

Evaluation of the Academy for College Excellence

Report on Implementation and Student Outcomes



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Executive Summary

Of the over one million students entering U.S. community colleges every year, more than two-thirds are not prepared for college-level work, with instructional costs for remedial courses estimated at nearly \$4 billion per year. Despite the significant resources dedicated to remedial education programs, many seem to be ineffective and do little to inspire students to pursue further education. To increase the rate of success with these students, we need a better understanding of which programs are most effective, what features of those programs make them effective, and how to share best practices.

The Academy for College Excellence (ACE), founded in 2002 by Diego Navarro at Cabrillo College in Aptos, California, is one model that has shown promise for increasing academic success for students at high risk of failure in an academic setting. This report describes the program and examines its outcomes in six colleges, including five in California—Cabrillo College (Aptos), Hartnell College (Salinas), Los Medanos College (Pittsburg), Las Positas College (Livermore), and Berkeley City College (Berkeley)—and one in Pennsylvania, Delaware County Community College (Media).

The principal goal of this study was to determine whether the initial positive findings demonstrating the effectiveness of the ACE program at Cabrillo College, serving only 25 students per semester, would be replicated with more student cohorts, a longer time period, and a larger number of colleges. This current study shows that they are. The academic outcomes analyzed in this report are similar to those published in the Columbia University Community College Research Center (CCRC) study of the ACE program (Jenkins et al., 2009). This current study provides evidence that the ACE model, curriculum, faculty development, and train the trainer approach can generate similar academic results at multiple colleges, some of which are serving between 250 and 350 students per year.

The Academy for College Excellence (ACE) Model

The overall goal of ACE is to provide a national model for the recruitment, preparation, retention, and acceleration of underprepared community college students, especially disadvantaged young adults. It explicitly recognizes that these students often enter community colleges with the desire to better their lives but lack not only the academic qualifications, but also the professional skills and personal behaviors that are important precursors to academic success. Completing the developmental sequence and passing the first transfer-level gateway courses in English and math are the major objectives of the ACE program. More

importantly, preparing students for the “good life” by giving them the skills needed for the 21st century workplace is the ultimate goal of the program.

ACE is an intensive, full-time program that immerses students in a new vision of what academic life entails. It combines a rigorous academic program, courses to build life skills, and other support as a package to motivate students and enable them to engage in their education and succeed academically and in professional careers. The curriculum and pedagogical approach are designed to reinforce the behaviors and habits required for college success and provide students with an explicit and tangible understanding of the culture of professional careers.

The key elements of the ACE model are:

- An intensive **Foundation Course** (usually lasting two weeks) taken prior to the first semester. The Foundation Course meets for six to eight hours each day. It focuses on personal development and gives students the tools they need to support their identity as college students and reignite their excitement for learning.
- A **Bridge semester with a full-time load of academic courses** such as English, computer applications, and career planning. (The Bridge semester is also referred to as the “ACE semester” in this report.)
- A **Team Self-Management Course**, taken during the Bridge semester, that builds on the self-awareness, self-esteem, and communication lessons of the Foundation Course and strengthens the peer-support network. Faculty, supported by weekly Faculty Cohort meetings, monitor student progress, motivate students, deal with behaviors, and help students solve life problems.
- A project-based **Social Justice Course**, also taken during the Bridge semester, in which student teams conduct in-depth research on a local social justice issue of their choosing and present their findings to an audience at the end of the semester. This course is closely integrated with the curriculum of other courses such as English, math, computer science, and career planning.

To accommodate the needs of the colleges adopting the program, the basic model has sometimes varied across colleges and within colleges, over time, particularly in the courses taken during the ACE semester. For example, some colleges require students to take a degree-applicable English course and social justice course (the “Accelerated” model), while others are linked to career and technical education programs that have their own course requirements.¹

¹ See Karandjeff and Cooper (2013) for more details on the variations.

Study Components

The study had four key components:

- Analysis of college-provided data on the **academic achievement** of ACE students, with comparisons to a matched group of nonparticipants at three points in time: at the end of the Bridge (or ACE) semester and one and two semesters after that (except for the final cohort, which had completed only one post-ACE semester by the end of the study).
- Analysis of data on **affective precursors to academic achievement** collected through a web-based survey administered to ACE students at three points in time—before the two-week Foundation Course, after the Foundation Course, and after the ACE semester—to measure change over time. The survey was also administered to all incoming students (whether they participated in the ACE program or not) once, during their new-student assessment session, to allow comparisons between ACE participants and nonparticipants.
- Analysis of data on **student behaviors, academic plans, and attitudes** collected from a survey administered at the end of the ACE semester.
- Synthesis of information collected on-site at the colleges through interviews, focus groups, and observation to obtain **faculty, administrator, and student perspectives** on the ACE program.

Overview of Impact Findings

The main findings of the study are:

- **Participation in the ACE program has a robust positive effect on a number of academic outcomes based on analysis of data on multiple cohorts at a number of community colleges.**

Important positive outcomes have been documented. For example, ACE participants in accelerated programs (those requiring students to take a degree-applicable English course and a social justice course) were considerably more likely than a matched group of ACE nonparticipants to pass degree-applicable English in the ACE semester even though many of the ACE students assessed into lower level English courses. Moreover, this difference is still apparent two semesters later, although the difference attenuates slightly as greater numbers of non-ACE students make progress over time. These outcomes are particularly notable because those ACE students who had assessed into lower level English courses were effectively being accelerated.

ACE participants in accelerated programs were also more likely than comparable nonparticipants to complete transfer-level English. When tracked for three semesters, they were about one-and-a-half times more likely than students in a matched comparison group to complete transfer-level English and, on average, earned seven more degree-applicable credits. Accelerated ACE participants were more likely than comparable nonparticipants to persist and also more likely to enroll full time in the semester following the ACE semester.

At one college, the ACE curriculum included both English and math at the degree-applicable level in the ACE semester. At this college, ACE students were more than three times as likely as a matched comparison group to have completed both courses by the end of the second semester after the ACE one. This outcome is especially important because these courses are needed to meet the requirements for an associate's degree or transfer to a four-year institution.

As already indicated, these academic outcomes are similar to those obtained by the study conducted by the Community College Research Center (CCRC) (Jenkins et al., 2009) and are building evidence that this model is scalable. Moreover, the English, math, and degree-applicable credit completion results are robust to an alternate specification where ACE participants are compared with a matched sample limited to full-time students.

- **Participation in the ACE program improves students' scores on affective precursors to academic achievement.**

At the time of entry into the program, ACE students have lower scores on measures of psychosocial factors than do non-ACE students, as would be expected given their risk factors. However, ACE students show consistent improvement in their scores over the three point-in-time measures (before the Foundation Course, after the course, and at the end of the ACE semester). Students had increased their capacity in seven of the eight factors measured by the end of the two-week Foundation Course. With the exception of two factors, the change from Time 2 to Time 3 either remains consistent or improves slightly over the course of the ACE semester, indicating that students are maintaining the gains they made during the intensive Foundation Course. Because research has demonstrated the importance of the affective dimension for academic success, these findings suggest that the positive academic outcomes these students have achieved so far is at least partly due to the attention the ACE program gives to the affective dimension.

- **The ACE program appears to be helping students acquire the behaviors and attitudes needed to succeed in a community college program.**

At the end of the ACE semester, participants were asked to rate the extent to which they changed in specific areas in ways that improved their college experience. For all 21 behaviors covered in the survey, more than half of participants reported making positive changes.

(Among those not reporting positive changes, some may have believed that they did not need to make any changes.) This suggests that ACE is succeeding in its efforts to help students change their behavior in ways that will enable them to succeed in college. Participants were also asked about the impact of the program on their lives and about new decisions they had made about their future. Nearly half of respondents reported that they had made new decisions about their future and more than three-quarters indicated that they had changed as a result of being in ACE.

- **Administrators, faculty, and students reported generally positive effects on teaching and on the behaviors, attitudes, and academic outcomes of ACE participants.**

While faculty and administrators point to the demands placed on them because of teaching in the program, they also report positive effects on teaching approaches and dramatic effects on student behaviors and achievements. Students report significant positive effects on their academic and personal lives, on their preparation for continuing in college, and on their confidence and communication ability. Students often speak poignantly about how the program has transformed their lives.

Conclusions

This study provides strong evidence that the ACE model has positive effects on those students who participate and contributes strongly to their persistence and achievement rates. The report documents results across six semesters of the model from fall 2010 to spring 2013 and includes measures for students at the end of the ACE semester and one and two semesters following participation, comparing ACE participants with comparable nonparticipants. The findings provide evidence that a program like ACE can result in much more positive English and math outcomes for students who are at risk of failing to complete the standard remedial math and English sequences.

1. The Academy for College Excellence (ACE)

A substantial number of underprepared students enter the nation's community colleges every year. Nationally, 68 percent of first-time community college students in 2003–04 took at least one remedial course in any subject, 60 percent took at least one in mathematics, and 17 percent took at least one in English (Radford, 2012).² Students with remedial courses took an average of 2.9 such courses, but passed an average of only 1.9. A recent study estimated the cost of remedial instruction at community colleges at nearly \$4 billion per year (Scott-Clayton & Rodriguez, 2012, note 3).

Despite the significant resources dedicated to remedial education programs, many seem to be ineffective and do little to inspire students to persist. Few remedial students make it through college-level gateway courses (22.3 percent complete remediation and associated college-level courses in two years) and only 9.5 percent graduate within three years (Complete College America, 2012). To increase the rate of success with these students, we need a better understanding of which programs are most effective, what features of those programs make them effective, and how to share best practices.

The Academy for College Excellence (ACE), founded in 2002 by Diego Navarro at Cabrillo College in Aptos, California, is one model that has shown promise for increasing academic success for students at high risk of failure in an academic setting (Jenkins et al., 2009). This report describes the program and examines its outcomes in six colleges, including five in California—Cabrillo College (Aptos), Hartnell College (Salinas), Los Medanos College (Pittsburg), Las Positas College (Livermore), and Berkeley City College (Berkeley)—and one in Pennsylvania, Delaware County Community College (Media).

² Based on transcripts collected in 2009 from a nationally representative sample of beginning postsecondary students.

Program Goals and Structure

Goals and Approach

The overall goal of ACE is to provide a national model for the recruitment, preparation, retention, and acceleration of underprepared community college students, especially disadvantaged young adults. It explicitly recognizes that these students often enter community colleges with the desire to better their lives but lack not only the academic qualifications, but also the professional skills and personal behaviors that are important precursors to academic success. Completing the developmental sequence and passing the first transfer-level gateway courses in English and math are the major objectives of the ACE program. More importantly, preparing students for the “good life” by giving them the skills needed for the 21st century workplace is the ultimate goal of the program.

ACE is an intensive, full-time program that immerses students in a new vision of what academic life entails. It combines a rigorous academic program, courses to build life skills, and other support to motivate students and enable them to succeed academically and in professional careers. The curriculum and pedagogical approach are designed to reinforce the behaviors and habits required for college success and provide students with an explicit and tangible understanding of the culture of professional careers.

The ACE program consciously targets students who are at high risk of not being able to complete their education or to succeed in a job or career because of factors such as poverty, a history of involvement with the judicial system, immigration status, or drug abuse—disadvantages that are often compounded by low levels of self-efficacy and self-esteem (Navarro, 2012). These students often come from neighborhoods and schools with a history of violence and underperformance, have not been served well by the education system in the past, remain outside the doors of the academic environment, and are unable to contribute to the economy. Further compounding these problems, the neighborhoods and school environments in which they were raised have sometimes created symptoms in the students that are not unlike those of post-traumatic stress disorder (PTSD), which leads to hypersensitivity, hypervigilance,³ and other conditions that make performing at school difficult. They are survivors, but they have typically not had role models from whom to learn, and the behaviors and habits they rely on to survive in their homes and communities are not necessarily the ones they need to succeed in academic and professional environments.

These high-risk students require customized recruitment strategies. Often they were not encouraged to attend college by high school teachers or counselors and will not

³ Hypervigilance is an enhanced state of sensory sensitivity that may be accompanied by an exaggerated intensity in certain behaviors whose purpose is to detect threats.

independently take the steps needed to access education. They may be confident about their ability to survive in tough environments or when confronted by significant life challenges, but they often do not feel the same level of confidence about surviving in an academic environment.

The ACE program takes advantage of students' ability to persist and aims to build on and redirect the strengths of these students into the skills and behaviors they need to succeed in an academic setting. The goal is to create an educational environment that reinforces the strengths of the students and applies them to college-level learning in the classroom. In developing the ACE model, the founders took into account the characteristics of today's community college students and the research from a range of disciplines about what supports their success (discussed below in the section on the theoretical underpinnings).

Briefly, supporting the ACE approach is evidence that students are more likely to succeed if they have certain affective behaviors at the start of their education (Farrington et al., 2012); the first three weeks of enrollment can significantly impact achievement (Community College Survey of Student Engagement, 2012); significant credit accumulation in the initial year at college can increase the likelihood of longer-term success (Offenstein et al., 2010; Horn & Lew, 2007); and there are benefits to accelerating students with basic skills needs to transfer-level English and math coursework (Edgecombe, 2011).

The Canonical Model

To prepare high-risk students for the transition to rigorous academic or career and technical programs, the “canonical model” of the ACE program consists of an intensive, full-time program with the following key components:

- An intensive **Foundation Course** (usually two weeks) taken prior to the first semester. The Foundation Course meets for six to eight hours each day. It focuses on personal development and gives students the tools they need to support their identity as college students and reignite their excitement for learning.
- A **Bridge semester with a full-time load of academic courses**, which may vary. (The Bridge semester is also referred to as the “ACE semester” in this report.)
- A **Team Self-Management Course**, taken during the Bridge semester, that builds on the self-awareness, self-esteem, and communication lessons of the Foundation Course and strengthens the peer-support network. Faculty, supported by weekly Faculty Cohort meetings, monitor student progress, motivate students, deal with behaviors, and help students solve life problems.
- A project-based **Social Justice Course**, also taken during the Bridge semester, in which student teams conduct in-depth research on a local social justice issue of

their choosing and present their findings to an audience at the end of the semester. This course is closely integrated with the curriculum of other courses such as English, math, computer science, and career planning.

The Foundation, Team Self-Management, and Social Justice courses are very tightly structured and are designed to be fast-paced. The curriculum is carefully laid out, and all the necessary materials are provided in kit form.

Students move through the Foundation Course and Bridge semester as a cohort, creating and developing, through curriculum in the classroom, a peer-support network to facilitate their persistence and success. At the end of the ACE semester, they are expected to have completed a full-time load of college credits (12–16.5 units), which is more than the typical remedial program entails. Most of these credits, it should be noted, are not transferable to a four-year college. Once students have completed the ACE semester, no additional supports are provided. The only services available to them are those provided by the college to all students.

Variations

To accommodate the needs of the colleges adopting the program, the basic model has sometimes varied across colleges and within colleges, over time, particularly in the courses taken during the Bridge semester. For example, in fall 2010, Hartnell College offered one academically focused, accelerated program in which participants enrolled in college-level English in the ACE semester even if placement exams referred them to remedial English and positioned them for transfer to a four-year college. It also offered two nonaccelerated Career and Technical Education (CTE) programs that included coursework concentrated in green building or agriculture that were not focused on transfer to a four-year college and did not include English in the ACE semester at all. CTE students may intend to earn a certificate or associate's degree as their terminal award, transfer to a four-year institution, or simply wish to learn skills that they can apply on the job. Each of these goals has different educational requirements. Transfer to an in-state public university typically requires completion of transfer-level English, as does earning an associate's degree. Earning a CTE certificate or pursuing specific skills may not require any English coursework at all.

In addition to these structural variations, course sequencing and content have varied as well. For example, the Social Justice course is sometimes taught in one course and sometimes in two; the English course was not accelerated in all cohorts during the early years of implementation; math was accelerated in only one college; some programs include a movement course and career planning class while others do not; and most, but not all, include a computer class.

Figure 1 summarizes the current program variations. Every version includes both an affective component and an academic program. The coursework included in the academic program varies.

Figure 1. ACE program variations

ACE Program Variations			ACE Program Variation Coursework		
Program Variations	Target Students	Examples	Foundation Course	ACE Team Self-Mgmt	Other College Coursework
Affective Orientation	College-prepared Students	Orient to professional skills, behavior, mindsets, and college culture: Nursing, Gen. Ed. requirements, Rad Tech, etc.	✓		Students attend regular college courses and programs
Affective Summer Bridge	Transitioning Students	Provide rich academic and community-building experience leveraging students' exposure to social injustice	✓	✓	Social Justice Experiential Course
Affective Support for CTE	CTE Students	Medical Assisting, Green Jobs, Sustainable Construction, Agricultural Machinery, Respiratory Care, etc.	✓	✓	Career Technical Education
Affective Booster – Learning Community (LC)	LC Students	Provide 24/7 peer-support in hyperbonded community, through ACE affective curriculum	✓	✓	Linked courses
Accelerated Academic Learning	Developmental Education/STEM Students	Accelerated English and math and Integrated Science using a project-based course around which to integrate curriculum	✓	✓	Project-based course to integrate curriculum

SOURCE: Karandjeff and Cooper (2013).

Theoretical Underpinnings

The design of the ACE program was built on a foundation of research that shows the importance of factors within the affective dimension in the success of all students and, in fact, all individuals. This includes research on self-efficacy, motivation, socioemotional learning, mindfulness, and hope.

Psychologist Albert Bandura first introduced the construct of self-efficacy in the 1970s. More recently he published *Self-efficacy: The Exercise of Control* (1997), in which he situates self-efficacy within a theory of personal and collective agency that operates in concert with other sociocognitive factors in regulating human well being and attainment. Self-efficacy beliefs have received increased attention in educational research, primarily in studies of academic motivation and of self-regulation (Pintrich & Schunk, 1995). In this domain, self-efficacy re-

searchers have focused on three areas: the link between efficacy beliefs and college major and career choices (Lent & Hackett, 1987); the efficacy beliefs of teachers related to their instructional practices and to various student outcomes (Ashton & Webb, 1986); and the correlation of students' self-efficacy beliefs with other motivation constructs and with students' academic performances and achievement. Much of this work has focused on clarifying the structure of the motivational system, although this work has also begun to examine the influence of motivation on preference, choice, and learning (Markman, Maddox, & Baldwin, 2005).

The influence of social and emotional factors on learning is confirmed by a large number of studies as well. Based on evidence from 61 educational researchers, 91 meta-analyses, and 179 handbook chapters, Wang, Haertel, and Wallberg (1997) found that social and emotional factors were among the most influential factors on student learning. Those that were particularly high-ranking were classroom management, parental support, student-teacher social interactions, social-behavioral attributes, motivational-affective attributes, the peer group, school culture, and classroom climate. Through a review of these studies, the authors concluded that directly influencing the psychological components of learning is an effective way of changing how much and how well students learn.

