriculum course instructors were aligned in their delivery. The general approach to addressing this challenge was to work closely with college-level instructors to urge them frequently to teach at a corresponding pace. They placed emphasis on encouraging regular communication and coordination and also raising awareness to the difficulty poor alignment presented in the skills support classes. In fact, some of the colleges utilized a pacing guide. However, it was also widely acknowledged that it was

not an easy task to balance instructor autonomy with the need for tight alignment of curriculum material and tests. According to an instructor at CPCC:

It's a new challenge, having two professionals working together in this fashion. I don't want to get into the academic freedom or order of how material is covered conversation, but it's two individuals that have to work in pace, and sometimes an instructor [says], 'No, I want to focus on this thing.' And you want to bring in real-world examples, or something that has happened that may delay the pace of things. But we definitely recognize that.

The college teams each reported they felt progress had been made across the three semester implementation period in realizing closer coordination among college-level faculty. A Gaston lead noted:

We have seen improvement from closer coordination, but faculty still get off-pace as you get deeper into the semester. Short of going to a standardized syllabus, you are going to have that issue.

Most viewed the challenge as one that would continue to require attention and effort, but while disruptive, it was manageable. A CPCC instructor noted:

It still works, even if the class is not exactly on pace, it's just that it makes the 001 class harder for the student. I have talked to students about it, and they still find it beneficial because when a topic comes up in lecture, they have already seen it. I have asked them, 'Do you still feel that this class is beneficial?' They said, 'Very much so, because then, when my instructor covers it, it's already in my mind and I have an understanding, and it's been a lot easier.'

SPARK LEADER RECRUITMENT: While college-level and developmental education instructors led the support classes at five of the colleges, GTCC, looked to college students to serve in this role. The SPARK Leaders, responsible for facilitating the weekly SPARK sessions, coordinated their efforts with curriculum course faculty. In this capacity, the Leaders worked directly with students to review curriculum course material, provide lectures on challenging topics, guide students through problem-solving strategies, and hold exam review and preparation sessions, among other activities.

A particular challenge that GTCC faced was recruiting well-qualified SPARK Leaders. The hurdle for the college was two-fold, according to a project team member: "Getting enough people, and getting the right people." The college did not have optimal conditions under which to recruit qualified SPARK Leaders. As a two-year institution, for example, it was difficult to find students who had the necessary level of experience with statistics to effectively facilitate the learning of other students.

It's a problem for anything you try to recruit for here. We have the students for two years. When they don't take statistics until their second year, which many of them do not, then they may only be here one more semester after that.

--Team Lead, GTCC

The project team also had a limited pool of potential candidates from other institutions, as there are only two four-year institutions in close proximity to the community college.

The recruitment challenge was particularly acute for the college in the ramp-up to the initial implementation in Spring 2015, as there was very little time to identify, hire and train the Student Leaders. For the 2015-16 academic year, the SPARK Coordinator was able to initiate a “more robust recruitment and selection strategy,” and, as a result, the college was able to hire a more qualified team. However, the college continued to struggle in Fall 2015 with having an adequate number of Student Leaders. It was not until Spring 2016 that they were able to have both “enough people” and the “right people” in place.

Key Findings: Student Perspectives on the Academic Support Strategies

"I am glad to have been placed here as the course has helped me grasp concepts that were otherwise difficult to understand."

"I personally do not believe it could be improved. I have learned what I needed to in order to succeed in my core math class."

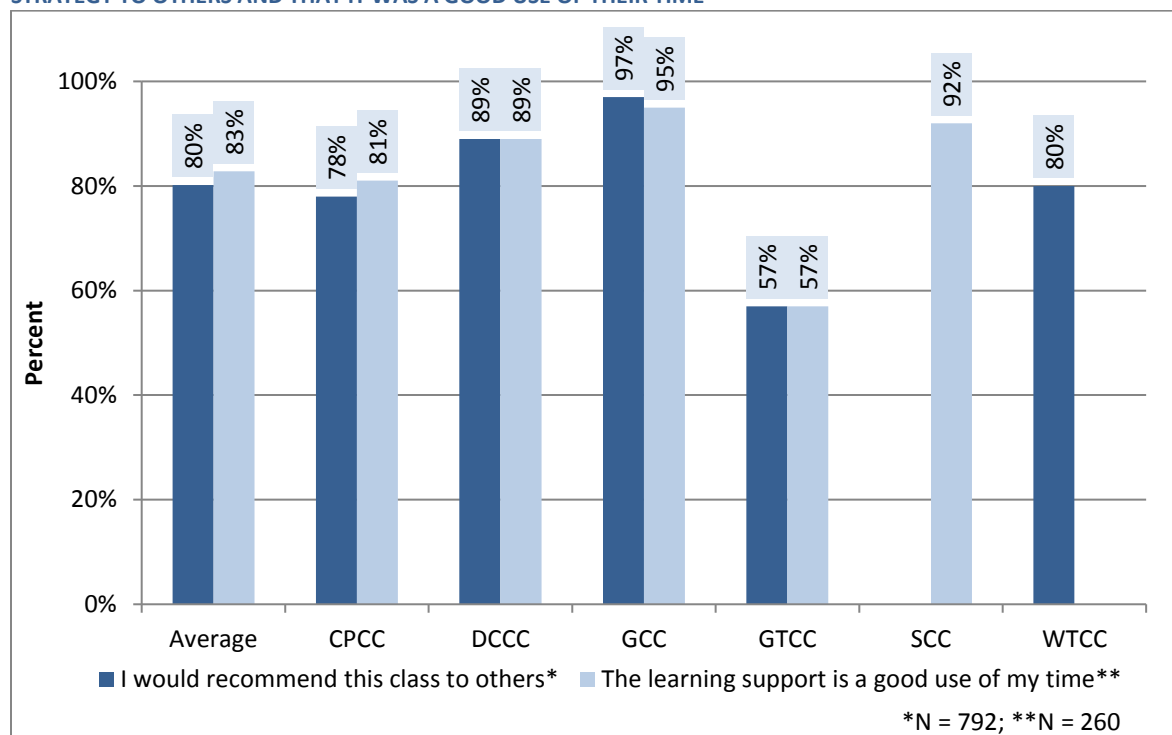
"I would change nothing from the course, everything was exceptionally well for me. It helped others and myself to better prepare for our math courses."

--Various North Carolina Multiple Measure Students

Student sentiment across the six colleges was overwhelmingly positive regarding the academic support strategies. Student surveys were customized and administered at each college regarding its respective supplemental support strategy; they covered similar key themes pertaining to college readiness, benefits and strengths of the academic support, student experience with the learning support, and assessments of specific practices used to deliver support. The majority of students who participated in the surveys were from the target population; however, some non-target students may have been included as well.

As shown in Figure 13, when asked if they would recommend their math-based intervention to others, 80 percent of students said they would. Similarly, 83 percent of students agreed that the academic support experience was a good use of their time. Across the individual colleges, 78 percent or more of students responded positively to both of these questions; impressively, three of the colleges' initiatives had favorable ratings near or over 90 percent. GTCC was the exception where about 60 percent of students responded affirmatively to both questions--still respectable but not as strong as the other colleges. And, interestingly, when asked, GTCC students did not offer much in the way of constructive criticism regarding the value of the SPARK sessions; in fact, one GTCC student stated, "Please don't take away SPARK, I understand there are budget cuts, but that would be suicide."