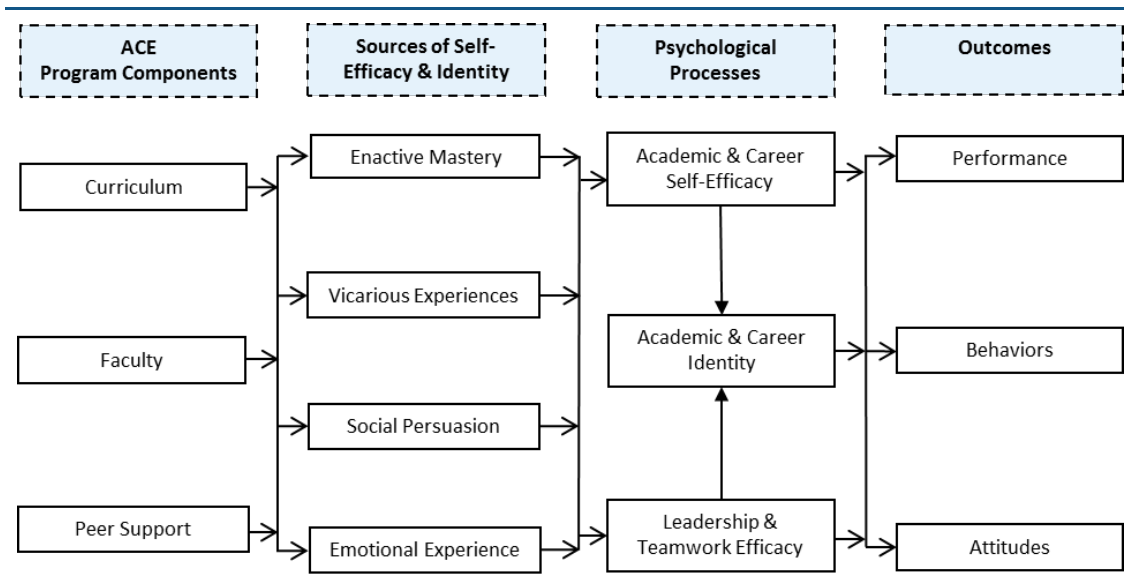
The ACE model also focuses on the development of hope in its students. Recently, the construct of hope has been receiving increased research attention; in one study, hope was shown to be more closely related to academic achievement than intelligence, personality, or previous academic achievement (Day, Hanson, Maltby, Proctor, & Wood, 2010).

Diego Navarro has a strong sense that the ACE program as it is designed improves students' brain functioning. Having reviewed and discussed brain functioning with experts, he learned that synaptic connections in the brain could be improved by education if curriculum and pedagogy were designed appropriately. While this hypothesis is in need of much deeper and more intentional research, the research on which it is based suggests plausibility. A surge in work on neuroplasticity that occurred around 2007 supported the ACE approach.

Martin Chemers, professor emeritus of psychology at the University of California, Santa Cruz, and a consultant to this study, has studied how psychological factors affect the commitment and success of underrepresented students in science, technology, education, and mathematics (STEM) education. Early studies (Chemers, Hu, & Garcia, 2001) showed clearly that academic self-efficacy plays an important role in student success. Employing a longitudinal design with first-year students at UC Santa Cruz, one of Chemer's studies indicated that measurements of academic self-efficacy taken in the first quarter of the school year predicted student outcomes eight months later, at the end of the year, including academic goals, grades, and adjustment and health. In subsequent studies, supported by the National Institutes of Health and the National Institute of General Medical Sciences, findings have

replicated those results and demonstrated that “research self-efficacy” and “identity as a scientist” predicted commitment to a career in STEM and satisfaction with the educational experience. Research showed that self-efficacy and identity fully mediated the effects on commitment of student experiences with authentic research, positive mentoring, and networking with professional scientists and other science students. Based on the findings of his research, Chemers proposed a model (figure 2), based on the ACE theory of change, to serve as a framework for understanding relationships between ACE program components, latent psychological mediators, and student outcomes.

Figure 2. ACE model theory of action



Development of the ACE Program

To develop the ACE program, Navarro researched educational programs that not only had the potential of making a difference for high-risk individuals, but that were able to “light a fire” within them. Without that, he realized they would have little chance of success. He wanted to determine what kind of program would accomplish that. With that end in mind, he reviewed 36 different curricula, narrowed it down to nine and set up five pilots to study their effect, seeking answers to questions such as: Does it have to be a residential program? Can it be done consistently and predictably? Can others be trained to provide the program? How many hours a day and how many days does it take to create the desired effect?

In working through this process, he used a research methodology known as the New Product Development (NPD) Process, whereby a company controls and monitors the flow of ideas

into successful product launches. Using such a process, product designers encourage and facilitate the review of a large number of ideas, use rigorous analysis and decision making to prioritize those with the highest likelihood of success, systematically pilot-test prototypes and measure their effect, accelerate the time to market them, and allow continuous improvement of the development process.

Through this exploratory work, Navarro began to define a program that would consistently “light a fire” in the students, was strengths-based, and focused on improving communication and building of community. One of the effects of building a strong sense of community was that it obviated the need for case management support services since students helped one another. This effectively reduced the cost of the program.

To help ensure the integrity of the program that was emerging and evolving, Navarro established a faculty institute and practicum to allow instructors who were interested in teaching in the program the opportunity to experience it as students would, so that they were able to understand the type of transformative process that students would go through.⁴ He and other ACE mentors conducted it as a facilitated model, as opposed to a traditional lecture and discussion format. He recognized that community college faculty are most often skilled in developing cognitive learning but that they are much less knowledgeable of *affective and experiential* learning and the value it brings to the educational environment. To help ensure integrity in implementation, the designers developed integrity indicators. As the program has been initiated at other campuses, the design has allowed them to make adjustments to align with local policy and practice, while still requiring that the core elements of the model become well established. They have embedded implementation integrity through professional development, curriculum kits and toolboxes, and mentoring.

⁴ These institutes and practica were evaluated by the University of California, Santa Cruz, Center for Justice, Tolerance and Community, which indicated that they were quite effective in training faculty in the ACE affective pedagogy (London, Smith, & George, 2006; Schirmer et al., 2007).

Study Purpose and Design

The principal goal of this study was to determine whether the initial evidence demonstrating the effectiveness of the ACE program at one college (Jenkins et al., 2009) could be confirmed in an expanded study that included more student cohorts, a longer time period, and a larger number of colleges. The specific objectives were to

- assess the impact of the ACE program on students' academic outcomes;
- identify the elements of the program associated with desired outcomes;
- provide the ACE staff, funders, and participating colleges with data and information to support ongoing program improvement; and
- contribute knowledge to the community college field about features of the ACE model that were most promising for enabling high-risk students to persist in college.

To address these objectives, the following research questions were developed:

- What are the effects of participation in the ACE program on student achievement?
- What are the effects of participation in the ACE program on the affective precursors to academic success, such as self-efficacy, interaction with others, and college identity?
- Is there evidence at the end of the Bridge semester that participation has positive effects on students' behaviors, academic plans, and attitudes?
- How do faculty, administrators, and students perceive the program?

The original intent was to examine separately the effects of selected variations of the ACE program, but sample sizes limited the ability to do this. However, some comparisons could be made between students in Accelerated programs (defined as including degree-applicable English and a social justice course in the ACE semester) and all other participants.

The data for the study were obtained from administrative records; student surveys; and on-site interviews, focus groups, and observations. The first data collection was in fall 2010 and the last was in spring 2013. For some analyses, data were collected for matched comparison groups as well as ACE participants. Some data were collected longitudinally to measure program effects at different points in time, and some were collected only once. Details on the sources of data, comparison groups, data analysis procedures, and time periods covered are provided below in the sections describing the findings on the effects of the ACE program. The key components of the study can be summarized as follows:

- Analysis of college-provided data on the **academic achievement** of five cohorts of ACE students (starting in fall 2010, spring 2011, fall 2011, spring 2012, and fall 2012). Comparisons were made with a matched group of nonparticipants at three points in time: at the end of the Bridge (or ACE) semester and one and two semesters after that—except for the final cohort, which had completed only one post-ACE semester by the end of the data collection in spring 2013 (Section 2).
- Analysis of data on **affective precursors to academic achievement** collected through a web-based survey administered to six cohorts of ACE students (fall 2010 through spring 2013) at three points in time—before the Foundation Course (at intake into the program), after the Foundation Course, and after the ACE semester—to measure change over time. The survey was also administered to the general population of incoming students (whether they participated in the ACE program or not) during their new student assessment session, allowing for comparisons between ACE participants and nonparticipants (Section 3).
- Analysis of data on **student behaviors, academic plans, and attitudes** collected from a survey administered at the end of the students' ACE semester (Section 4).
- Synthesis of information collected on-site at the colleges through interviews, focus groups, and observation to obtain **faculty, administrator, and student perspectives** on the ACE program (conducted between 2010 and 2012) (Section 5).

2. Effect of ACE Participation on Academic Achievement

The ultimate goal of the program is to provide students with the skills needed for the 21st century workplace. In this context, completing the developmental sequence and passing the first transfer-level gateway courses in English and math are the major academic objectives of the ACE program. Academic achievement is the ultimate goal of the program. Intermediate measures of achievement—such as persistence to the second term and second year and attainment of academic milestones such as completion of a given number of transferable units—are important as well as longer-term outcomes such as completion of degrees and credentials and transfer to four-year institutions. The data on academic achievement were obtained by ACE program staff directly from four of the six colleges included in this study: Cabrillo, Hartnell, Los Medanos, and Berkeley City. Except for placement data, these data are part of a standard set that California Community Colleges submit to the California Community Colleges Chancellor’s Office Management Information Systems (MIS).⁵ The rest of this section describes the data and methodology used for measuring the impact of ACE participation on academic achievement and compares the achievement of ACE participants to the achievements of a matched set of nonparticipants.

Student Cohorts

The academic outcomes in this report are based on five cohorts of students starting in fall 2010, spring 2011, fall 2011, spring 2012, and fall 2012 at the four California colleges listed above. The students were tracked longitudinally from the first semester of participation in ACE (the “ACE semester”) through the next two semesters. However, the fall 2012 cohort has outcomes only for the ACE semester and one additional semester (spring 2013, the last semester covered by this study).

Participation in ACE was defined operationally as the successful completion of the short Foundation Course with a passing grade (A, B, C, CR, or P). As detailed in appendix table A15, among students (in all cohorts) who took the Foundation Course, 87.6 percent received a passing grade, 0.1 percent were dropped by the instructor before the college’s census date for recording enrollment (DR), and 12.3 percent received a nonpassing or incomplete grade (D, F, IF, IX, NP, RD, or W). The proportion of students who failed to complete the

⁵ For more information on the California Community Colleges Chancellor’s Office MIS, please visit <http://datamart.cccco.edu>.

Foundation Course is sufficiently small that recoding these noncompleters as ACE participants would be very unlikely to appreciably affect the results. For some outcomes, such as completion of degree-applicable English, the proportion of noncompleters is considerably smaller than the difference in outcomes between ACE participants and a matched sample of nonparticipants.

The first or Bridge semester immediately following the Foundation Course is referred to as the ACE semester throughout this report. Depending on the college, enrollment in the Foundation Course⁶ was recorded as occurring either during the ACE semester or during an abbreviated summer or winter term immediately prior to the ACE semester.

The population of students included in the analysis of academic outcomes includes 1,362 ACE participants and 199,535 nonparticipants enrolled in Cabrillo College, Hartnell College, Los Medanos College, and Berkeley City College in the fall 2010, spring 2011, fall 2011, spring 2012, and fall 2012 semesters. Table 1 summarizes enrollment by college, semester, and participation. Within each college and semester, ACE participants are identified as those who successfully completed the Foundation Course immediately prior to that semester, and nonparticipants consist of all other enrolled students. As described below in the methodology section, each ACE participant is matched to the most similar nonparticipant in a given college across all semesters. For example, the 578 Cabrillo College participants starting in fall 2010 would be matched to 578 nonparticipants from a total pool of 72,002 nonparticipants. After matching within colleges, results were pooled across all colleges for accelerated and other program types. “Accelerated” is defined as taking a degree-applicable English course and a social justice course.

⁶ The specific courses were DMCP 110 at Cabrillo College, EDU 110 at Hartnell College, HMSRV 110 or ACS 110 at Los Medanos College, and LRNRE 220, LRNRE 248, or LRNRE 248UQ at Berkeley City College.

Table 1. Enrollment by college, semester, and ACE participation

Semester	Cabrillo College			Hartnell College			Los Medanos College			Berkeley College			All Colleges		
	Non-ACE	ACE	Total	Non-ACE	ACE	Total	Non-ACE	ACE	Total	Non-ACE	ACE	Total	Non-ACE	ACE	Total
Fall 2010	15,145	165	15,310	9,639	99	9,738	9,835	25	9,860	6,936	29	6,965	41,555	318	41,873
Spring 2011	14,628	153	14,781	11,010	60	11,070	10,197	24	10,221	7,061	18	7,079	42,896	255	43,151
Fall 2011	14,398	118	14,516	9,302	103	9,405	9,012	25	9,037	6,470	75	6,545	39,182	321	39,503
Spring 2012	14,232	67	14,299	9,526	71	9,597	9,170	47	9,217	6,464	54	6,518	39,392	239	39,631
Fall 2012	13,599	75	13,674	8,409	73	8,482	8,581	25	8,606	5,921	56	5,977	36,510	229	36,739
All Semesters	72,002	578	72,580	47,886	406	48,292	46,795	146	46,941	32,852	232	33,084	199,535	1,362	200,897

Table 2 shows the percentage of ACE participants with various risk factors. A total of 634 ACE participants who enrolled between the fall of 2010 and spring of 2012 completed an intake application that collected information on factors associated with high risk. All of these students were considered “at risk” and 77 percent had one or more “high risk” factors, ranging from 61 to 81 percent, depending on the college (table 2). Overall, 64 percent were first generation college students and many had life situations likely to interfere with their ability to succeed academically (such as unstable homes, single parenthood, legal troubles, etc.) without significant encouragement and support.

Table 2. Percentage of ACE participants with various risk factors: Fall 2010–spring 2012

Risk Factor	Berkeley City College (N=91)	Cabrillo College (N=489)	Delaware County Community College (N=113)	Hartnell College (N=174)	Las Positas College (N=65)	Los Medanos College (N=97)	Total (N=1029)
	First generation college (A)	65%	66%	57%	67%	40%	61%
Difficulty learning (A)	36%	41%	22%	32%	49%	39%	37%
Receives government benefits (A)	42%	40%	31%	47%	20%	38%	39%
Unstable home (H)	38%	35%	19%	30%	29%	29%	32%
Has been arrested (H)	21%	25%	11%	30%	3%	19%	22%
Parent is agricultural worker (A)	11%	33%	3%	55%	6%	9%	27%

Table 2. Percentage of ACE participants with various risk factors, fall 2010–spring 2012—Continued

Risk Factor	Berkeley	Delaware			Las Positas	Los	Total
	City	Cabrillo	County	Hartnell	College	Medanos	
	College	College	College	College	College	College	
	(N=91)	(N=489)	(N=113)	(N=174)	(N=65)	(N=97)	(N=1029)
Has been on probation (H)	15%	23%	8%	30%	0%	9%	19%
Parent with dependent children (A)	24%	21%	4%	25%	2%	21%	19%
Working while in school (A)	26%	24%	21%	21%	32%	27%	24%
Homeless (H)	24%	20%	9%	18%	6%	14%	17%
Substance abuse (H)	13%	17%	3%	20%	6%	4%	14%
Gang association (H)	22%	20%	10%	25%	18%	16%	20%
Domestic violence (H)	15%	19%	10%	18%	11%	14%	16%
Currently on probation (H)	9%	11%	2%	28%	0%	7%	12%
Child abuse (H)	11%	12%	8%	11%	14%	13%	11%
Medical condition (H)	10%	6%	13%	5%	15%	6%	7%
Foster care history (H)	7%	6%	8%	7%	6%	5%	6%
Mental condition (H)	8%	6%	4%	5%	6%	6%	6%
Risk Level							
At least one high-risk factor	60%	61%	44%	59%	52%	52%	57%
At least one risk factor	95%	98%	88%	98%	93%	92%	96%

A=At-risk; H=High-risk.

NOTE: ACE intake forms were not available for all ACE participants. Percentages are based on the number of participants with intake forms.

Methodology

This study evaluates the impact of participation in the ACE program on academic achievement by comparing the outcomes of ACE participants with a matched comparison group of similar students who did not participate using a method called propensity score matching. This section on methodology describes the rationale for this approach, the method used for constructing the comparison group, the limitations of matching approaches, and a comparison of matching with other methods.

Propensity Score Matching

The counterfactual model of causal inference defines the true causal effect of an intervention as the difference in outcomes in the presence of the intervention and in the absence of that intervention (Neyman, 1990 [1923]; Rubin, 1974; Holland, 1986; Morgan & Winship, 2007; Sekhon, 2009). The fundamental problem of causal inference, though, is that it is impossible to simultaneously observe both outcomes simultaneously. Instead, the evaluation

must try to approximate as closely as possible the answer to the question “What would have happened to these individuals if they had not had the intervention?” Randomized controlled trials (RCTs), or experiments, are generally considered the gold standard in establishing causality of interventions. Under most conditions, random assignment ensures that the group receiving the intervention is equivalent to the group not receiving the intervention, even on variables that cannot be adequately measured such as ability and motivation. RCTs are often infeasible, however, because of resource limitations and ethical concerns. In this situation, an RCT would have required the ACE program to turn away a proportion of interested students even if space were available, contravening the program’s stated goal of helping underprepared students succeed in community college.

When random assignment is ruled out, researchers must use other methods to control for factors that affect both participation in the intervention and the outcomes of interest. One quasi-experimental method increasingly used in evaluation and social science research is matching, where participants are matched to nonparticipants with similar background characteristics. The analysis for this study uses propensity score matching (PSM), which statistically estimates each individual’s propensity to participate in the intervention based on pre-intervention measures and then matches participants and nonparticipants with the most similar propensity scores. Propensity score matching has been shown under certain conditions to produce estimates of program effects equivalent to estimates based on random assignment even where other methods such as regression fail (Dehejia & Wahba, 1999; LaLonde, 1986; Agodini & Dynarski, 2004; Peikes, Moreno, & Orzol, 2008). The primary limitation of matching is that it cannot control for unobservable factors, but this is equally true of regression methods and most other multivariate statistical techniques.

The estimated effects in this report use a 1:1 nearest neighbor match without replacement. A student’s propensity score is the estimated likelihood that the student would participate in the ACE program, regardless of whether he or she actually did, as a function of the student’s background characteristics. Propensity scores were generated using logistic regression and calculated as the predicted probability of participation in ACE. A student with a propensity score of 0.15, for example, has an estimated 15 percent probability of participating in ACE.

In plain language, each ACE participant is matched to the single nonparticipant with the most similar propensity score, and that nonparticipant is removed from the pool of available matches. In cases of ties, where two or more nonparticipants with identical propensity scores were the closest matches to an ACE participant, the matched nonparticipant is selected randomly. ACE participants are only matched to nonparticipants within the same college and program model (accelerated or not).⁷ ACE participants with placement scores and without

⁷ ACE program model variations are discussed in the first section of this report. “Accelerated” means that the student took a degree-applicable English course and social justice course.

placement scores were matched separately to nonparticipants with and without placement scores, respectively.

To illustrate the process, an ACE participant with a propensity score of 0.15 would be matched with a nonparticipant with the propensity score closest to 0.15. That nonparticipant would not be matched to a participant again. If there were no available nonparticipants with a propensity score exactly equal to 0.15, the process would seek out a nonparticipant with a score of 0.14 or 0.16, and so forth. If there were multiple available nonparticipants with propensity scores of 0.15, then one would be selected at random.

Of the 1,362 ACE participants in the five semesters and four colleges, 179 were excluded due to missing data (other than placement data), which prevented the estimation of propensity scores. An additional 95 students were excluded to ensure common support—that is, that no ACE participant had a propensity score larger than the largest score for a nonparticipant or smaller than the smallest score for a nonparticipant. (Common support excludes individuals with extreme values of propensity scores for whom there is unlikely to be a sufficiently close match.) Ultimately, the actual maximum number of ACE participants in the analyses was 1,020. When confirmatory regressions were run, the results confirmed the findings of the PSM. To test balance between the ACE and comparison groups, the mean value for each variable was calculated for each group before and after matching. Balance was maximized by iterated adjustments to the propensity score model. The matching was implemented by the *psmatch2* module in Stata/MP 13.0 for Windows (Leuven & Sianesi, 2003; StataCorp, 2013).

Construction of the Matched Comparison Group

Following the Columbia University Community College Research Center evaluation by Jenkins et al. (2009), this analysis uses the following background characteristics derived from MIS data elements as the basis for constructing a matched comparison group (see table 3 for the percentage of ACE students with each characteristic at each college and overall):

- Gender
- Race/ethnicity (indicators for white, African American, and Hispanic, with other categories and missing treated as a reference category)
- Socioeconomic status, operationalized as whether the student's home zip code has 20 percent or more of households below the poverty line
- Student's age in years as of December 31 of the year of the ACE semester
- Whether the student graduated from high school
- Whether the student earned a GED or other type of high school equivalency

- Whether the student did not complete high school or a GED
- Number of credits earned at current community college prior to ACE semester
- The student's placement level in English, in terms of levels below the college level
- For Los Medanos College only, the student's placement level in math, in terms of levels below the college level

Most of the elements were measured dichotomously, but squared terms for the student's age and prior credits earned were included to account for extreme values. Matching on age and prior units earned further reduces the already small probability, for example, that an otherwise similar nonparticipant with many prior credits (who most likely has already overcome any initial obstacles to college success) would match to an ACE participant with few, if any, prior credits.

To further refine the comparison group, nonparticipants who completed transfer-level English in the ACE semester and, at Los Medanos College only, transfer-level math, were excluded from the analyses regardless of their propensity scores. Because of these exclusions, students from the comparison group have, perforce, no results for completion of transfer-level English and math in the ACE semester.

Table 3. Characteristics of ACE participants used for matching, by college and overall

Variable	Fall 2010–Fall 2012 combined									
	Cabrillo		Hartnell		Los Medanos		Berkeley City		All Four Colleges	
	Pct	N	Pct	N	Pct	N	Pct	N	Pct	N
All ACE participants	100%	578	100%	406	100%	146	100%	232	100%	1362
Male	60.4%	349	69.2%	281	32.2%	47	37.5%	87	56.1%	764
White	31.9%	182	9.0%	33	21.0%	30	6.7%	14	20.1%	259
African American	3.2%	18	4.4%	16	29.4%	42	58.6%	123	15.4%	199
Hispanic	58.1%	332	82.8%	303	36.4%	52	21.0%	44	56.7%	731
From high poverty zip code	6.4%	36	36.5%	144	0.0%	0	35.3%	79	19.9%	259
High school graduate	73.1%	407	54.8%	213	78.7%	111	74.5%	155	68.4%	886
Completed GED	16.3%	91	14.4%	56	14.2%	20	12.0%	25	14.8%	192
Did not complete high school or GED	6.5%	36	20.6%	80	6.4%	9	9.1%	19	11.1%	144
Has placement data	79.1%	457	37.7%	153	67.8%	99	35.8%	83	58.2%	792
Placed at college-level English*	10.5%	48	5.9%	9	7.3%	8	14.5%	12	9.6%	77
Placed one level below college-level English*	48.8%	223	25.5%	39	68.2%	75	0.0%	0	42.0%	337
Placed two or more levels below college-level English*	40.7%	186	68.6%	105	24.6%	27	85.5%	71	48.4%	389
Placed at college-level math*	–	–	–	–	0.0%	0	–	–	–	–
Placed one level below college-level math*	–	–	–	–	11.1%	11	–	–	–	–
Placed two or more levels below college-level math*	–	–	–	–	88.9%	88	–	–	–	–
	Mean		Mean		Mean		Mean		Mean	
Age	24.6		24.1		23.5		27.9		24.9	
Prior college credits earned	2.4		2.1		4.6		2.7		2.6	

* Results exclude ACE participants with missing placement data.

Limitations of Matching

Intake forms completed by ACE participants show that high percentages of them have background factors that put them at risk of not completing college (Jenkins et al., 2009). These risk factors include past substance abuse, participation in gangs, and having a criminal record. None of these risk factors are collected in the MIS data, and thus they were not available as selection parameters for nonparticipants. A concerted effort was made to identify students

who attended alternative or continuation high schools, but high school codes were missing for over half of ACE participants and nonparticipants.

Similarly, no direct measures of students' socioeconomic status, such as parental income and education, were available. Receipt of financial aid was considered and rejected because it is not considered a valid or reliable indicator of financial need for California community college students for a number of reasons, including relatively low fees, the high administrative burden of completing financial aid paperwork, restricted eligibility for the large proportion of students who enroll part time, and the limited English proficiency of many students (TICAS, 2007; Berkner & Woo, 2008). Instead, following Jenkins et al. (2009), a high percentage of households in poverty in the student's home zip code was used as a proxy for socioeconomic status, while recognizing that using ecological measures to infer individual-level correlations may be problematic (Robinson, 1950).

The matching analysis of student achievement also does not control for the fact that ACE participants were required to enroll full time in the Bridge semester, whereas the comparison group includes both full-time and part-time students. This is appropriate because ACE students comprise a group with mixed intentions regarding full-time enrollment. ACE application and intake surveys revealed that many of the ACE students were not intending on enrolling full time prior to engaging with the ACE program, and it was the full-time enrollment requirement of the program that encouraged these students with part-time intentions to enroll full time.

Full-time enrollment is significant because students who enroll full time, defined as at least 12 credit hours, have the potential to earn more credits and complete more courses in a given term than students who enroll part time. Numerous studies have shown that community college students who initially enroll full time are more likely to complete certificates and degrees and to transfer to four-year institutions (Calcagno et al., 2006; Clery, 2010; Skomsvold et al., 2011; Topper & Lee, 2010). Yet only about half of first-time community college students enroll full time in the first term (Horn & Radwin, 2012, p. 35). A supplementary set of analyses replicating the matching results but limiting the comparison group to full-time students is presented in appendix tables A5 through A14.

Finally, it was not possible to identify students who participated in other learning community programs that also targeted high-risk students and that shared some elements in common with the ACE program. Such programs existed at Cabrillo College during the period of the ACE evaluation. To the extent that these alternative programs enrolled students with a similar profile to ACE participants, it would be expected that excluding these students from the comparison group would have increased the differences between ACE participants and nonparticipants beyond the differences presented in this report.

Comparison with Other Methods

To check the robustness of the propensity score matching results to other forms of estimation, a separate analysis (not shown here) used multiple regression to attempt to replicate the matching results. Dichotomous outcomes (completion of English and math courses, persisting to the following semester, and enrolling full time in the following semester) were estimated using logistic regression, and continuous outcomes (number of cumulative degree-applicable and transfer-level credits) were estimated using ordinary least squares (OLS) regression. Because these regression methods used listwise deletion, only students with valid values for the outcome and for each of the control variables (gender, age, prior credits, and so forth) could be included in the estimation samples.

For completeness, each of 23 regression equations was estimated twice: once only for students with valid placement data and once for all students, not using placement scores as a control. The sample sizes for the 46 regressions, which included the total number of ACE participants and nonparticipants with valid data, ranged in size. At the low end were the regressions for the Los Medanos College math-related outcomes two semesters after the ACE semester for students with placement scores, which included 12,811 students. At the high end were the regressions of other outcomes during the ACE semester and one semester after the ACE semester, which included 139,865 students.

Overall, the regression results confirmed the matching results in terms of direction and statistical significance, and the magnitude of the OLS regression estimates, which can be compared directly to the matching estimates, were remarkably close to the matching estimates. For example, the OLS regression indicated that controlling for other factors, including placement data, ACE participants earned 7.4 more degree-applicable credits than nonparticipants in the ACE semester, and controlling for other factors except placement data, ACE participants earned 6.8 more degree-applicable credits. The matching method, based on both students with and without placement data, found that ACE participants earned 6.8 more degree-applicable credits than nonparticipants, only 0.6 credits below the first OLS estimate and identical to the second.

Similarly, the OLS regression showed that the difference in cumulative degree-applicable credits was 7.6 to 8.1 credits by the end of the first semester after the ACE semester and 8.0 to 8.3 credits by the end of the second semester after the ACE semester. These estimates were only slightly higher than the results of the propensity score match—7.1 credits one semester after the ACE semester and two semesters after the ACE semester. In sum, the close correspondence of the regression and matching estimates suggests that the results using propensity score matching are robust compared to other estimation methods.

Indicators of Academic Achievement

A number of indicators were used to assess the impact of the ACE program on student progress and success, including:

- Percentage of students who passed **degree-applicable English** (one level below transfer-level) during the ACE semester, by one semester following the ACE semester and by two semesters following the ACE semester;
- Percentage of students who passed **transfer-level English** (applicable toward an associate's degree and toward transfer to a University of California [UC] or California State University [CSU] campus), by one semester following the ACE semester and by two semesters following the ACE semester;
- Percentage of students **enrolled full time** (12 credits or more) at the same college one semester following the ACE semester;
- Percentage of students **enrolled (either full time or part time)** at the same college in the semester following the ACE semester;
- Mean cumulative number of **degree-applicable credits** (applicable toward an associate's degree) earned during the ACE semester, by one semester following the ACE semester and by two semesters following the ACE semester;
- Mean cumulative number of **transferable credits** (applicable toward an associate's degree and toward transfer to a UC or CSU campus) earned during the ACE semester, by one semester following the ACE semester and by two semesters following the ACE semester;

For students at Los Medanos College only:

- Percentage of students who **passed degree-applicable math** (one level below transfer-level) during the ACE semester, by one semester following the ACE semester and by two semesters following the ACE semester;
- Percentage of students who **passed transfer-level math** (applicable toward an associate's degree and toward transfer to a UC or CSU campus), by one semester following the ACE semester and by two semesters following the ACE semester;
- Percentage of students who **passed both degree-applicable math and degree-applicable English during the ACE semester**, by one semester following the ACE semester and by two semesters following the ACE semester; and

- Percentage of students who **passed both transfer-level math and transfer-level English**, by one semester following the ACE semester and by two semesters following the ACE semester.

These intermediate outcomes, while arguably meaningful in their own right, are also important because they have been shown to correlate with completion of certificates and degrees and transfer to four-year colleges (Horn & Radwin, 2012; Offenstein, Moore, & Shulock, 2010; Offenstein & Shulock, 2010; Moore, Shulock, & Offenstein, 2009; Leinbach & Jenkins, 2008; Calcagno et al., 2006; Adelman, 2005). Unit accumulation is important because, for example, California Community College students typically need at least 60 degree-applicable and transferable credits to transfer to a University of California or California State University campus with upper-division standing (Moore, Shulock, & Offenstein, 2009), and most associate's degrees require at least 60 degree-applicable credits (McCormick, 1999).

The identification of certain factors—educational goals, enrollment patterns, and course-taking patterns, for example—have also been shown in the Transfer Velocity Research Project (TVP), conducted through the Research and Planning Group of the California Community Colleges, to be significant in ensuring college transfer and completion. The TVP is a comprehensive study of two-to-four-year transfer in California. Awarded in 2007 by the California Community College State Chancellor's Office, the study investigates the full spectrum of factors, interventions, strategies, and practices that have a positive impact on transfer (Hayward, 2011; Mery & Schiorring, 2011). Early accumulation of credits, especially in transfer-level English and math, is the first step in the path to transferring and earning an associate's degree. Likewise, because completion and transfer almost always require at least two years of full-time enrollment, persistence across semesters is all but necessary to achieve either of these goals.

These interim measures of student progress provide early feedback on the efficacy of the ACE program long before most students would be expected to graduate or transfer to a four-year college with upper-division standing. For instance, even the minority of community college students who earn an associate's degree within six years still take over three years on average to complete the degree (Green & Radwin, 2012). Delaying this analysis to allow more time for students to progress through college would compromise the timeliness of this evaluation.

Tables 4 to 13 and figures 3 to 10 show findings related to the outcome measures for the applicable ACE cohorts and the matched comparison group. The results are disaggregated by program type (accelerated or other) where applicable, but the discussion centers on ACE participants in the accelerated program.

The first column in each table shows the number of ACE participants for all five cohorts across all four colleges for the ACE semester and the end of the first semester after the ACE semester. The numbers at the end of the second semester after the ACE semester (shown in the note to the table) are smaller because they do not include students who started in fall 2012 and had only completed one post-ACE semester by spring 2013, when the last data collection occurred. The numbers of nonparticipants are the same because they are matched 1:1 to participants. Each row also shows the difference in mean values between ACE participants and comparable nonparticipants and an indication if the difference is statistically significant at the .05, .01, or .001 level.⁸

Completion of Degree-Applicable English

ACE participants in accelerated programs were considerably more likely than nonparticipants in those programs to pass degree-applicable English in the ACE semester, although this difference attenuates slightly over the next two semesters as non-ACE students slowly begin to catch up. As table 4 shows, 51 percent of accelerated ACE participants completed degree-applicable English by the end of the ACE semester compared with 13 percent of the comparison group, a difference of 38 percentage points ($p < .001$). By the end of the first post-ACE semester, 58 percent of ACE participants completed transfer-level English compared with 24 percent of comparable nonparticipants, and by the end of the second semester after the ACE semester, 60 percent of the ACE participants and 29 percent of comparable nonparticipants completed transfer-level English (both differences $p < .001$).

There is no statistically significant difference between nonaccelerated ACE participants and matched comparable nonparticipants, however, during the ACE semester or the two following semesters. This finding is hardly surprising considering that other programs do not require participants to enroll in degree-applicable English.

⁸ Statistical significance measures the probability that a sample would have yielded a difference of a given magnitude due to random sampling error if the true value of the difference in the population were zero—that is, if by chance the groups in the sample had different outcomes even though the outcomes were the same in the population. A typical standard for statistically significant is a less than 5 percent probability that the difference could have been caused by chance ($p < .05$), and differences with a less than 1 percent probability of being caused by chance ($p < .01$) or less than 0.1 percent ($p < .001$) are even more highly statistically significant. A difference that does not reach statistical significance at the .05 level does not necessarily imply that there is no difference in the population but only indicates that there is at least a 5 percent probability that the difference could be due to chance.

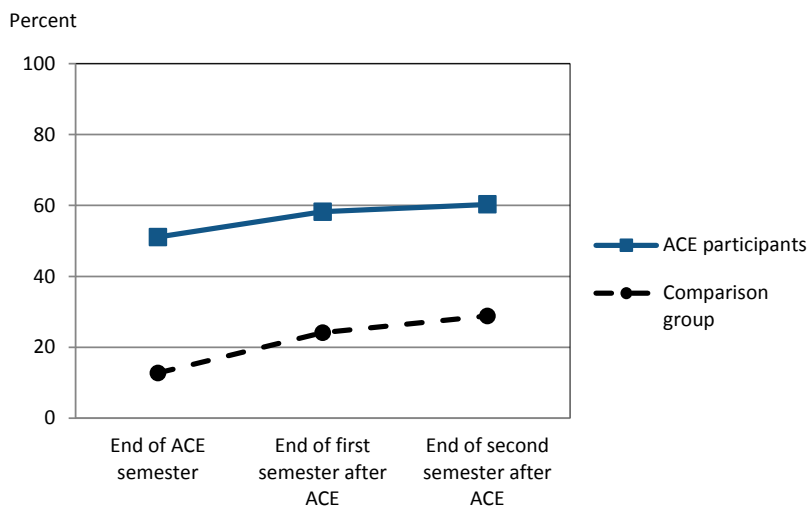
Table 4. Percentage of degree-applicable English completion by semester

	Number of Students in ACE and End of First Semester after ACE	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.
Accelerated	1,020	51.1	12.7	38.3***	58.2	24.1	34.1***	60.3	28.8	31.5***
Non-accelerated	162	19.1	14.2	4.9	37.0	27.8	9.3	40.6	31.0	9.6

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

NOTE: For second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 834 for accelerated students and 155 for nonaccelerated.

Figure 3. Percentage of degree-applicable English completion by semester, ACE participants in accelerated cohorts and matched comparison group



Completion of Transfer-Level English

ACE participants in accelerated programs are also more likely than comparable nonparticipants to complete transfer-level English. There is an understandably greater lag time between the ACE semester and passing transfer-level English. Transfer-level English is not part of the canonical ACE program by design, so results are not reported for the ACE semester. Neither the ACE students nor the comparison group students had assessed at transfer-level. This indicates that even a steeper level of acceleration may be feasible under the right conditions. The goal of equivalency between ACE students and the matched comparison group required that comparison group students not be enrolled in transfer-level English coursework during the ACE semester because ACE students were not supposed to be taking transfer-level Eng-

lish in the ACE semester. By the end of the first semester after the ACE semester, 20 percent of accelerated ACE participants had completed transfer-level English compared with 9 percent of comparable nonparticipants, a difference of 11 percentage points ($p < .001$). Two semesters after the ACE semester, 23 percent of accelerated ACE participants and 13 percent of comparable nonparticipants completed transfer-level English, a difference of 10 percentage points ($p < .001$). The nonaccelerated ACE participants were less likely than the matched comparison group to have completed transfer-level English by two semesters after the end of the ACE semester, but again this result is not surprising considering that the nonaccelerated programs did not require degree-applicable English, the usual prerequisite for transfer-level English, in the ACE semester.

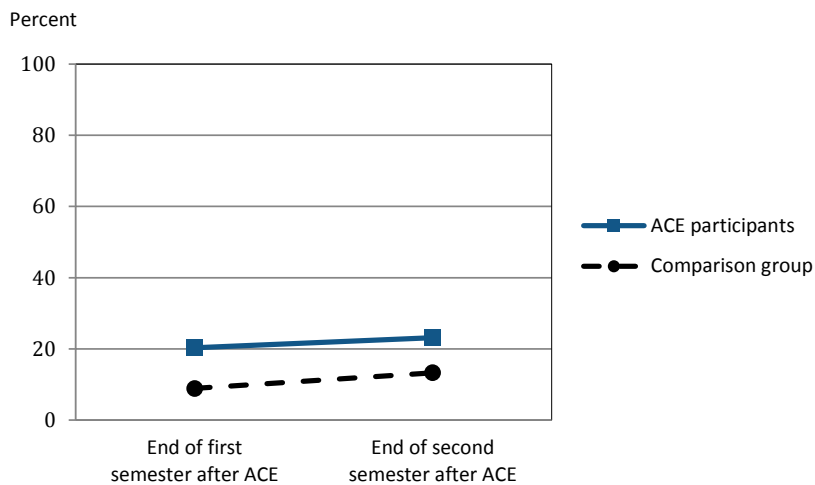
Table 5. Transfer-level English completion by semester

	Number of Students in ACE and End of First Semester after ACE	By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Comp. Group	Diff.	ACE	Comp. Group	Diff.
Accelerated	1,020	20.3	8.9	11.4 ***	23.1	13.3	9.8 ***
Nonaccelerated	162	5.6	11.7	-6.2 *	11.0	16.6	-5.6 **

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test

NOTE: Analyses exclude all nonparticipants who passed transfer-level English in the ACE semester and all LMC nonparticipants who passed transfer-level math in the ACE semester. For second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 834 for accelerated students and 155 for nonaccelerated.