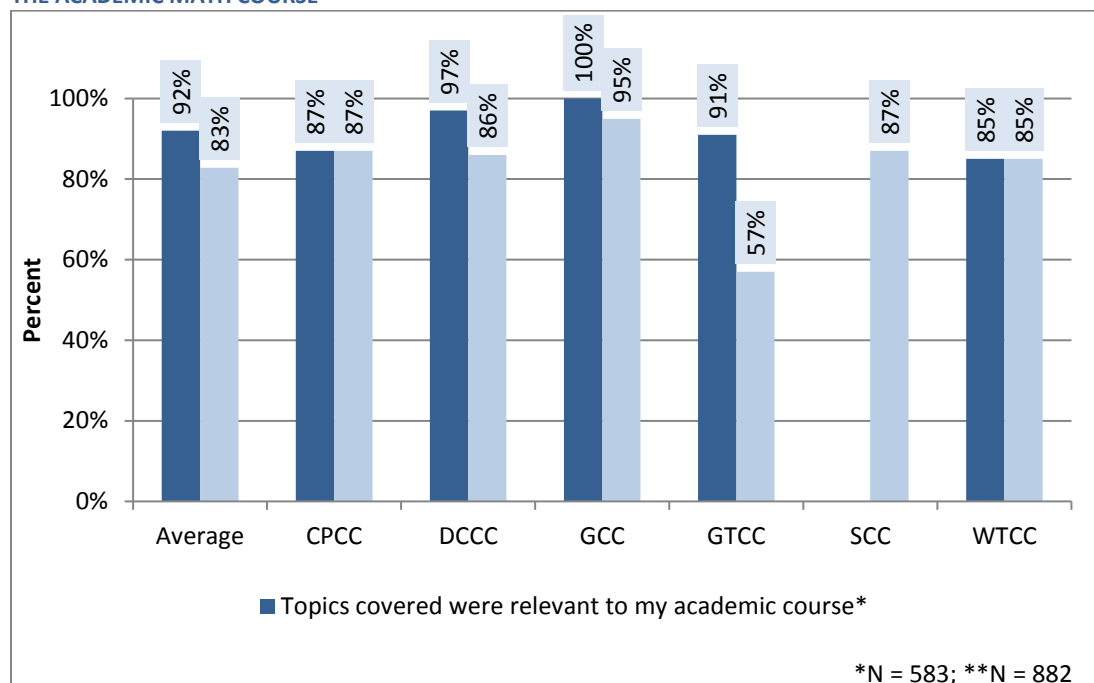
FIGURE 13. PERCENTAGE OF STUDENTS SURVEYED AGREE THAT THEY WOULD RECOMMEND THE MATH SUPPORT STRATEGY TO OTHERS AND THAT IT WAS A GOOD USE OF THEIR TIME



Similarly, the vast majority of students felt that the particular range of topics covered in their math supports, across the different types of interventions, was relevant to their college-level math classes (Figure 14). An average of 90 percent of students agreed that the supports were applicable. Slightly less, but still a vast majority, 83 percent, agreed when asked whether the supports helped them in their academic math courses. GTCC had the lowest percentage of students remarking favorably that the learning support helped them in their gateway class. However, over 90 percent of GTCC respondents indicated that *SPARK for Statistics* was relevant to their college-level coursework, which was in-line with the other colleges. This could be due to the issues addressed regarding challenges GTCC cited in linking the learning support curriculum with the academic coursework, as articulated in these GTCC student comments:

- ❖ *"If we could do similar problems [in the supplemental instruction sessions] that would actually [be] given on the test, or exam...."*
- ❖ *"Stick to practice worksheets that focus on the topics taught in class on the same day/week."*
- ❖ *"I would prefer for the [academic course] instructor(s) to teach SPARK."*
- ❖ *If the student leader took the class with the same professor [it] would be better."*

FIGURE 14. PERCENTAGE OF STUDENTS AGREE TOPICS COVERED WERE RELEVANT AND THE LEARNING SUPPORT HELPED IN THE ACADEMIC MATH COURSE