Figure 4. Transferable English completion by semester, ACE participants in accelerated cohorts and matched comparison group



Credit Accrual

Table 6 and figure 5 show the mean values of the cumulative number of degree-applicable college credits (applicable to an associate’s degree or CTE certificate but not necessarily transferable to a four-year college) earned during the ACE semester and the two semesters that follow. Associate’s degrees typically require 60 college credits, and certificate programs require anywhere from 12 to over 100 credits (Moore, Jez, Chisolm, & Shulock, 2012). Overall, accelerated ACE participants earned 7 more degree-applicable credits than comparable nonparticipants in the ACE semester, and the difference is statistically significant at the .001 level. Accelerated ACE participants earned 11 degree-applicable credits in the ACE semester on average, while comparable nonparticipants earned 4 credits on average, a difference of 7 credits. Participants earned 15 degree-applicable credits by the end of the next semester and 17 credits by the end of the second semester after the ACE semester, compared with comparable nonparticipants’ 8 and 10 credits in the respective semesters, maintaining the difference of 7 degree-applicable credits. There is also no evidence that the nonparticipants were catching up to participants in accumulation of degree-applicable credits over the following semesters. Among the nonaccelerated program types, ACE participants earned 5 to 6 more degree-applicable credits than comparable nonparticipants, a difference that is statistically significant at the .001 level. Figure 5 shows the progression in degree-applicable credit accumulation for the accelerated ACE participants and their matched nonparticipants.

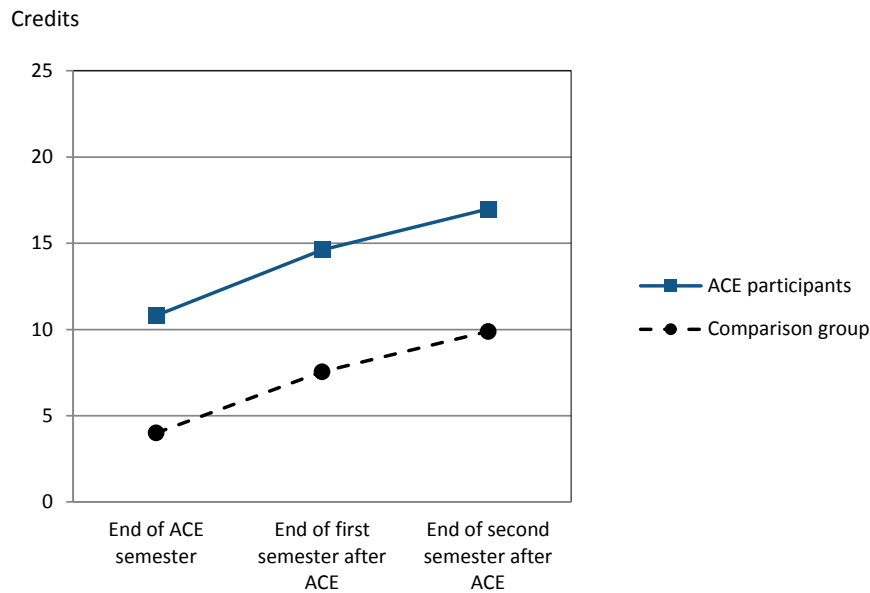
Table 6. Cumulative degree-applicable credits earned by semester

	Number of Students in ACE and End of First Semester after ACE	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Group	Comp. Diff.	ACE	Group	Comp. Diff.	ACE	Group	Comp. Diff.
Accelerated	1,020	10.8	4.0	6.8***	14.6	7.6	7.1 ***	17.0	9.9	7.1***
Non-accelerated	162	9.1	4.0	5.2***	13.7	7.5	6.2 ***	16.3	10.0	6.3***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

NOTE: For second semester after the ACE semester, which excludes students who started in fall 2012, the N’s were 834 for accelerated students and 155 for nonaccelerated.

Figure 5. Cumulative degree-applicable credits earned by semester, ACE participants in accelerated cohorts and matched comparison group



The story is quite different for earning credits that are transferable to an in-state public university (UC or CSU), which are also applicable to a degree or certificate. Neither ACE participants nor comparable nonparticipants earn very many such credits, averaging 1 to 3 credits per semester, and ACE participants tend to lag 1 to 2 credits behind comparable nonparticipants. As shown in table 7, accelerated ACE participants earned 1 transferable credit in the ACE semester compared with 3 such credits earned by comparable nonparticipants, a difference of 1 credit before rounding ($p < .001$). By the end of the next semester, ACE participants averaged 4 credits and comparable nonparticipants averaged 5 credits, and by the semester after that, ACE participants had earned 6 credits and comparable nonparticipants had earned 7 credits. The chief reason that participants earn so few transferable credits on average in the ACE semester (and, by extension, overall) is that the ACE courses are not accepted for transfer at public universities in California. ACE staff are negotiating with CSU officials to change this situation and have been successful in two other states in designating ACE courses as transferable to their respective states' public universities. Figure 6 plots the progression of transferable credits earned for the accelerated participants and the comparison group. The results were similar for nonaccelerated ACE participants but did not reach statistical significance. The most important implication of these results may be that even after three semesters, neither group of ACE participants earned over 12 cumulative transferable credits on average (nor, for that matter, did any comparison group), which means that even

after three semesters the average student is still a long way from the 60 credits needed to transfer with upper-division standing. This finding related to the amount of time it takes community college students to accumulate sufficient units to graduate and/or transfer, which is well known among community college educators and researchers.

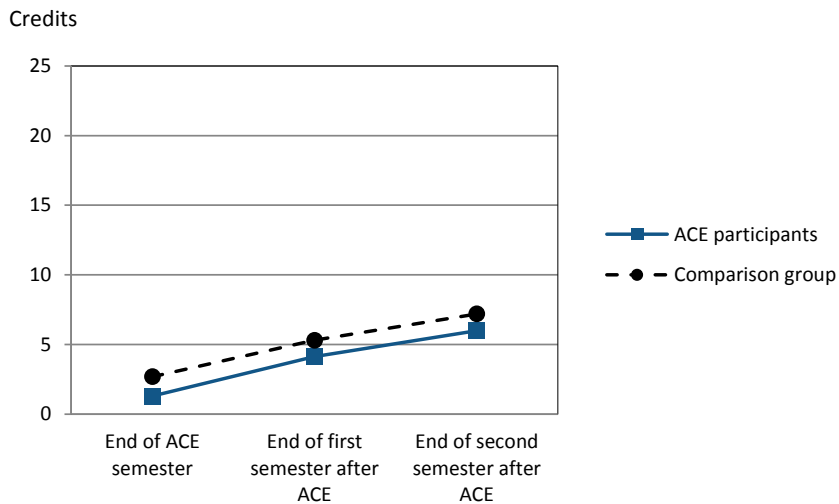
Table 7. Cumulative transferable credits earned by semester

	Number of Students in ACE and End of First Semester after ACE	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.
Accelerated	1,020	1.3	2.7	-1.4***	4.1	5.3	-1.2***	6.0	7.2	-1.2**
Non-accelerated	162	1.6	2.4	-0.7*	3.8	4.7	-1.0	5.1	7.5	-2.4

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

NOTE: For second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 834 for accelerated students and 155 for nonaccelerated.

Figure 6. Cumulative transferable credits earned by semester, ACE participants in accelerated cohorts and matched comparison group



Full-Time Enrollment After ACE Semester

Full-time enrollment (based on the number of units attempted) in the first post-ACE semester (based on units attempted) is reported in table 8. Some 37 percent of accelerated ACE participants and 28 percent of comparable nonparticipants enrolled full time in the following

semester, a difference of 9 percentage points ($p < .001$). Nonaccelerated ACE participants were more likely than the comparison group to enroll full time in the semester following the ACE semester, but the difference did not reach statistical significance.

Table 8. Percentage enrolled full time in first semester after the ACE semester

	Number of Students in ACE and End of First Semester after ACE	Enrolled Full Time in First Semester after ACE		
		ACE	Comparison group	Diff.
Accelerated	1,020	37.2	28.1	9.0 ***
Nonaccelerated	162	35.8	29.6	6.2

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

Persistence

Table 9 reports one-semester persistence, defined as full-time or part-time enrollment at the same college in the semester after the ACE semester. Overall, 66 percent of accelerated ACE participants persisted to the next semester compared with 60 percent of comparable nonparticipants, a difference of 7 percentage points calculated before rounding ($p < .01$). Similarly, nonaccelerated ACE participants were slightly more likely to persist in the semester following the ACE semester, with 66 percent of ACE participants and 55 percent of nonparticipants persisting ($p < .05$).

Table 9. Percentage who persisted to first semester after the ACE semester

	Number of Students in ACE and End of First Semester after ACE	Enrolled Full or Part Time in First Semester after ACE		
		ACE	Comparison group	Diff.
Accelerated	1,020	66.0	59.5	6.5 **
Nonaccelerated	162	66.0	54.9	11.1 *

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

Completion of Degree-Applicable Math

As noted above, the Los Medanos College ACE program, unlike the others, includes degree-applicable math (one level below transfer level) as part of the curriculum in the ACE semester (even though few if any participants place at the college level in math) and prepares them to enroll in transfer-level math in the following semester. Table 10 and figure 7 compare degree-applicable math for Los Medanos ACE participants and comparable nonparticipants matched by characteristics including placement in mathematics. Nonparticipants who com-

pleted transfer-level math in the ACE semester were excluded from the analyses. It should be noted at the outset that these analyses of math completion are based on just over 100 ACE participants and an equal number of comparable nonparticipants at a single college, so the results should be interpreted accordingly.

Some 43 percent of ACE participants completed degree-applicable math in the ACE semester, compared with 12 percent of comparable nonparticipants, a difference of 30 percentage points before rounding ($p < .001$). By one semester after the ACE semester, 59 percent of ACE participants completed degree-applicable math, compared with 21 percent of comparable nonparticipants ($p < .001$). By the second semester after the ACE semester, 53 percent of ACE participants and 25 percent of comparable nonparticipants completed degree-applicable math ($p < .001$).

The reason for the apparent decline in ACE participants completing degree-applicable math between the first semester after the ACE semester and the second semester after the ACE semester is that the former analysis includes the cohort starting in fall 2012 and the latter analysis does not because the data were not available at the time. As it turned out, the fall 2012 cohort (the most recent) was by far the most successful of the five Los Medanos College cohorts in terms of math completion, with 96 percent of participants (24 out of 25) completing degree-applicable math by the end of the first semester after the ACE semester compared with 40 percent to 68 percent of ACE participants in the other four cohorts. Including the fall 2012 cohort would increase ACE participants' completion of degree-applicable math to over 59 percent.⁹

⁹ Although the results presented here do not show results by entering cohort, no fall 2010 or spring 2011 ACE participants apparently completed degree-applicable math in the ACE semester even though 65 percent and 39 percent, respectively, completed transfer-level math in the next semester. This seemingly anomalous result appears to be an artifact of coding of the Los Medanos College ACE math course in the fall 2010 and spring 2011 source data as not degree-applicable, either out of error or intentionally due to its provisional nature. In any case, the course was coded as degree-applicable starting in the fall 2011 source data and this discrepancy does not appreciably change the overall results.

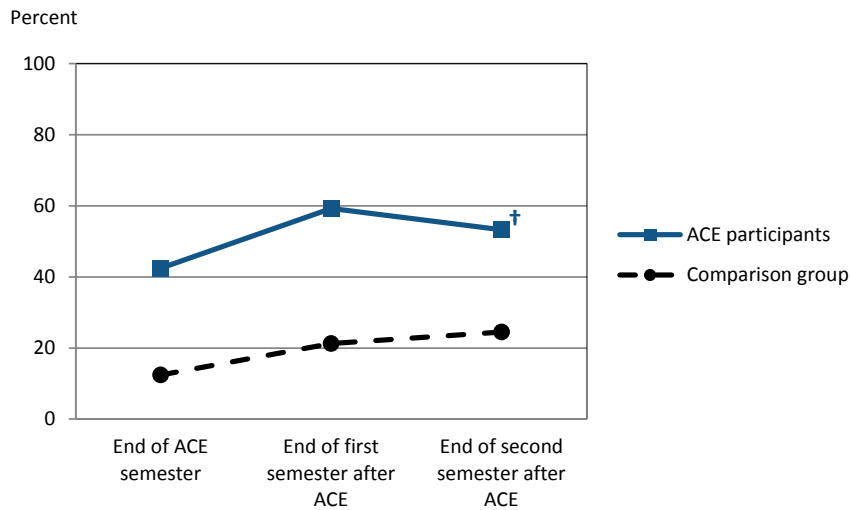
Table 10. Percentage of degree-applicable math completion by semester, Los Medanos College ACE participants and matched comparison group

	Number of Students in ACE and End of First Semester after ACE	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.
Los Medanos College	113	42.5	12.4	30.1***	59.3	21.2	38.1***	53.3†	24.5	28.8***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Figure 7. Degree-applicable math completion by semester, Los Medanos College ACE participants and matched comparison group



† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (fall 2013) were not available at the time this report was written.

Completion of Transfer Level Math

Participants at Los Medanos College who passed degree-applicable math in the ACE semester would be expected to enroll in transfer-level math in a subsequent semester. One semester after the ACE semester, 46 percent of ACE participants completed transfer-level math compared with 11 percent of nonparticipants, a difference of 35 percentage points ($p < .001$). Two semesters after the ACE semester, 40 percent of ACE participants completed transfer-level math compared with 12 percent of nonparticipants, a somewhat smaller difference but one that was still statistically significant at the .001 level.

As was the case with degree-applicable math, excluding the exceptionally successful fall 2012 cohort caused an apparent decline in completion of transfer-level math by the end of the second semester after the ACE semester. Once again this cohort clearly outshone the others, with 76 percent of ACE participants completing transfer-level math in the first semester after the ACE semester compared with 26 to 60 percent of other cohorts.

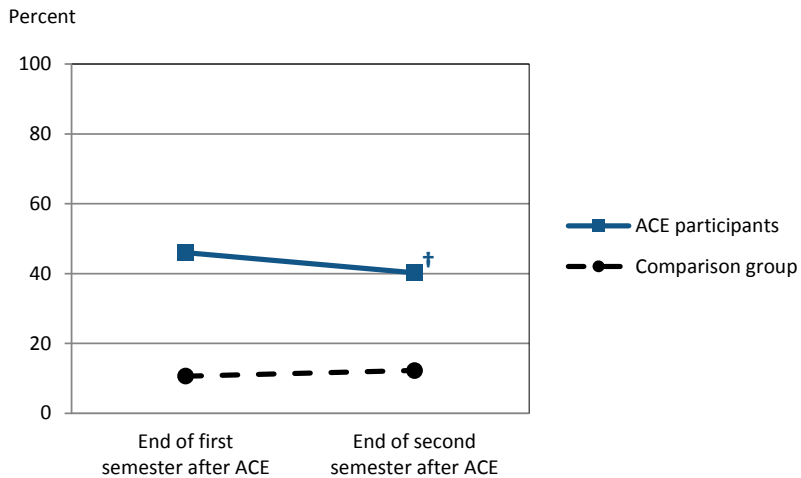
Table 11. Percentage of transfer-level math completion by semester, Los Medanos College ACE participants and matched comparison group

	Number of Students in ACE and End of First Semester after ACE	By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Comp. Group	Diff.	ACE	Comp. Group	Diff.
Los Medanos College	113	46.0	10.6	35.4***	40.2†	12.2	28.0***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Figure 8. Percentage of transfer-level math completion by semester, Los Medanos College ACE participants and matched comparison group



† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Completion of Both Degree-Applicable English and Degree-Applicable Math

Ultimately, many ACE participants need to complete both degree-applicable English and degree-applicable math, either to fulfill the requirements for an associate’s degree and/or as a stepping stone toward completing both transfer-level English and transfer-level math in order to transfer to a UC or CSU campus. At Los Medanos College, 40 percent of ACE participants completed both degree-applicable English and degree-applicable math, while only 3 percent of nonparticipants did the same, a difference of 37 percentage points (table 12). By the end of the first semester after the ACE semester, 58 percent of ACE participants and 12 percent of nonparticipants completed both degree-applicable English and degree-applicable math, an even larger difference of 45 percentage points. The percentage of ACE participants completing both courses shrank to 52 percent by the end of the second semester after the ACE semester, but again this seemingly inconsistent result was driven by the exclusion of the highly successful fall 2012 cohort. All differences were statistically significant at the .001 level.

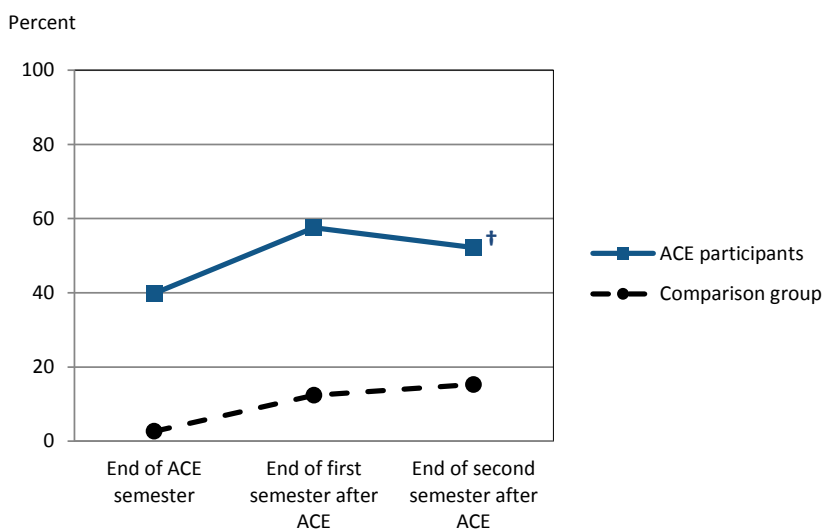
Table 12. Percentage of degree-applicable English and math completion by semester, Los Medanos College

	Number of Students in ACE and End of First Semester after ACE	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.	Comp. ACE	Group	Diff.
Los Medanos College	113	39.8	2.7	37.2***	57.5	12.4	45.1 ***	52.2†	15.3	36.9***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Figure 9. Percentage of degree-applicable English and math completion by semester, Los Medanos College ACE participants and matched comparison group



† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Completion of Both Transfer-Level English and Transfer-Level Math

Finally, by the end of the first semester after the ACE semester, 35 percent of ACE participants completed both transfer-level English and transfer-level math, 30 percentage points higher than the 4 percent of nonparticipants who did the same ($p < .001$) (table 13 and figure 10). After two semesters, the percentage of ACE participants who completed both transfer-level English and transfer-level math dipped to 28 percent as compared with 7 percent of nonparticipants ($p < .001$), but once again this anomalous result is due to the exclusion of the fall 2012 cohort.

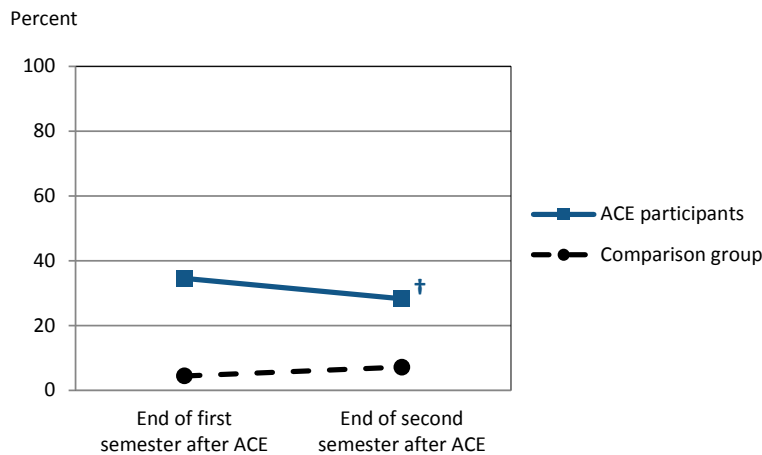
Table 13. Percentage of transfer-level English and math completion by semester, Los Medanos College

	Number of Students in ACE and End of First Semester after ACE	By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Comp. Group	Diff.	ACE	Comp. Group	Diff.
Los Medanos College	113	34.5	4.4	30.1***	28.3†	7.1	21.1***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Figure 10. Percentage of transfer-level English and math completion by semester, Los Medanos College ACE participants and matched comparison group



† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Summary of Student Achievement Outcomes

Table 14 summarizes the results for the 10 outcomes described above. ACE participants were substantially more likely to complete degree-applicable English than a matched group of nonparticipants by the end of the ACE semester or the following semester, although by two semesters after the ACE semester the gap narrowed modestly. Likewise, ACE participants completed transfer-level English at an appreciably higher rate than comparable nonparticipants. ACE participants earned an average of 11 degree-applicable credits during the ACE semester, considerably more than the 4 credits earned by the comparison group, and this 7 credit difference persisted over the following two semesters. (These results were also largely reinforced in a supplementary analysis comparing ACE participant with a matched comparison group limited to full-time nonparticipants and reported in appendix tables A4 through A14.) But ACE participants lagged slightly behind nonparticipants in accumulating transferable credits, though even after three semesters, neither group earned very many credits on average toward the 60 transferable credits needed to transfer with upper-division standing.

Some 37 percent of ACE participants enrolled in college full time in the next semester compared with 28 percent of comparable nonparticipants. Including part-time enrollment yielded a less pronounced difference, with 66 percent of ACE participants persisting to the next semester and 60 percent of comparable nonparticipants persisting. At Los Medanos College, which offers accelerated math as part of the ACE curriculum, 59 percent of ACE participants completed degree-applicable math or higher by the end of the first semester after

the ACE semester compared with 21 percent of comparable nonparticipants. Also, 46 percent of ACE participants completed transfer-level math by the end of the semester following the ACE semester, compared with 11 percent of comparable nonparticipants.

Table 14. Summary of outcomes

Outcome	ACE Accelerated Participants	Comparison Group
Passed degree-applicable English by end of ACE semester	51.1%	12.7%
Passed degree-applicable English by end of first semester after ACE semester	58.2%	24.1%
Passed degree-applicable English by end of second semester after ACE semester	60.3%	28.8%
Passed transfer-level English by end of first semester after ACE semester	20.3%	8.9%
Passed transfer-level English by end of second semester after ACE semester	23.1%	13.3%
Mean degree-applicable credits earned during the ACE semester	10.8	4.0
Mean degree-applicable credits earned by end of first semester after ACE semester	14.6	7.6
Mean degree-applicable credits earned by end of second semester after ACE semester	17.0	9.9
Mean transferable credits earned during the ACE semester	1.3	2.7
Mean transferable credits earned by end of first semester after ACE semester	4.1	5.3
Mean transferable credits earned by end of second semester after ACE semester	6.0	7.2
Full-time enrollment in first semester after ACE semester	37.2%	28.1%
Persistence to the first semester after ACE semester	66.0%	59.5%
Passed degree-applicable math by end of first semester after ACE semester (Los Medanos College)	59.3%	21.2%
Passed degree-applicable math by end of second semester after ACE semester (Los Medanos College)	53.3%	24.5%
Passed transfer-level math by end of first semester after ACE semester (Los Medanos College)	46.0%	10.6%
Passed transfer-level math by end of second semester after ACE semester (Los Medanos College)	40.2%	12.2%
Passed both degree-applicable English and degree-applicable math by end of first semester after ACE semester (Los Medanos College)	57.5%	12.4%
Passed both degree-applicable English and degree-applicable math by end of second semester after ACE semester (Los Medanos College)	52.2%	15.3%
Passed both transfer-level English and transfer-level math by end of first semester after ACE semester (Los Medanos College)	34.5%	4.4%
Passed both transfer-level English and transfer-level math by end of second semester after ACE semester (Los Medanos College)	28.3%	7.1%

NOTE: Results are combined for all accelerated ACE participants unless otherwise noted. Maximum N = 1,020 participants and 1,020 nonparticipants.

3. Effect of ACE Participation on Affective Precursors to Academic Achievement

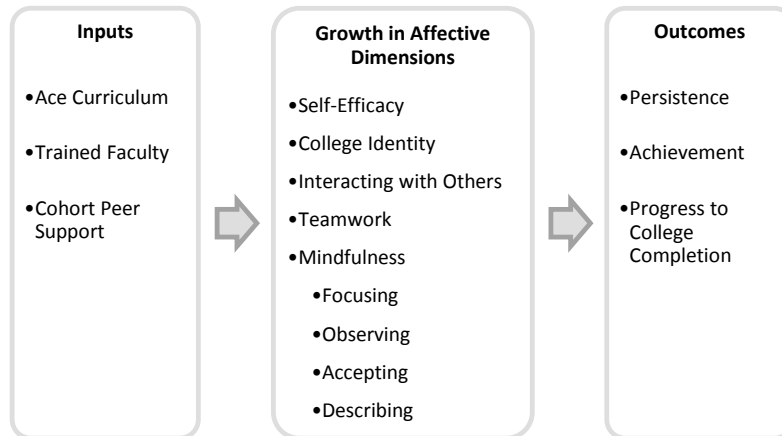
Student achievement measures are of primary importance in describing the effects of participation in the ACE program. However, achievement indicators do not tell the full story of ACE. The rationale for the design of the ACE model—as described by the founder, Diego Navarro—is that factors associated with the affective dimension are necessary precursors to being successful in school and life and that students who enroll in the ACE program typically have not developed these skills due to the negative circumstances of their lives and their prior negative experiences as students. ACE posits that its program leads to transformational changes in factors represented in the affective dimension and that these changes in students’ increased understanding of themselves and others are critical precursors to academic success.

To understand what effect the ACE program has on student growth in key affective precursors to academic achievement—self-efficacy, college identity, interacting with others, teamwork, and mindfulness—RTI International researchers, in collaboration with Martin Chemers and ACE Staff, developed a survey instrument called the College Student Self-Assessment Survey (CSSAS). This survey incorporated several sections from an earlier ACE survey instrument known as the Self-Efficacy Assessment (SEA). Figure 11 shows the general theory of action described in figure 2, expressed in terms of the measures of affective factors actually used in this study.

The CSSAS was administered as a web-based survey to ACE students at all six of the colleges participating in this study in all six semesters covered by this study: fall 2010, spring 2011, fall 2011, spring 2012, fall 2012, and spring 2013. ACE Students were surveyed at three points in time: Time 1, prior to the Foundation Course; Time 2, at the end of the Foundation Course; and Time 3, at the end of the ACE semester. To measure change over time, a scale score was calculated for each of the affective dimension factors, along with the mean score for each factor at each time point. Matched-samples *t*-tests were then used to determine if the mean score changes were statistically significant between Time 1 and Time 2 and also

between Time 1 and Time 3. In addition to mean scores, the percentage of students scoring in the top quarter of each factor scale at each time point was calculated.¹⁰

Figure 11. Conceptual model of how affective dimensions measured by CSSAS fit into the ACE process



College Student Self-Assessment Survey (CSSAS) Design and Validation

The CSSAS was designed to identify and measure growth in important psychological constructs that are theorized to be critical precursors to college success for ACE students. The CSSAS is based on several validated survey instruments used in other research studies to measure factors related to the affective dimensions that are addressed in the ACE program. Each of these factors has published evidence in refereed journals and is based on theory. Table 15 shows the eight factors measured by the CSSAS (grouped into three general categories) and the sources for the survey items. Appendix table A1 provides a detailed list of research literature associated with each factor.

¹⁰ The scale is based on the number of items contained within each factor. For example, self-efficacy consists of 11 items, for a total scale score of 55 (5 points per item). Students who scored 44 or above would be in the top quarter of the self-efficacy scale. On the other hand, identity consists of 3 items, for a total scale score of 15. Students who scored 12 or above would be in the top quarter of the identity scale.

Table 15. CSSAS constructs and sources

Affective Dimension	Section and Description of Items	Sources ¹
1. Self-Efficacy	Items relating to one’s confidence in successfully completing school-related tasks and in one’s ability to regulate learning and study behaviors. Also includes items related to students’ hopes regarding their academic futures. Respondents rate the extent of their agreement on each statement using a five-point scale (1 = Strongly disagree; 5 = Strongly agree).	Academic Self-Efficacy Scale by Chemers, Hu, & Garcia (2001); Efficacy for Self-Regulated Learning Scale by Zimmerman, Bandura, & Marinez-Pons (1992); Domain Specific Hope Scale by Shorey & Snyder (2004).
2. College Identity	Items relating to identifying as a college student, communication skills, and aspects of	Drafted by Dr. Martin
3. Teamwork	personal responsibility that affect interaction	Chemers based on
4. Interacting with Others	with others. Respondents rate the extent of their agreement on each statement using a five-point scale (1 = Strongly disagree; 5 = Strongly agree). Also includes two items on anticipated stress and ability to handle challenging stress levels, measured on a five-point scale.	previous survey research in each domain (2010); Personal Responsibility Questionnaire by Merger, Spencer, & Patton (2004).
Mindfulness, including	Items relating to being mindful of one’s ability to focus on tasks, and one’s inner state, through observing, describing, and accepting one’s actions, thoughts, and behaviors. Respondents rate themselves on the truth of specific statements, on a five-point scale (1 = Never or rarely true; 5 = Very often or always true).	Kentucky Inventory of Mindfulness Skills by Baer (2004).
5. Focusing		
6. Accepting		
7. Observing		
8. Describing		

¹ See the References section for full citations.

A multi-step process was used to determine the validity of the CSSAS instrument, including:

1. Administering a pilot survey to a sample of ACE students in spring 2010;
2. Conducting an exploratory factor analysis of pilot results to determine items to retain or drop from the survey;
3. Administering a streamlined survey to all ACE students in fall 2010 and spring 2011. Additional items from the prior self-efficacy survey developed at Cabrillo College were added before the Time 3 administration in fall 2010 to broaden the self-efficacy measure;
4. Checking the validity of the survey and factors using Time 1 results from fall 2010 and spring 2011. No items were dropped from the survey;

5. Administering the CSSAS during student assessment periods to all incoming students at Cabrillo and Hartnell Colleges in fall 2011 in addition to all ACE students at the six participating colleges;
6. Conducting a final exploratory and confirmatory factor analysis on the entire sample of Time 1 surveys, including those from ACE participants and nonparticipants. The original 10-factor model was changed to the final 8-factor model based on the results of the Confirmatory Factor Analysis;
7. Rerunning all analyses of change over time in CSSAS factor scores for all terms using the final 8-factor model.

The rest of this section describes these steps in more detail and presents the results from rerunning of all the analyses using the final 8-factor model.

Limitations of CSSAS Analysis

ACE students were surveyed in fall 2010, spring 2011, fall 2011, spring 2012, fall 2012, and spring 2013. Because the study examines change over time, the analysis is necessarily limited to ACE students who completed all surveys at all three time points. The total N for the analysis of change over time is 769 students from the six colleges with ACE programs. A breakdown of respondents by college is presented in table 6.

Table 16. CSSAS respondents by college: Fall 2010–spring 2013

	N	%
Berkeley City College	74	10%
Cabrillo College	401	52%
Delaware County Community College	93	12%
Hartnell College	104	14%
Las Positas College	17	2%
Los Medanos College	80	10%
Total	769	100%

The observed changes over time in this analysis may not be representative of the change for all ACE students because only 769 out of approximately 1,600 ACE students enrolled from fall 2010 to spring 2013 completed all three surveys, reflecting the challenges that ACE staff had in trying to make sure that all ACE students at six different campuses took the CSSAS at all three time points.

Exploratory and Confirmatory Factor Analysis of CSSAS

As indicated above, the creation of the CSSAS was based on a pilot survey jointly designed and developed by RTI and ACE staff and given to a small sample of ACE students in the spring of 2010. The pilot survey measured factors within the affective dimension similar to those that appear in the CSSAS, but the survey was much longer and needed to be streamlined. Exploratory Factor Analysis (EFA) was used to determine which underlying constructs emerged from the survey data and which items could be dropped from the survey. Exploratory Factor Analysis reveals the number of factors produced by a survey and measures how well the items in the survey measure each of the factors. As expected, the EFA revealed the affective dimensions theorized to be measured by the survey, including self-efficacy, interaction with others, teamwork, college identity, and several aspects of mindfulness.

Items with low factor loadings on a construct were eliminated because they did not provide a good measurement indicator for that construct. Also, items that cross-loaded onto more than one factor were eliminated because they did not do a good job of differentiating between factors. Items with the highest loadings on each factor were retained, while lower scoring items were dropped to decrease the length of the survey. EFA allows for parsimony in measurement of factors because items can be removed without sacrificing reliability or validity. Each identified factor was also subjected to a reliability test using Cronbach's Alpha, and scores for each factor were good, ranging from .71 to .92. After low-performing items were removed, the revised CSSAS was administered in fall 2010 to all ACE participants at the beginning of the ACE semester. It was administered again two weeks later and then again at the end of the ACE semester. Exploratory and Confirmatory Factor Analysis (CFA) of these administrations of the CSSAS confirmed the validity of the instrument. Confirmatory Factor Analysis revealed high overall measurement scores for each factor, plus high factor loadings for each measured item. Cronbach's alpha reliability scores also were good, in the .70 to .95 range for each dimension.

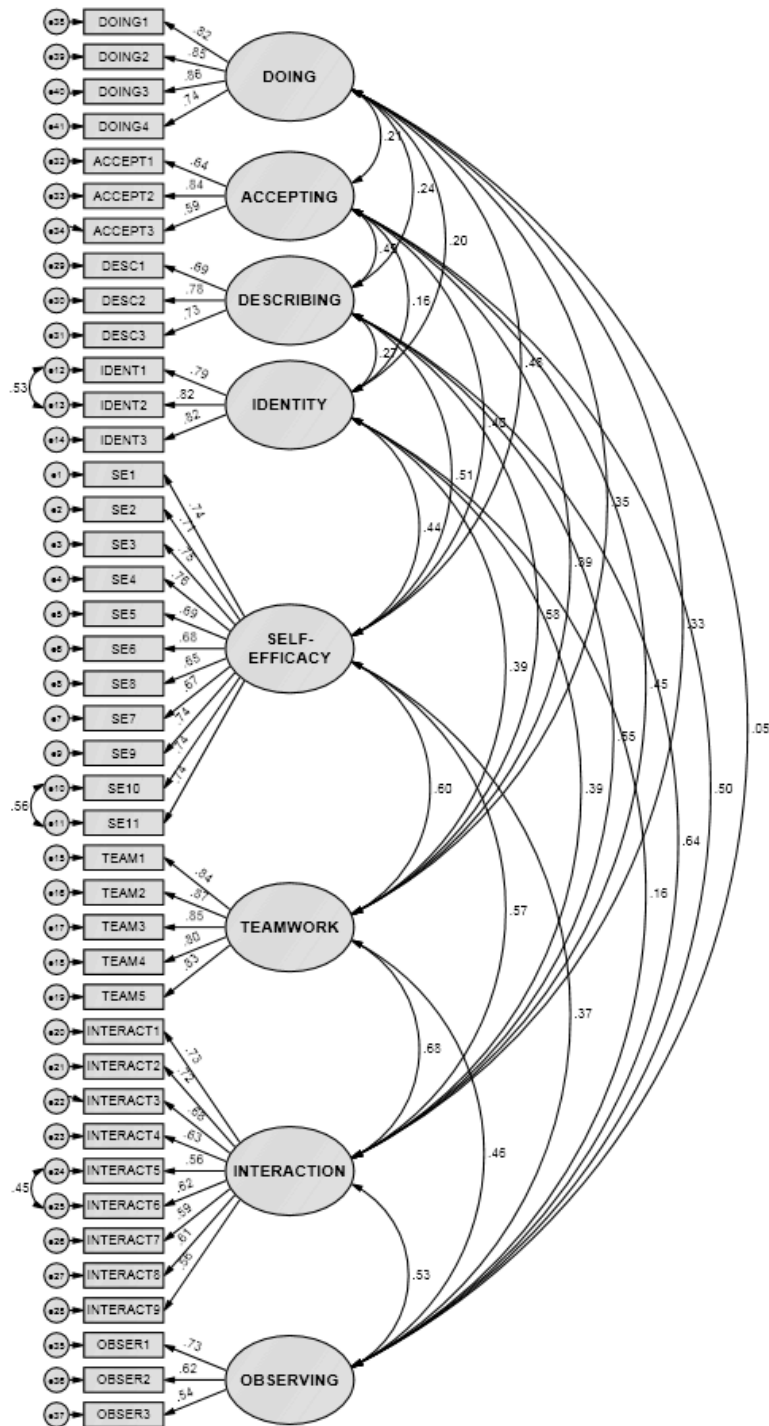
RTI and ACE staff continued to pilot the CSSAS instrument in spring 2011 with students participating in ACE. Exploratory and Confirmatory Factor Analysis were used after each administration to examine the validity of the instrument and determine if items were performing poorly. Confirmatory Factor Analysis follows Exploratory Factor Analysis in the research process. In CFA, the researcher specifies which items load on to identified factors, instead of allowing the computer software (Mplus 6.0) to determine which items cluster together as factors based on statistical characteristics.

Final factor analyses of the CSSAS were conducted using the combined survey results from administration of the Time 1 Survey to ACE participants in fall 2011, as well as the school-wide CSSAS administered to nonparticipants in fall 2011. Exploratory and Confirmatory Factor Analysis are large-sample techniques, so using all the survey results provided addition-

al validity for the results. The final sample size was 1,369. Appropriate analysis techniques also require that the EFA and CFA be conducted on different random samples pulled from the entire dataset. Using the same data for both analyses may yield unreliable results. Having a large sample size allowed RTI to use a random sample of 40 percent of the survey takers for the EFA and the remaining 60 percent of the survey takers for the CFA. Items were dropped from the CSSAS model if the EFA or CFA revealed that items had low factor loadings or loaded on to more than one construct.

The results for the Confirmatory Factor Analysis of the model are shown in figure 12. This model provides the factor loadings for each of the items on each affective dimension factor as well as the correlation between each factor. Ideally, in Confirmatory Factor Analysis, factor loadings will be above .40 and correlations of latent factors (the affective dimensions in the large circles) will be less than .70. The figure shows that the CSSAS meets both of these criteria. The factor loadings are all above .50 and the factor correlations are less than .70. The correlation between factors is used to determine if factors are measuring separate constructs or if they should be collapsed into one smaller factor (generally if the correlation is higher than .80). These results suggest that the CSSAS is a valid instrument.

Figure 12. Confirmatory Factor Analysis model of CSSAS



Another way to measure the validity of an instrument is to use CFA to generate fit statistics for the model. These fit statistics measure the model as a whole, while the size of the factor loadings measure the validity of each individual construct and item. Standard fit statistics reported in the research literature include the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). All fit statistics for the data tested here met the criteria required to claim that a survey is a valid and reliable instrument (table 17). An RMSEA score below .05 is considered necessary to indicate a well-fitting model. Scores between .05 and .07 are adequate, between .08 and .10 are poor, and any score above .10 indicates that the model is not acceptable. In addition, a 90 percent confidence interval for the RMSEA score should not exceed .10 on the upper-bound level. The model tested using the fall 2011 survey data had an excellent RMSEA score (.042), and the confidence interval had an upper-bound level below .05. Scores above .90 on the CFI indicate a good model, and scores above .95 indicate excellent model fit. The CFA of the model tested here and depicted in figure 9 produced CFI results of .948, indicating that the model is very strong. The final fit statistic, the SRMR, should provide values as close to 0 as possible. The score for this analysis was .038, again indicating excellent fit of the model. Reliability scores are reported along with survey items and factor loadings in appendix table A2. Correlations among the latent factors are reported in appendix table A3.