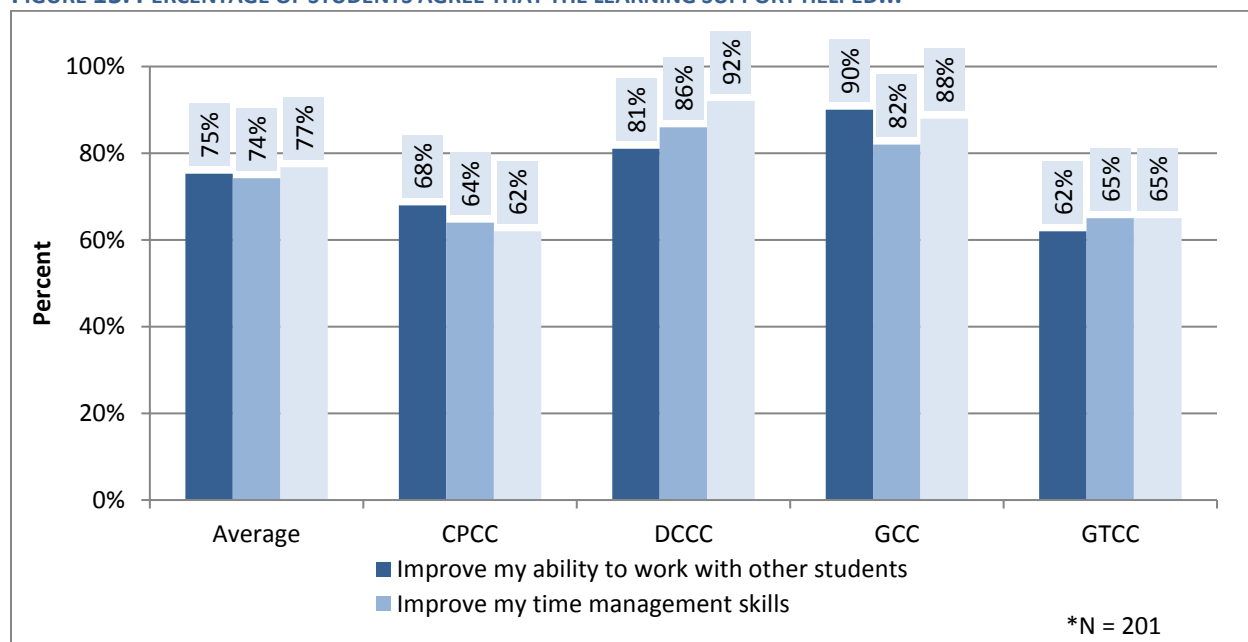
Noteworthy is that some of the changes suggested by students were made as GTCC's student support evolved (i.e., the student leaders now take the same course, and GTCC realigned the support's curriculum with that of the academic course).

The primary focus of the math skills support classes and SPARK sessions was math learning; however, the interventions also placed an emphasis on helping students develop a broader set of skills applicable to college-level learning and academic success. Students at four of the colleges were asked whether they felt participation in the academic supports were helpful in developing these broader skills. The majority of responses were affirmative, with well over 70 percent of students across the colleges indicating their ability to work with other students and their time management and general study skills had improved as a result of the supports (Figure 15).

"We get to work in groups and this helps you understand the problem better."

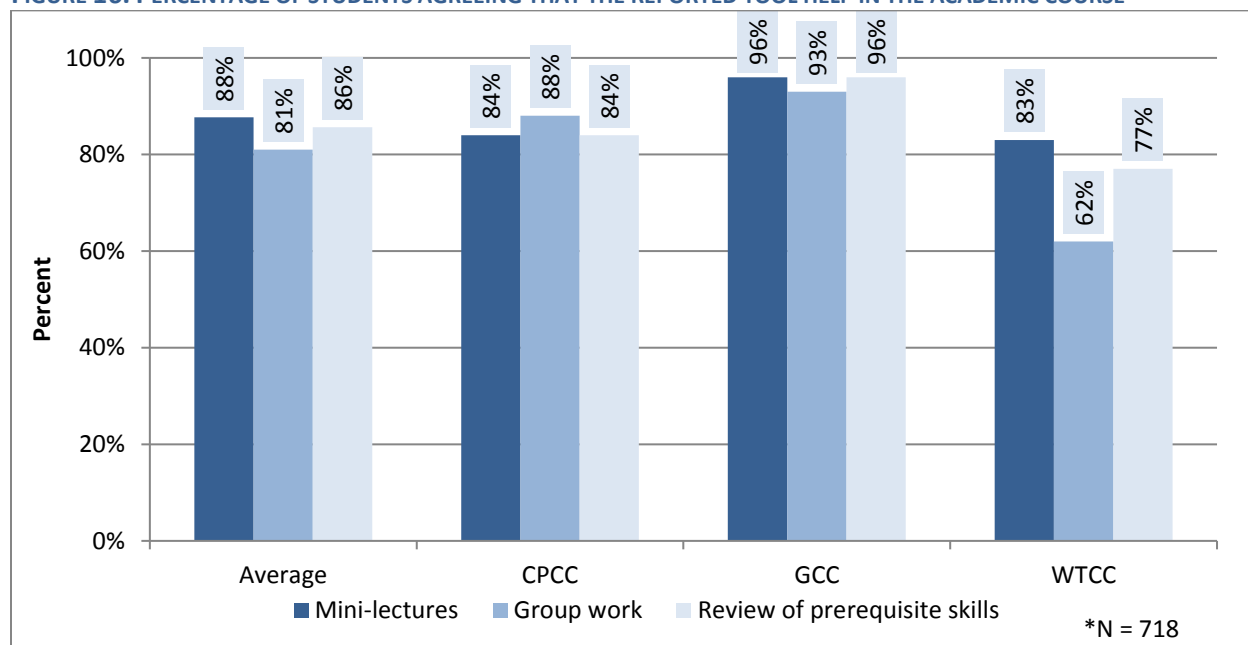
--GCC Student

FIGURE 15. PERCENTAGE OF STUDENTS AGREE THAT THE LEARNING SUPPORT HELPED...*



Students at three of the colleges implementing co-requisite math skills support classes were asked to share their perspectives on some of the core activities and practices used to deliver supports. These included mini-lectures, group work, and the review of prerequisite concepts and skills. Each of these activities was commonly used by instructors in the skills support classes to support student achievement in their curriculum classes. A large majority of students, over 80 percent, agreed that these types of practices were beneficial for their learning (Figure 16).

FIGURE 16. PERCENTAGE OF STUDENTS AGREEING THAT THE REPORTED TOOL HELP IN THE ACADEMIC COURSE*



Finally, students at all six colleges were asked to share their ideas for improving the supplemental support strategies. The ideas tended to fall into three general categories, identified below. It is interesting to note that one of the most common responses to this question across the colleges was not a suggestion for a specific type of change, but that no change was needed. Students also used the space to broadly compliment their instructors. As indicated below, it is interesting to note that the calls for change pertaining to class frequency and length were typically framed as a request for more and longer classes, and few students requested less class time.

Better alignment of the skills support class with curriculum course

- "Go along with my core class more and how my teacher teaches it."
- "Have the support class be taught by the students' core math teacher."
- "...Math Skills Support Lab would benefit me a lot better if the worksheets we did were up to pace with my current math class."

Improvement of instructional practices and learning support activities

- "More time to work on homework."
- "Have more practice problems and time for questions."
- "Having more hands on activity in class."

Changes to class frequency, length, and schedule

- "More time for class." (Note, this was a high frequency response.)
- "Being in class only once a week, it's not enough."
- "It could be helpful to have the support class immediately after the main course."

Concluding Remarks

The focus of this initiative was on ensuring that potentially academically at-risk students who received multiple measure waivers and enrolled directly into college-level classes would be able to succeed in their gateway math and English courses. As part of their participation in this study, each of six North Carolina community colleges developed and implemented a supplemental academic support strategy targeting these potentially at-risk students, or those with 2.6 to 3.0 high school GPAs. Four of the six participating colleges implemented co-requisite skills support classes; the fifth college implemented a student-led supplemental instruction program, and the sixth college implemented an innovative, online remediation program.

Coffey conducted an implementation and student outcomes evaluation of the efforts of these six colleges to provide academic support to the target students. The evaluation focused on student outcomes in gateway courses—those with the supplemental supports attached—as a way to gain insight into the different interventions’ capacities to promote academic achievement. The implementation process of each support was evaluated to identify challenges encountered by the colleges and conditions that served as key motivators for effective implementation. The analysis also examined and identified the details of the supplemental supports and highlighted the methods and activities employed to assist the students. The aim was to gain insight not only into what the colleges did at the ground level but also into the activities and practices that comprised the colleges’ strategies.

The key takeaway from the research was that the supplemental academic supports implemented at each of the colleges appeared to make a difference for many students, as increased student success was evidenced for the target group of students, post-implementation. Specifically, among target students, the average grade attained in the gateway courses rose, withdraw rates from the gateway courses declined, and the achievement gap between the target students and that of a control group closed with the introduction of the academic support. Further, students attributed value to the assistance they received at their college, with the majority of students surveyed stating that they felt the support was beneficial and made a difference for them in their college-level coursework. Students appeared to be satisfied with the character of the support, the activities embedded in the interventions, and the quality of their interaction with those who delivered the support.