Table 17. Fit statistics for Confirmatory Factor Analysis of fall 2011 CSSAS

	RMSEA	RMSEA 90% Confidence Interval	CFI	SRMR
School CSSAS (N = 821)	0.042	0.039 to 0.044	0.948	0.038

To further confirm the validity of the instrument, Cronbach’s Alpha reliability scores were calculated along with the EFA and CFA analyses. Cronbach’s Alpha is widely used in the research community to determine the reliability of survey instruments, with .90 indicating excellent fit and scores above .70 indicating adequate fit for a model to be accepted as a reliable indicator of the constructs being measured. The Cronbach’s Alpha score for the overall instrument was .94, considered excellent. Individual reliability scores were also conducted on each construct and generated scores ranging from .66 to .95, again indicating that each construct is reliable in addition to the survey in its entirety being a reliable measure.

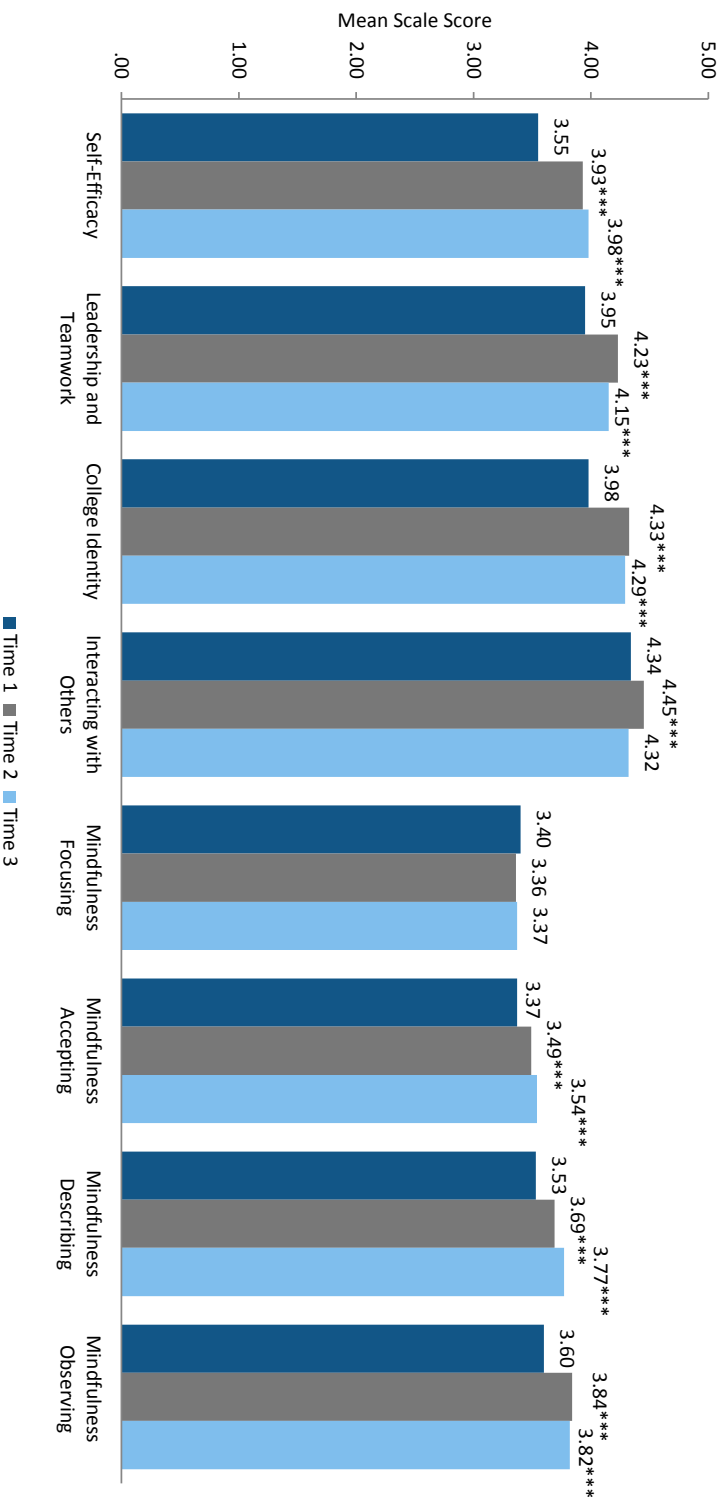
Based on these findings, RTI determined that the CSSAS had high validity and reliability, and the instrument was considered final as of fall 2011. The final instrument consists of 41 items measuring affective dimension factors as well as two items measuring students’ response to stress.

Change in ACE Student Scores Over Time

To analyze the CSSAS findings, scale scores were created for each factor. Each survey item consisted of a scale from 1 to 5. Items in each factor were added together and divided by the number of items to arrive at a standardized scale of 1 to 5 points for each factor, regardless of the number of items included. Mean scores were derived for each time point the CSSAS was administered: Time 1 before the Foundation Course, Time 2 after the Foundation Course, and Time 3 at the end of the ACE semester. Figure 13 shows the mean scores for each factor at each of the three time points. Results were tested using a matched samples *t*-test to determine if the change over time from Time 1 to Time 2 and from Time 1 to Time 3 were statistically significant. Significance results are indicated by asterisks in figure 10. Details of the *t*-test results are provided in appendix table A4.

Overall, students improved in their mean scores over the course of their ACE experience. The biggest growth is seen between Time 1 and Time 2, which makes sense given that the two-week Foundation Course focuses on building students' capacity in each of the affective areas. The only factor that does not show a significant mean score increase over this time period is Mindfulness – Focusing. Between Time 2 and Time 3 (i.e., before and after the ACE semester), students either remained at the same level or improved slightly, with the exception of the Focusing and the Interacting with Others factors, which are not significantly different from Time 1. These results indicate that students are maintaining the gains they made during the intensive Foundation Course.

Figure 11. Mean scores on CSSAS factor scales of ACE participants by survey time point: Fall 2010—spring 2013



*** $p < .001$.
 NOTE: $N=769$. Survey responses were based on a five-point scale, from “strongly disagree” to “strongly agree” for the nonmindfulness items and from “never or very rarely true” to “always or almost always true” for the mindfulness items. Each factor consisted of different numbers of items. Individual scores on each item in a factor were added together and divided by the number of items to arrive at a standardized scale of 1 to 5 points for each factor, regardless of the number of items included. The y-axis represents the mean (average) score for each factor.

Analysis of CSSAS change results among colleges participating in the study show that there is variation in school populations on the affective dimension factors measured by the CSSAS, even within the ACE program. Table 18 shows mean factor scores at each time point broken out by college. The differences indicate that the CSSAS is able to detect differences among varying student populations and suggests that the CSSAS could be a useful instrument for evaluating students' need for support programs based on their affective dimension profile. The colleges are not identified by name because the sample size for some of the colleges is small and might compromise the personal privacy of students at those schools or create unfair comparisons between campuses. Also, these results are presented for illustrative purposes to indicate the ability of the CSSAS to distinguish between different student populations and should be taken in the context that some of the sample sizes are small and may not be representative of the college or the ACE program as a whole.

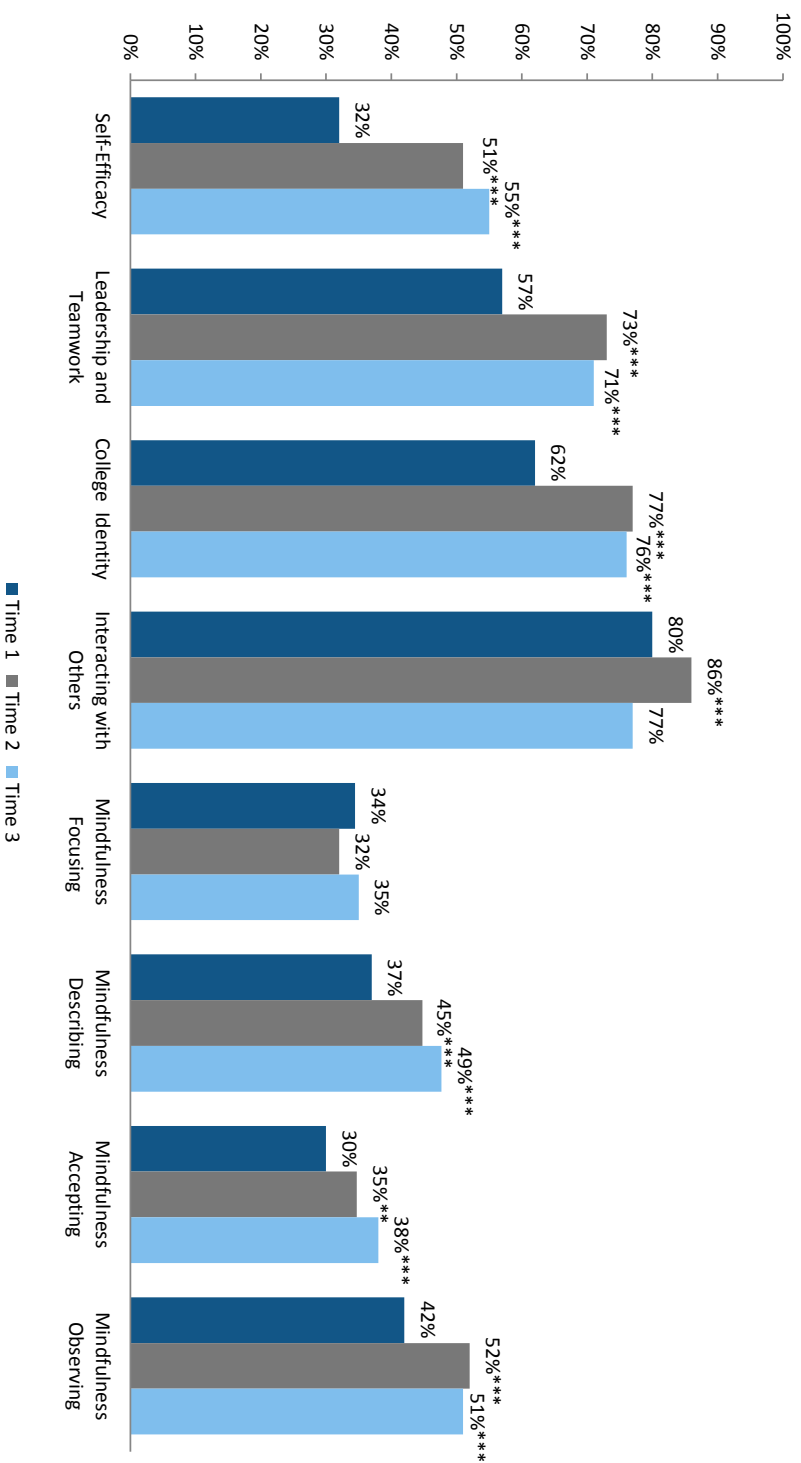
Table 18. Mean scores on CSSAS factors, by survey time point and college: Fall 2010–spring 2013

		College 1	College 2	College 3	College 4	College 5	College 6
Self-Efficacy	Time 1	3.80	3.41	3.64	3.50	3.43	3.88
	Time 2	4.00	3.88	3.99	3.91	3.52	4.07
	Time 3	4.04	3.98	3.93	3.81	3.62	4.17
Teamwork	Time 1	4.19	3.88	4.03	3.84	3.60	4.14
	Time 2	4.34	4.18	4.36	4.17	4.02	4.23
	Time 3	4.25	4.11	4.22	4.02	3.86	4.34
College Identity	Time 1	4.31	3.84	4.11	3.84	3.92	4.26
	Time 2	4.55	4.26	4.32	4.35	4.06	4.47
	Time 3	4.48	4.25	4.27	4.14	3.86	4.55
Interacting with Others	Time 1	4.49	4.27	4.38	4.41	3.96	4.48
	Time 2	4.50	4.42	4.50	4.44	4.19	4.54
	Time 3	4.37	4.29	4.24	4.35	3.95	4.52
Mindfulness Focusing	Time 1	3.48	3.33	3.50	3.26	2.84	3.82
	Time 2	3.45	3.35	3.45	3.22	2.71	3.41
	Time 3	3.44	3.36	3.28	3.27	3.10	3.62
Mindfulness Accepting	Time 1	3.43	3.35	3.42	3.27	3.18	3.50
	Time 2	3.47	3.50	3.50	3.49	3.45	3.48
	Time 3	3.43	3.58	3.42	3.48	3.20	3.73
Mindfulness Describing	Time 1	3.68	3.46	3.54	3.55	3.33	3.71
	Time 2	3.70	3.66	3.80	3.63	3.49	3.78
	Time 3	3.77	3.79	3.66	3.67	3.57	3.97
Mindfulness Observing	Time 1	3.58	3.60	3.63	3.64	3.33	3.62
	Time 2	3.69	3.87	3.88	3.89	3.65	3.84
	Time 3	3.65	3.90	3.78	3.75	3.37	3.89

NOTE: N=769.

To supplement the analysis of mean scores, RTI also calculated the percentage of students who scored in the top quarter of each factor scale for each of the time points. These percentages give an indication of the overall trend in student scores over the course of the ACE experience. Figure 14 shows the findings from this analysis. The trends mirror those shown by the mean scores analysis. Large gains occur between Time 1 and Time 2 in self-efficacy, teamwork, and college identity. These gains are maintained over the course of the ACE semester. Scores on the mindfulness dimensions are uniformly lower than the other four affective dimensions. Statistical significance test results are shown with asterisks and are also similar to those found in the analysis of mean factor scores.

Figure 12. Percentage of ACE students scoring in top quarter of CSSAS factor scales: Fall 2010–spring 2013



** $p < .01$; *** $p < .001$.

NOTE: $N=769$. The Y-axis represents the percentage of students who scored in the top quarter of the CSSAS factor scale. The scale is based on the number of items contained within each factor. For example, self-efficacy consists of 11 items, for a total scale score of 55 (5 points per item). Students who scored 44 or above would be in the top quarter of the self-efficacy scale. On the other hand, identity consists of 3 items, for a total scale score of 15. Students who scored 12 or above would be in the top quarter of the identity scale.

Comparison of ACE and Non-ACE Student Scores

To determine if ACE students differ from the general student population on the affective dimensions measured by the CSSAS, the Time 1 CSSAS was completed by non-ACE participants at three of the colleges—Cabrillo College, Hartnell College, and Los Medanos College. Attempts were made to capture all incoming students at the colleges by having students take the CSSAS during their new student assessment sessions. This procedure was in place at Cabrillo College and Hartnell College in fall 2011, spring 2012, and fall 2012. Non-ACE participants at Los Medanos College took the CSSAS voluntarily online as part of their college orientation in spring 2012 and fall 2012. Not all incoming students take assessments, however, so the sample of non-ACE participants may not be representative of all incoming students at Cabrillo College and Hartnell College. Because taking the CSSAS was voluntary for non-ACE participants the Los Medanos College results also may not be representative of the incoming classes. Sample sizes are sufficient, however, to provide some insight into differences among ACE participants and non-ACE participants on specific risk factors as well as the affective dimensions. Table 19 shows the sample sizes by term and college.

Table 19. Number of ACE and non-ACE participants taking Time 1 CSSAS, by college and term

Term	College	Non-ACE		Total
		Participant	ACE Participant	
Fall 2011	Cabrillo College	760	198	958
	Hartnell College	489	135	624
	Total	1,253	357	1,610
Spring 2012	Cabrillo College	692	71	763
	Hartnell College	92	51	143
	Los Medanos College	131	44	175
	Total	915	166	1,081
Fall 2012	Cabrillo College	433	119	552
	Hartnell College	339	170	509
	Los Medanos College	234	24	258
	Total	1,006	313	1,319
All Terms	Cabrillo College	1,885	388	2,273
	Hartnell College	920	356	1,276
	Los Medanos College	369	92	461
Total		3174	836	4010

The Time 1 CSSAS included some basic demographic questions, which allowed for comparison of ACE and non-ACE participants on such factors as parental education level, personal income, parental income, and first in family to attend college. Generally, students whose parents have low education levels, who are the first in their family to attend college, and who come from low-income homes are at greater risk of not enrolling or persisting in college. A comparison of these characteristics between ACE and non-ACE participants suggests that ACE students are more disadvantaged than their non-ACE peers (table 20). For example, 28 percent of ACE participants had parents who did not graduate from high school, compared with 17 percent of non-ACE participants. Nearly half of ACE participants reported being the first in their families to attend college, compared with about one-third of non-ACE participants.

Table 20. Percentage of ACE and non-ACE participants with various characteristics, from Time 1 CSSAS

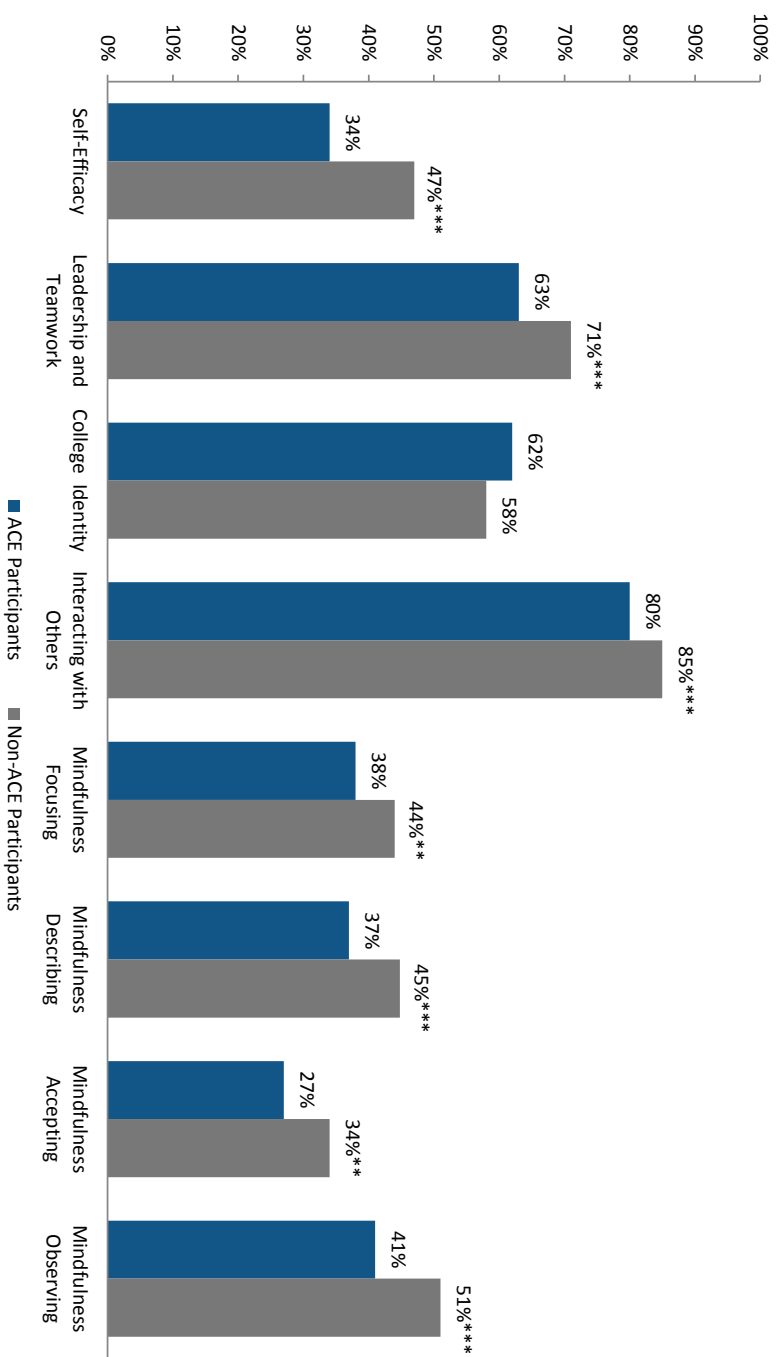
Characteristic	Non-ACE Participant	ACE Participant
Parental education		
Did not graduate high school	17	28
High school diploma/GED	21	25
Some college but no degree	17	10
Two-year degree	8	5
Four-year degree or higher	25	11
Don't know	12	22
Personal income		
\$0–\$10,000	55	74
\$10,001–\$30,000	16	11
\$30,000 or above	9	3
Do not know	20	12
Parental income		
\$0–\$10,000	13	24
\$10,001–\$30,000	20	31
\$30,000 or above	34	22
Do not know	33	24
First in family to attend college	34	49

To explore differences between ACE and non-ACE participants on the affective dimensions, the percentage of students scoring in the top quarter of the scale for each affective dimension was calculated for ACE participants (N=836) and non-ACE participants (N=3174) who took the Time 1 CSASS in fall 2011, spring 2012, and fall 2012.¹¹ Because of risk factors experienced by ACE students, it was anticipated that ACE students would score lower on measures of self-efficacy and the other affective dimensions measured by the CSSAS. The results confirmed this hypothesis.

Figure 15 below shows the percentage of ACE and non-ACE participants scoring in the top quarter of each affective dimension scale. The percentage of non-ACE participants scoring in the top quarter of the affective dimensions was higher across the board, with the exception of the College Identity factor. This result suggests that ACE participants face bigger challenges in school because of their lower scores on affective dimensions, which are theorized to be essential components of all students' academic success.

¹¹ The CSSAS was administered to non-ACE participants at three of the colleges in this study: Cabrillo College, Hartnell College, and Los Medanos College.

Figure 15. Percentage of ACE and non-ACE participants scoring in top quarter of CSSAS factor scales, fall 2011–spring 2012



** $p < .01$; *** $p < .001$.

NOTE: The y-axis represents the percentage of students who scored in the top quarter of the CSSAS factor scale. The scale is based on the number of items contained within each factor. For example, self-efficacy consists of 11 items, for a total scale score of 55 (5 points per item). Students who scored 44 or above would be in the top quarter of the self-efficacy scale. On the other hand, identity consists of 3 items, for a total scale score of 15. Students who scored 12 or above would be in the top quarter of the identity scale. Sample includes students from Hartnell, Los Medanos, and Cabrillo Colleges only. See table 19 for details of the sample population.

The most notable difference between ACE and non-ACE participants is seen in the Self-Efficacy factor. This factor measures how confident students are about their academic ability and their ability to be successful in school. Just 34 percent of ACE participants scored in the top quarter of this scale, compared to 47 percent of non-ACE participants. ACE participants begin their college career at a deficit in self-efficacy compared to their peers who may not have the same risk factors or challenging life situations. Results reported in figure 13 show that ACE students make significant gains on the self-efficacy measure over the course of the ACE program.

Another dimension where ACE participants lag behind their peers is Teamwork and Leadership. Although results for both groups are relatively high, at 71 percent for non-ACE participants and 63 percent for ACE participants, ACE participants still face a deficit of 8 percentage points in this area. Both ACE and non-ACE participants score lower overall as a group on the Mindfulness dimensions compared to all other dimensions except Self-Efficacy.

4. Student Self-Reported Effects of ACE Participation

The ACE program recognizes that academic ability is just one facet of student success. Students, particularly those who have not succeeded in traditional school environments in the past, often need to learn behaviors and attitudes essential to succeeding in college. To measure the impact of the ACE program on developing these behaviors and attitudes, ACE participants were asked to rate the extent to which they changed in ways that improved their college experience.

To obtain this information, selected items were drawn from ACE's original end-of-semester survey and added to the CSSAS administered at the end of the ACE semester. Surveys were administered at all six colleges participating in the ACE program in fall 2010, spring 2011, fall 2011, and spring 2012. A total of 926 surveys were collected and analyzed. Table 21 shows the number of respondents by college and term.

Table 21. Number of ACE participants responding to ACE-specific items on the CSSAS at the end of the ACE semester, by college and term

	Fall 2010	Spring 2011	Fall 2011	Spring 2012	Total
Berkeley City College	26	16	49	56	147
Cabrillo College	109	118	115	54	396
Delaware County Community College	26	16	25	17	84
Hartnell College	42	29	37	33	141
Las Positas College	40	8	25	0	73
Los Medanos College	16	20	15	34	85
Total	259	207	266	194	926

Behaviors Affecting the College Experience

Table 22 shows the percentage of students who agreed or strongly agreed that they had changed a behavior in positive ways that had a beneficial impact on their college experience. Approximately two-thirds of participants agreed or strongly agreed that they had made positive changes in “being ready to learn/caring about school,” “being more aware of me, others, and my surroundings,” and “acknowledging others.” Overall, more than half of participants reported making positive changes in all 21 behaviors listed in the survey, suggesting that

ACE is succeeding in its efforts to help students change their behavior in ways that will enable them to succeed in college.

Table 22. Percentage of CSSAS respondents at the end of the ACE semester who reported changing behaviors in ways that improved their college experience: Fall 2010–spring 2012

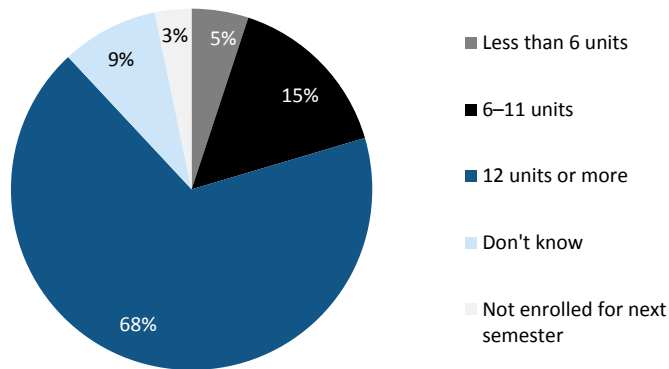
Behavior	Percent
Being ready to learn/caring about school	67
Being more aware about me, others, and my surroundings	66
Acknowledging others	65
Respecting others	64
Honoring others	64
Being responsible for choices I make in my life	64
Being more understanding and compassionate of others	64
Being dependable	64
Knowing how to focus/stay present	64
Paying attention	64
Completing assignments	63
Speaking in front of others	63
Being prepared and organized	63
Being able to reflect on how I feel	62
Making and keeping agreements	62
Thinking before speaking	59
Sharing in class	58
Judging people less	58
Asking questions in class	58
Being on time	56
Speaking nonviolently	54

N=927

Academic Plans and Goals

Survey items also provide insight into how participation in ACE has affected students' academic plans and goals. These measures are important indicators for student achievement because they demonstrate students' confidence in their ability to succeed academically and their sense of efficacy in regard to having a successful future. Two-thirds of students (68 percent) reported that they planned to enroll in 12 or more units in the term following the ACE semester, a course load generally accepted as full-time enrollment (figure 16). Another 15 percent of students planned to take 6–11 units. Just 5 percent planned to take fewer than 6 units and 3 percent did not plan to enroll for the following semester.

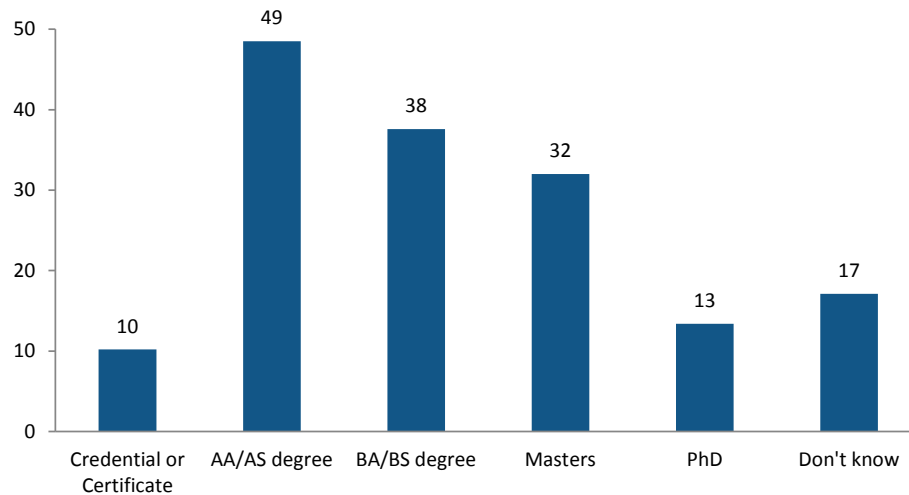
Figure 16. ACE respondents' plans for enrollment following ACE semester: Fall 2010–spring 2012



N=927

ACE students also reported ambitious long-term academic goals (figure 17). Approximately half of the students reported that they expected to earn an associate's degree and more than one-third expected to earn a bachelor's degree.

Figure 17. ACE respondents' academic goals: Fall 2010–spring 2012



N=927

For many ACE students, the ACE semester is the first semester of college coursework that they have attended full time. For students to complete the semester is an accomplishment in itself, but for students to also maintain a positive and ambitious outlook on the remainder of their academic career indicates a level of academic confidence that likely stems from their participation in the ACE program.

This conclusion is supported by respondents' answers to other questions about how participation in ACE affected their college experience. More than three-quarters of respondents (80 percent) agreed or strongly agreed that they were more motivated to finish college because of their experience in the ACE program. A similar percentage of students (78 percent) indicated that they were more likely to complete a credential, certificate, or degree because of the ACE program (table 23).

Table 23. Number and percentage of ACE students who agreed or strongly agreed with CSSAS statements about college: Fall 2010–spring 2012

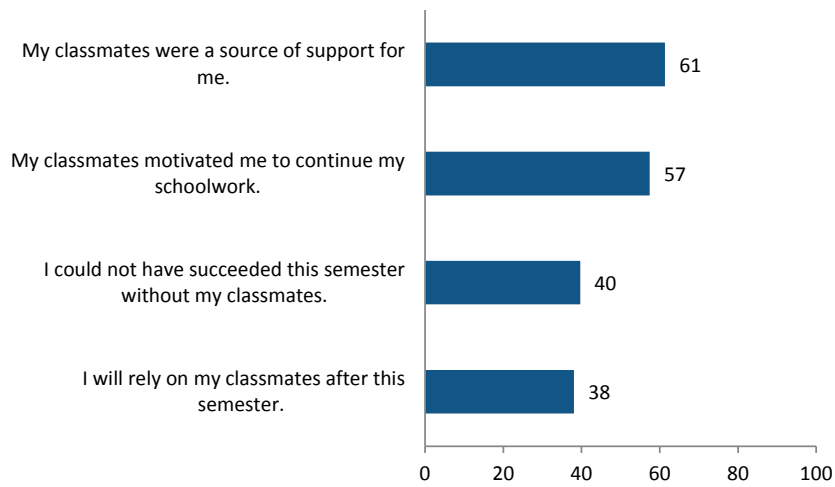
	N	Percent of total N
I am more motivated to finish college because of my experience in the program (N =882)	704	80%
I think I am more likely to graduate from this college because of my experience in the program (N = 882)	686	78%

Attitudes Toward the Cohort Model

Another aspect of the ACE design expected to have an effect on student persistence and achievement was the cohort model. As part of the ACE model, students stay together as a cohort through the Foundation Course and ACE semester. The Foundation Course and the Team Self-Management courses are designed to facilitate the development and maintenance of a peer-support network in the classroom. This conscious programmatic design allows students to form a supportive network of peers to rely on for academic and emotional support.

On the whole, students agreed that their ACE classmates were a positive influence during the ACE semester (figure 18). Over half of respondents agreed that their classmates were a source of support (61 percent) and motivation (57 percent) for them, while 40 percent agreed that they could not have succeeded in the ACE semester without the support of their classmates and 38 percent indicated that they will continue to rely on their cohort classmates for support after the ACE semester.

Figure 18. Percentage of ACE students who agreed or strongly agreed with statements about the cohort model: Fall 2010–spring 2012



Impact on Their Lives

Open-ended items on the survey administered at the end of the ACE semester asked participants to indicate whether they had changed as a result of being in the program and if so, in what ways. They were also asked about the impact of the program on their lives and about new decisions they had made about their future. Nearly half of the respondents reported that they had made new decisions about their future and more than three-quarters indicated that they had changed as a result of participating in the ACE program (table 24).

Table 24. Student responses to items about impact of ACE on their lives: Fall 2010–spring 2012

Number and percent of students answering “yes” to the following items	N	Percent
Have you made any new decisions about your future based on your experience in the program? (N=861)	434	50%
Do you think you have changed as a result of being in the program? (N =873)	685	78%

When asked to elaborate on the ways their lives had changed, students provided answers that were coded for patterns and placed in the order of frequency with which they occurred (table 25).

Table 25. Open-ended responses from survey on how the ACE program had changed their life: Fall 2010–spring 2012

Response	Number of Responses
Increased confidence	42
Increased motivation for education or established identity as college student	41
Better understanding of self	34
Better relationships and teamwork skills	21
Improved time management skills	19
Better outlook on life	15
Improved communication skills	11
More responsible	8

Among the 243 respondents who reported that they had made new decisions, 107 specified the decisions they had made, which fell primarily into two categories: furthering their education (73 responses); and pursuing a particular career (34 responses).

5. Faculty, Administrator, and Student Perspectives

To document the implementation of the ACE program, including its variations, strengths, and challenges, site visits were conducted between 2010 and 2012 to all six colleges in this study. For each visit, protocols were developed for conducting interviews, focus groups, and observations. The protocols were developed based on a set of constructs derived from background interviews, review of documentations, and meetings with ACE staff. They were refined as more information was gathered about how implementation varied across sites.

Between April 2010 to April 2012, evaluators conducted 18 interviews with ACE program designers (2) and college administrators (16); engaged 36 ACE faculty either in individual interviews or in focus groups; conducted interviews or focus groups with 85 students, and conducted 32 classroom observations (table 26). Site visit data were collected at all six of the colleges implementing the ACE program and the responses were coded for major themes.

Table 26. Qualitative data collection during site visits, by year

Year	College	Program Designer Interview	Administrator Interview	Faculty Interview or Focus Group (number of faculty)	Student Interview or Focus Group (number of students)	Classroom Observation
2010	Cabrillo College	2		9	10	4
2011	Berkeley City College		1	2	8	2
	Cabrillo College		2		16	6
	Delaware County Community College		1	4	9	4
	Hartnell College		3	6	10	3
	Las Positas College		1	4	5	1
2012	Berkeley City College		1	1	8	2
	Cabrillo College		1	3	9	5
	Hartnell College		3	6	8	3
	Los Medanos College		3	1	2	2
Total		2	16	36	85	32

Faculty and Administrators

Faculty who teach in the ACE program find it to be stimulating and rewarding. They also find that it takes a lot of energy and can be emotionally draining.

In general, faculty who were interviewed reflected a very strong commitment to the program and a strong sense that it had clearly transformed the lives of many of the students who participated and, in some cases, their own lives as well. Many who were interviewed had developed a clear passion for the program and identified clear, measurable benefits for the students who participated. Some were particularly supportive of specific aspects of the model, such as acceleration, that is, the requirement that students take more advanced English or math and a full load of coursework during the Bridge semester. Some of the comments that were made in interviews when they were asked about their general reactions included that it gave them a “profound sense of purpose,” that it encouraged them to think differently and that it “really humanizes us.” At one college where they had been planning to initiate something similar to ACE, the faculty reported that they were “blown away because [ACE] was much more sophisticated than what we were trying to do at the time.” Most also reported feeling part of a community of practice and that the program affected their teaching in significant ways. One person who reported that she had spent a semester teaching outside of ACE said that she found herself to be much more innovative in her teaching. Others reported using the techniques they had learned, “Whip-its” and “Light-and-Livelies,” in other classes or in meetings of other groups. In comparing ACE to developmental or remedial programs, an important observation was that “ACE is bigger than remediation; the flaw with remediation is the assumption about accumulating skills.” All faculty interviewed acknowledged that the intent of ACE and the outcomes associated with it are way beyond and more productive than what is accomplished in most developmental courses or programs. Administrators at one college who reported that they had a narrower definition of risk than Cabrillo did saw it as an opportunity to “satisfy the needs of developmental students, a more structured approach that didn’t allow them to malingering.”

As with most new and innovative programs, however, there were also comments about challenges. One faculty member reported that he knew of some who were teaching “to the script,” while he felt that faculty should inject some of their own thinking and be a bit more flexible about how they implemented it. Another faculty member commented on how individuals were recruited to participate, feeling that they were simply recruited because they were willing, not because they possessed the appropriate skill set.

Apart from these somewhat isolated adverse opinions, though, there were two areas where a more consistent message about the challenges for faculty was detected. The first had to do

with the “emotional upheaval” that often occurs in the core ACE courses, especially the Foundation Course, and occasionally the Team Self Management or Social Justice courses. Some felt that it could be difficult for faculty who “don’t know how to deal with intimate knowledge and emotional upheaval.” This individual reported that it “takes years to feel comfortable with this model.” Some have needed to take a break from teaching in the ACE program for a semester or more. Another faculty member felt that there needed to be more time for faculty and students to process their feelings, more time to debrief. “What we do in FELI and the Foundation Course is break down emotional makeup, and we may not spend enough time putting it back together.”

A second area of concern was expressed in a comment about a “deteriorating level of rigor” in the ACE courses. This came from an administrator who had been very supportive of the program and observed it for many years. She wasn’t sure whether the change came about because of the changing nature of student cohorts participating in the model or fears about ensuring the students could succeed. She felt strongly, however, that the high level of rigor she had observed in early cohorts needed to be sustained. This was also recorded in some of the observations conducted by RTI researchers, that is, that there was a considerable range in the level of rigor with which courses were taught, especially across colleges. The researchers noted that clearly a strong level of rigor was possible, given what they had observed, but that it wasn’t always reflected in the classes they saw. While they observed 32 classrooms, it still is not a random sample, and these classrooms were only observed one time. Thus, it is not possible to draw firm conclusions about this factor. It should be noted, though, that students in one or two of the focus groups also indicated that they would have liked a higher level of challenge. Since the cohorts even within colleges and certainly across colleges represent a wide range of ability levels, it is not surprising that there is variation in the level of rigor or challenge that faculty can maintain.

Faculty reported significant differences among cohorts and in student populations served at different colleges.

The general stated intent of the ACE model is that it is designed for students who are at high risk of failure due to the circumstances of their life histories. There have been continual questions raised, however, about whether the model is appropriate for all types of students. These are questions that are in need of additional research, but our observations over the last three years have revealed that the cohorts within each college and across colleges have differed markedly. While the most common marker still seems to be that the cohorts include a majority of students that would be considered to be “at risk”—Navarro has even referred to them as “ultra high-risk”—this is less true at some colleges or within some cohorts than others.