The investigation into the implementation process showed that the supplemental supports were well-designed, effectively implemented, and grounded in proven principles for good practice. As would be expected, challenges were experienced as the interventions were rolled-out and maintained over the course of the implementation period.

The strategies launched by the six the North Carolina colleges have been in place since 2015. Colleges continue to monitor and adjust their implementations to better customize and further increase the effectiveness of their student supports and their student outcomes. The college teams at each site stated their intentions to keep their interventions in place beyond the auspices of this study. It was not clear, however, that all six colleges would be able to achieve this objective. In particular, there was

question as to whether GTCC would be in a position to continue operating *SPARK for Statistics* beyond the period of grant funding provided for this initiative, given the cost and complexity of a supplemental instruction initiative.

RECOMMENDATIONS

BASED ON THE FINDINGS OF THIS ANALYSIS, the research team puts forth the following recommendations for colleges considering implementing a supplemental academic support initiative in response to placement policy changes or, more generally, to support the success of academically at-risk students who are enrolled in college-level courses.

- ❖ **Selection of a Strategy Type.** Select an academic support strategy that best fits the conditions and culture of the college and the respective academic department. Make certain that the strategy is optimal for and supports the student learning outcomes in the targeted college-level course. A strategy that offers ongoing support across the semester may provide the most comprehensive, just-in-time support experience for students and can position the college to readily identify and address the range of students' foundational needs as they emerge over the semester.
- ❖ **Character of the Support.** Focus on the use of proven practices that directly address key academic and learning barriers and that situate the student at the center of the support experience. Such practices include: active learning techniques, frequent opportunities for interaction with instructor and peers, prompt feedback, regular assessment to track learning, focused and guided practice time, linking the support with curriculum course learning, the use of quality instructional materials, and study skills teachings that are embedded directly into the support.
- ❖ **Be Aware of Gaps.** Place an emphasis on identifying and understanding the relevant academic needs and challenges, as well as strengths of the students, and align the support closely with these needs. Consider employing diagnostic tools at the start of the support, or other means throughout the semester, to map gaps and weaknesses in foundational knowledge to current learning and skill areas.
- ❖ **Continual Remediation and Core Support.** Continually enhance the students' ability to master new knowledge and skills by integrating on-going review and practice of core competencies into the learning support. Closely and purposefully link the character and delivery of remedial support to the college-level course's subject matter and academic outcomes.
- ❖ **Mandatory or Optional? *Make it mandatory--require targeted students to participate in the intervention.*** While not required, consider allowing others who may want to receive additional assistance to participate.
- ❖ **Messaging.** Develop and implement a comprehensive messaging or communication strategy that ensures students and college personnel who have a role in ensuring effective implementation, such as academic advisors, are well-informed of the learning support. The messaging strategy should cover, at a minimum, the purpose, requirements, and structure of

the intervention. Ensuring that all staff are well-informed will facilitate a smooth program kick-off.

- ❖ **Ensure Technical/Functional Requirements are Operational.** Ensure early on that the necessary IT and/or registration system or other technical processes are in place to meet the new program requirements. For example, can the college's registration system accommodate specific class registration requirement? If not, identify corrective measures to minimize disruption at enrollment. Also, ensure that mechanisms are in place so that student advisors are fully aware of the support, including its requirements and purpose.
- ❖ **Identify Champions and Promote Stakeholder Support.** Include all stakeholders in program development—involve well-qualified and committed practitioners. Ensure the strategy is championed by key college personnel. Promote collaboration, resource sharing, and communication during strategy development and implementation as core values and key processes for goal achievement.
- ❖ **Faculty Involvement.** Actively involve faculty members associated with the college-level courses and those charged with delivery of the learning support during all stages of program development and implementation. Work to ensure not only buy-in but active engagement across the program's life cycle.
- ❖ **Instructor Autonomy.** Provide broad autonomy to those charged with delivering the learning support in deciding how best to tailor the assistance to meet the needs of their students, while also working from a common model of support. Also, ensure implementing personnel have access to shared resources and that there is regular communication among instructors to promote coordination of delivery and to encourage dissemination of effective practices, ideas, and experiences.
- ❖ **Monitor the Evidence.** Implement an active and comprehensive strategy of data collection and analysis that continuously informs the delivery of support and ensures that the strategy continues to align with students' needs and the goals of the learning support program. Actively monitor student engagement and learning within the setting of the support, and regularly gather the perspectives of students on the efficacy of the support. Establish a dissemination plan to ensure college personnel involved with the initiative are well-informed and can offer feedback. Utilize the data as a key input for program learning and improvement.

FOR THE NORTH CAROLINA COLLEGES PARTICIPATING IN THIS ANALYSIS, notable implications were revealed from the academic outcomes analysis, largely for the colleges' advising functions.

- ❖ **Proactive Advising into Gateway Courses.** The numbers and shares of first-time students that enrolled in the gateway courses during their first term at some of the participating colleges were relatively small at the time of this study. During the course of this study, the researchers were made aware that the colleges' advisors were acting more proactively to enroll more of their first-time students in the gateway courses upon first enrollment at the college; colleges should continue to bolster these efforts, especially given that early completion of gateway courses has been positively correlated with increased chances of credential completion.

- ❖ **Examine the Needs of Part-time Students.** Given that part-time students were found to withdraw from the gateway courses at higher rates than those attending full-time provides the opportunity for advisors and counselors to explore the potential reasons as to why--there may be a simple and relatively solvable solution to decreasing part-time students' withdraw rates.
- ❖ **Continually Monitor Students' Needs.** Sometimes coupled with the overall declining rate of withdraws was an increased rate of D-grades or F-grades (along with increased successful grade attainment). Thus, it may be the case that students have bolstered confidence to remain in the course for the duration, and it is recommended that college teams continue to monitor their students' needs and progress and make adjustments to their strategies accordingly.
- ❖ **Consider Adding Wrap-Around Resources.** Relatedly, given the overall relatively high success seen by CPCC, coupled with the fact that CPCC implemented more wrap-around supports than the others, colleges may consider adding additional types of activities to broaden the level and breadth of support they offer.

FUTURE ANALYSIS

The first evaluation report, the interim report that was a part of this initiative, focused primarily on the college's experiences during the initial implementation of the supplemental supports. This second report continued the implementation review and analysis and examined in detail the character of the academic support that was provided within the setting of the interventions at each of the six colleges. This report also examined whether the strategies had beneficial effects on the academic outcomes of the target student population. The primary focus of the outcomes analysis herein was twofold: (1) whether a difference in outcomes exists between the target student group and a comparison group of students; and (2) whether target students are benefiting from the student supports. This report also touched on whether outcome differences by specific student groups among the targeted student group exist and whether the trends are the same within the same a control group.

Coffey plans on preparing and submitting a final analysis in August 2017. This final report will focus on an analysis of student-level data that will include Fall 2016 semester FTIC students' academic activity. The six participating colleges are currently in the midst of a final student-level data collection cycle that includes this additional semester of activity. We anticipate that the addition of this student cohort to the study¹² will enable a more robust analysis of student academic outcomes. The final analysis will further expand on analysis conducted for this final report and attempt to examine whether some student groups' outcomes are more affected by the implementation strategies. The analysis will also provide an examination of target student outcomes compared to those of the control group. The intent is to continue to facilitate the monitoring of student outcomes for the colleges involved in the research study and to help inform the field as to what works, and what works well, to support academic success within the operation of the learning support strategies.

¹² Fall semester first-time enrollments are much larger than that of spring semesters.

Appendix: Multiple Measures Research Study, College Intervention Strategies

	CPCC	DCCC	Gaston	GTCC	Stanly	WTCC
Primary intervention developed as part of the multiple measures initiative to support student achievement and learning	Co-requisite Skills Support Classes	Co-requisite Skills Support Classes	Co-requisite Skills Support Classes	Supplemental Instruction Sessions	Remediation Modules	Co-requisite Skills Support Classes
Secondary interventions for students developed as part of the multiple measures initiative	NROC ¹	-	Math Workshops, Tutoring	Exam Reviews	-	-
Subject areas focus of the intervention as of Spring 2016: (P) Pre-calculus, (S) Statistics, (Q) Quantitative Literacy, (W) Writing and Inquiry	Math (P,S)	Math (P,S,Q) English (W)	Math (P,S)	Math (S)	Math (P,S,Q) English (W)	Math (P) English (W)
Duration of the learning support available within the setting of the intervention	Semester	Semester	Semester	Semester	Two weeks ²	Semester
Target and non-target students enrolled at the college have access to the supplemental support	Yes	Yes	Yes	Yes	Yes	Yes
The intervention is required for target population students taking gateway math or English courses	Yes	Yes	Yes	Yes	Yes ³	Yes
Target students can opt-out of the support during the semester based on curriculum course grade	No ⁴	No	No	Yes ⁵	No	No
Grading policy or approach for indicating performance in the supplemental learning support class	Pass/Repeat; 80% or better to pass. ⁷	Math: Pass/Repeat; 70% or above to pass ⁶ English: Letter grade A-F	Pass/Repeat; 50% of grade is based on attendance and 50% on participation	No Grade ⁸	Equivalent of a quiz grade for curriculum course	Math: Pass/Repeat; 70% or above to pass. English: Letter Grade A-F
Students receive college-level credit for successfully completing the intervention	No	Yes ⁹	Yes ¹⁰	No	No	Yes ¹¹

	CPCC	DCCC	Gaston	GTCC	Stanly	WTCC
Students are required to pay college tuition for enrolling or participating in the intervention	Yes	Yes	Yes	No	No	Yes
Online version of the supplemental learning support is available to student participants	Yes	English Only	No	Yes	Yes	Yes

¹ NROC Homework Online is a learning management system that provides students the opportunity to review pre-requisite material for Pre-calculus and Statistics topics as they are covered each week in the gateway math course. The review material was developed by CPCC mathematics instructors.

² The Stanly College remedial program, *Let's Go Racing*, runs the first two weeks of the semester. However, students have access throughout the semester to the pre-requisite learning support material used as part of the intervention.

³ The *Start Your Engines* pretest, the initial assessment component of Stanly College's pre-requisite review program, is mandatory for all students taking the gateway courses; however, the additional two components – the learning modules (*Pit Stops*) and the post-test (*Winner's Circle*) - are optional.

⁴ Target students at Central Piedmont cannot opt-out of the lab during the semester; however, they have the option of fully placing-out of the lab. Students who are admitted to the college based on high school GPA may select to take a MAT-171 placement test prior to the start of the semester. If a student places into MAT-171 based on their assessment score they have the option of not taking MAT-001 during the semester.

⁵ The opt-out period for Guilford Tech students begins approximately nine weeks into the semester and is based on a student's curriculum course grade. Students are required to have a curriculum course grade above 75% in order to opt-out and need to maintain this grade or return to their SPARK session.

⁶ Students taking MAT-001 at Davidson County receive a grade of SA, SB, SC, or U to indicate performance. The scale is used to provide a more detailed understanding of student performance relative to a traditional grading scale - for example, between passing with a 90% or higher versus a 70%.

⁷ CPCC's grading policy includes 25% online for the NROC weekly assignments and 75% class participation and in-class completion of the worksheets.

⁸ Students do not receive a grade for their SPARK session. Each curriculum course instructor linked to a session determines how SPARK attendance will impact the students' MAT-152 course grade. The general rule is that students may miss two SPARK sessions without penalty, but after two absences, most instructors deduct points from the MAT-152 grade. Student registrations for SPARK sessions are coded as audits.

⁹ Students taking the English skills lab (ENG-111A) at Davidson County receive a grade as well as course credit since the lab is offered as a curriculum-level course. While students receive credit, it is credit that is over and above the standard degree requirements. This means that, for students in the target group, the class is added as a degree requirement but is not transferable nor does it apply toward any other degree credits.

¹⁰ Students enrolled in the MAT 001P and MAT 001S courses at Gaston College receive college credit for the courses on their transcripts; however, these courses do not count toward a degree. The credits are not counted as required credits or elective credits.

¹¹ Students taking ENG-111A at Wake Tech can receive college-level elective credit for successfully completing the skills support class.