A lot of this variation depended primarily on how students were recruited. In some years, participants were recruited from drug rehabilitation centers or through probation offices. At Cabrillo College, some students were recruited from a local alternative high school. In some locales, there was a prevalence of Latino students and in others, there were far more African American students. At one college, the faculty reported that they had a high percentage (sometimes 50 percent) of learning disabled students because the college had established a reputation for serving those students well. At Hartnell College, where there is a strong nursing program, they instituted an ACE model within that program.

The variation in cohorts generated many comments from faculty, without much consistency in what was said. Faculty who were interviewed reported widely varying experiences with cohorts, only commonly noting that they had had very different experiences from one cohort to another. The question about the appropriateness of the ACE Program for all types of students was the only one that led to multiple comments about whether ACE was appropriate for younger students or those who would be considered low-risk. Some respondents felt that it was not appropriate for students just out of high school. One reported, “It works best for students who have hit a wall, are underprepared, students who have encountered real difficulty and some sort of readiness; it’s not great for students right out of high school.” Another faculty member noted, “Students from low-risk and wealthy backgrounds might be overwhelmed by the emotional sharing, and many are young and not ready for that kind of interaction and emotional bonding. They may never have encountered people from high-risk backgrounds and don’t know how to respond to people talking about being in jail.” This faculty member did think, however, “there might be ways to manage the mix to mitigate that issue.” In fact, some reported that they liked the mixed-age cohorts and even felt that it was necessary. One person reported that participants who had done well in traditional education “were shell shocked; they complained about the experience.” While these were noted as observations that were made multiple times, they were by no means unanimous conclusions.

Despite the above-reported reservations about students for whom the model didn’t work as well, faculty members were definitive about the benefits for certain students. One noted: “For students who have been homeless, in prison, and in gangs—you don’t often hear of people coming back from that, but it happens in ACE.” At the college with a high percentage of learning disabled students, the faculty interviewed reported that students often have developed problems with authority and are angry: “They come to us, and they’re still angry, but that almost always goes away.”

RTI staff were struck by the number of times it was reported that students repeated the program (perhaps not common in ACE, but notable when considering the benefits that students gain from the program). Clearly many participants recognized what the program had given them, and they thought that increasing the dosage would also increase those benefits. And as one faculty member reported, even those students who have not been in rehab experience a

transformation because they feel they're able to "address the skeletons in the closet." Perhaps one of the most poignant reports was about a student who didn't exhibit other high-risk factors, but he had a cleft palate and had endured an abundance of teasing throughout his education. In a required piece of writing, he wrote about "embracing the part of me that's lonely."

Despite initial skepticism on the part of some participants, most faculty members who participated in the Faculty Experiential Learning Institute (FELI) found the experience valuable and essential for teaching in the ACE program.

While there were a few comments from faculty who expressed reservations about particular aspects of the FELI, the vast majority reported experiences similar to those that students reported: "It transformed my life"; "It bridges intellect and affect"; and "It was deep and cathartic and revelatory." Some reported improved personal relationships, and most also reported positive effects on their teaching. As one said, "It helped me slow down. The phrase I learned was 'slow down to go fast.' I was able to see the importance of doing it." As context for this comment, he mentioned how he had always been racing through material, to make sure he covered the curriculum, without taking time to see his students as individuals with other things going on emotionally and cognitively that affect their learning in profound ways. Another faculty member noted that the experiential aspect gave her knowledge about what students would be doing and gave her opportunities to reflect and look into herself more deeply.

There were a few faculty members who reported discomfort with "sharing" and that they felt they couldn't take the risk. One noted that it felt very "cult-like." At one college, a faculty member interviewed noted that they had a counselor involved who had had clinical experience and that he felt that was important. (See separate evaluation report on the FELI for extensive detail.)

Faculty affirmed the need for leadership and college support for program to ensure sustainability.

This was an area that was commented on frequently by faculty who were interviewed. In some cases, they spoke of the absolute need for support from the college—writ large—if the program is to be sustained, and in many cases, they expressed sadness or disappointment that there was not greater support. While they drew considerable strength from those within the ACE community, they felt the sting of others' nonsupport. This was sometimes in the form of inadequate funding or in the presentation of barriers to scheduling courses (since the program was multi-disciplinary) or classroom space. There were comments about losing space and feeling chastised because the numbers of students enrolled was "not meeting standards."

In California, the last 4–5 years have been particularly difficult for community colleges that have experienced drastic budget reductions, so it has been a difficult climate in which to garner support for a “learning community,” or some would say “boutique” programs where a faculty member teaches a relatively small and select group of students.

Other faculty reported that some of their peers were resistant to the idea of “acceleration,” and others expressed serious concerns about what they saw as increased risks from having the type of students who were recruited for ACE programs on campus. The most common expression of concern was for the stigma attached to ACE students or the way in which they were stereotyped. They knew the students felt it, and the students confirmed this in focus groups with them.

In general, the feeling expressed by a faculty member at a college outside of California was shared by others: [Installation of ACE] “could not have been done without upper administrative support.” Another administrator noted, “You really need an energetic champion who can figure out formal and informal power levers to pull to make things happen. [That person] needs to be tenacious.” A number of others mentioned how much of a problem it presents when supportive administrators leave.

A key area in which faculty reported the need for general college support was in recruitment of students. While some programs assumed almost full responsibility for recruitment, others were either depending on or about to depend on the general college recruitment process. Some noted that if counselors were not “on board,” did not support the program, or did not provide enough information so that potential students were fully informed, that the program suffered from low numbers or from the enrollment of students for whom the program really was not appropriate.

Faculty reported significant outcomes for students who participated in the ACE program, recognizing that success should be defined in different ways for typical students in the ACE program.

Without hesitation, faculty reported notable outcomes for students, and they often commented on the need to view progress or success in different ways for these students. In some cases, it seemed that they made such comments because they really did not know what the traditional achievement outcomes would show for their students. In fact, the results on achievement indicators in this report reflect significant academic outcomes for ACE participants. In one college where they were themselves monitoring academic indicators, the faculty member interviewed reported that “persistence and retention have been much higher; all [the results] were above college level, every way you slice it.” A faculty member at another college noted that the ACE course had the same English syllabus as other classes, but “what comes back from ACE students is always better, and there’s a higher completion rate.”

Other faculty made the following comments when responding to questions about student outcomes as a result of participating in the ACE program:

They gain agency, writing their own script for success as a student.

Their ability to “code-switch”—not leaving behind qualities that got them this far, but gaining access to a culture that will allow them to move forward.

Getting students to understand how to work with people and work around a common goal is a really important thing.

It makes them feel like they are a part of a larger discussion in the country on change; makes them feel in control of their lives—an empowering effect.

Their behavior changes; they come to class on time, come prepared.

They see themselves as having a purpose and a part in the big picture; realizing that they have the academic ability. Through working out some of their bad habits and learning new ones, they’re able to become academically successful.

They develop self-efficacy: learning how to function in a team, broaden strengths, not becoming victim to self-confidence issues.

The core elements and curriculum for the ACE program were praised by both faculty and administrators. While some felt that the Team Self Management course needed modifications, they expressed enthusiasm for the breadth and depth of the content provided in all of the core classes.

The ACE curriculum is carefully researched, planned, organized, and packaged—a fact that was universally appreciated by faculty who were interviewed. While there was a small degree of variation in whether they thought they should or could deviate from what was provided, they generally expressed considerable respect for what was included, noting sometimes that there was so much that it was relatively easy to be flexible, given the constraints of any particular teaching situation.

Some aspects of the curriculum or the program were identified as being particularly strong. These are discussed below.

Most faculty members liked the Social Justice course and the focus on related topics. One noted that students “leave with an understanding that society operates on a large-scale system of ownership and how inequalities are structural and historical, play out throughout our

lives. I want them to have a sense that they can shape outcomes for themselves and others; that they can become historical agents; think critically, evaluate ideas, refute or substantiate ideas with data, and make sense of numbers.” In one case, a faculty member expressed a desire for more cultural relevancy to her community. She felt there was a need for more topics that were suited or were of concern to her students’ community.

Most faculty members reported that they had departed either a little or a lot from the Team Self Management curriculum. While they understood the intent and valued the general concepts, they indicated a strong need for revision. One faculty member noted that his college had revised 75 percent of that curriculum. In response to these concerns, the TSM curriculum was substantially revised and released for use in the summer of 2012 for fall 2012 implementation. Many TSM faculty were involved in the review and provided materials for this major revision.

Most of those interviewed highly valued the ACE behavior system. They recognized that it had provided a needed framework to help those students who had not developed a system for being responsible or for self-regulation necessary for success within a college setting. On the other side of this issue, some faculty expressed concern when there was too much flexibility exercised within the system, for example, by not enforcing a college attendance policy. Students who were interviewed also expressed concerns about unbalanced or unfair treatment within classes, for example, when some students who were notoriously late or who had poor attendance were allowed to turn papers or projects in late and were still given grades equivalent to those who had observed deadlines. While this may not be considered a systemic issue, it was raised numerous times across colleges. It would seem to be another factor that would be difficult to manage given the high-risk characteristics of some students and the intent of the model to help students move forward.

It seems unquestionable, based not only on interviews with faculty and administrators but also on interviews and focus groups with students, that the cohort model offers students in the ACE program a strong support system that, in effect, makes it possible for them to succeed. A faculty member noted, “They have each other to rely upon.” She had heard them talk about wanting to ‘surround themselves with people headed in the same direction.’”

Finally, there are three aspects of the program that were noted by many of those interviewed. This included the importance of regular faculty meetings at which members shared accomplishments and issues or concerns and worked together to address specific student needs. In some cases, students who were having trouble were invited to discuss what was going on and how the faculty could help.

Another aspect was the potential for receiving transfer-level credits. While they had mounted a serious effort to accomplish this goal at Cabrillo College, it has not yet been successful. At

one or two other colleges, they have managed to meet the requirements and have been able to give students such credits. Students at one of those colleges affirmed strongly that the opportunity to earn transfer-level credits made all the difference to them in deciding whether to participate.

Lastly, one of the colleges felt that their students were entering the program with lower level skills than some of the other students, and they had added a developmental reading class to their program. It was not clear, and there were no data to provide evidence, as to whether this was a successful strategy or not.

Students

In individual student interviews and student focus groups, students reported very positive reactions to the ACE program. With a few exceptions among the students interviewed, the general reaction to the program was very positive. Specific reactions to the program are organized in subthemes identified below:

Students reported great appreciation for ACE faculty, with only a few exceptions.

Students were eager to let us know about the deep appreciation they had for the faculty in the various ACE programs across the colleges. They repeatedly used terms like “awesome” and “amazing” to describe them. They reported that faculty “let students know that they can do it;” “ACE teachers made me feel the sky’s the limit.” The students most often commented on the faculty’s caring and supportive approach. One student’s comment captured what many others said: “Teachers don’t care if you come in other programs or schools, but in the ACE program they really do. They call you up if you miss a day. I like that because you feel important to someone. I actually matter to someone.” Regarding teachers’ supportive approach, one student noted that they “set you up for success.”

There were a few faculty members that one or two students complained about, but there was no accumulation of negative reports on any one individual. The only complaint that was heard quite a number of times was with regard to a lack of fairness. Because the students in ACE programs are often immersed in difficult life situations, individual faculty members sometimes bent over backwards to be tolerant of their lack of attendance or lateness. Other students who were attending regularly and meeting deadlines felt it was unfair and inconsistent with the message of responsibility and accountability.

Students reported positive effects on their academic and personal lives.

Students consistently reported various positive effects on their lives. They spoke of their increased awareness and sense of responsibility. They mentioned improved relationships and an increase in their ability to resist responding negatively to potentially adversarial situations: “I learned to calm down, avoid conflict; you can’t have a gangster mentality.” Another noted, “I grew up a lot coming to ACE.” They commonly reported that being in the program taught them to manage their time better, as well as enlightened them about themselves: “It made me realize I’m actually smart in some things.” Some made strong positive comments about particular aspects of the program: “I learned a lot since being in the program, especially the first two weeks and how to work with others, learning styles. I liked it most when everybody got to tell stories. I’m not used to people expressing themselves in front of people. That was like an inspirational thing.”

Many of the students interviewed reported increased confidence and improved communication skills as the primary benefits of the program.

The most common outcome reported was an increase in students’ confidence and their ability to communicate with others and work in teams. This was expressed in comments about new ways to think and to learn, new outlooks on life and on school. One woman noted that her “confidence is so much higher, and I have improved vocabulary—my husband can’t believe what comes out of my mouth!” A significant aspect of this was their reports of new awareness. In commenting on his experience in the Social Justice course, a student noted that it made him aware of things he hadn’t thought about; prior to the course, he didn’t really concern himself with issues of social justice.

Students felt that the ACE program really prepared them for continuing in college.

It “opened doors for me” was an example of the kind of comment made regarding the potential of the program to prepare students for college. One noted that some referred to it as “college kindergarten.” This preparation was reported with regard to the development of an understanding of their learning styles, learning to do research, accountability, management of time (“I’m now respectful of other people’s time”), and just understanding structures and having a foundation. One person stated that he “would have been terrified to walk on campus without this preparation.” Another explained, “The Foundation Course helped me jump out of my seat—to get started. I wouldn’t have been ready without the Foundation Course, would have been far behind. They give you the tools necessary for being a successful college student. Everything I could need is right here in the program.”

Perhaps the difference the program reportedly makes for students who exhibit high risk factors is best exemplified in one student's story:

In January, fresh out of prison, I enrolled at Cabrillo. I wasn't in ACE; it was overwhelming to me. I didn't understand half the things they were saying to me. So I just stopped going to school. Then I came here—through the ACE program, the next semester—now I know what I have to do, how I have to do things, taking notes, time to put into my studying.

An aspect of the program that students almost unanimously acknowledged as a positive benefit was the cohort model.

As faculty members had also noted, students consistently reported the benefits of being in a cohort and how important it was to them to build the relationships they did. Even students who stated that they did not like the program eagerly reported that they liked the “community” aspect of the program. They commonly stated that it “felt like family”; “We had each other's backs.” In one college where there was a clear difference between two cohorts that ran concurrently, the importance of the relationship-building was evident in the fact that one cohort had clearly surpassed the other in building relationships. In a focus group that included students from both cohorts, the students were able to compare their experiences, and they saw clearly that one group had been much more successful in building community. Students from the other cohort expressed strong regret that community building had not been accomplished to as great an extent in their cohort. The ACE faculty at this college learned that it was essential to blend cohorts, to include a more heterogeneous group of students in each cohort.

A few students did not like particular aspects of the program or the program as a whole.

There were students who were interviewed who reported that they did not like the program. While it is not possible to generalize from the number of interviews conducted, it did seem that those who had the most serious reservations were younger students, especially ones who were right out of high school. Even older students commented that the program “may not be good for younger students. I don't think younger kids get it in the same way an older person does; can see that they've been in the school system for a long time and don't understand the value of it.” Younger students tended to report that they liked the academic courses better than the Foundation or Team Self Management courses. One said that it “felt remedial for me.” Another one of the younger students who reported having a “good upbringing,” said she didn't like sharing emotional issues. She said she “didn't have the kind of story others did.”

Students also did not like that credits were not transferable: “More than halfway through the semester, the counselor told me that none of my classes would benefit me at a college level.” At another college, students in a focus group expressed the need for more structure, more rigor. They felt the program as it was implemented was “too loose” and reflected a lack of consistency: “We did get a syllabus, but we didn’t stick to that syllabus.”

6. Summary

Almost 10 years after the first ACE program (originally called the Digital Bridge Academy) was initiated in Watsonville, California, there is accumulating evidence that it does have strong effects on participants' achievement outcomes and on certain affective indicators that are precursors to academic success. The Academy for College Excellence (ACE) was founded on a strong theoretical framework based on a broad research base related to such psychosocial factors as self-efficacy, motivation, identity, and hope. It was designed to provide an alternative model to common developmental education programs in community colleges and to meet the needs of underserved students who are considered high risk because of their life experiences. This study was undertaken to examine the effectiveness of this model in six community colleges (five in California and one in Pennsylvania). Data were collected on implementation and on affective indicators for all six participating colleges; data on academic outcomes were available for four of the six colleges. While the program reflects some variations depending on the college in which it is implemented, and these variations result in some differences in outcomes, most of the outcomes are consistent across colleges. Propensity-score matching was used to form comparison groups to examine academic outcome data on credit accrual and persistence.

The analyses of academic outcomes show that ACE participants in accelerated programs were considerably more likely than students in a matched comparison group to pass degree-applicable English in the ACE semester, and this difference is still apparent two semesters later, although the difference attenuates somewhat as the comparison group slowly improves its outcomes. They are also more likely than comparable nonparticipants to complete transfer-level English, and they earn seven more degree-applicable credits than comparable nonparticipants. These results were mirrored by separate analyses, reported in the appendix, comparing ACE participants to nonparticipants enrolled full time. Accelerated ACE participants were more likely than comparable nonparticipants to enroll full time in the semester following the ACE semester.

The academic outcomes analyzed in this report show similar results to the outcomes published in the Columbia University Community College Research Center (CCRC) study of the ACE program (Jenkins et al., 2009), which analyzed the ACE implementation at Cabrillo College when it only served 25 students per semester. This current study builds the evidence that the ACE model, curriculum, faculty development, and train the trainer approach can reproduce similar academic results at multiple colleges some of which are serving between 250 and 350 students per year.

To study the effects on psychosocial factors, RTI researchers and ACE staff jointly designed and developed an instrument, the College Student Self-Assessment Survey (CSSAS), to be administered at three points in time: 1) before students enroll in the Foundation Course, 2) after the first two-week Foundation Course, and 3) after completion of the program at the end of the ACE one-semester intervention. In several of the colleges, a school-wide version of the CSSAS was administered to a majority of incoming students to obtain data on nonparticipants.

The CSSAS has provided a rich source of outcome data for this study, and the results have demonstrated very positive effects of the program on psychosocial factors for students who participate. ACE students show consistent improvement in performance over the three point-in-time measures. Overall, students improved in their mean scores over the course of their ACE experience. The biggest growth is seen between Time 1 and Time 2, which makes sense given that the two-week Foundation Course focuses on building students' capacity in each of the affective areas. Students had increased their capacity in seven of the eight factors measured by the end of the two-week Foundation Course. With the exception of two factors, the change from Time 2 to Time 3 either remains consistent or improves slightly over the course of the ACE semester, indicating that students are maintaining the gains they made during the intensive Foundation Course.

Results of the survey given to ACE students at the end of the ACE semester consistently show that students report changes in college behaviors such as paying attention, completing assignments, and being prepared and organized. They also reported changes in their interactions with others. These results can likely be attributed to the camaraderie and cohesiveness that is developed and facilitated through the ACE curriculum and model. Students from diverse backgrounds and experiences learn from and about each other and, as shown both in survey responses and interviews, clearly support one another as they become acclimated to a college environment and the requirements of being a student.

To measure the impact of the ACE program on developing these behaviors and attitudes, ACE participants were asked to rate the extent to which they changed in specific areas in ways that improved their college experience. Overall, more than half of participants reported making positive changes in all 21 behaviors listed in the survey, suggesting that ACE is succeeding in its efforts to help students change their behavior in ways that will enable them to succeed in college. They were also asked about the impact of the program on their lives and about new decisions they had made about their future. Nearly half of respondents reported that they had made new decisions about their future and more than three-quarters indicated that they had changed as a result of being in ACE.

From interviews and focus groups with administrators, faculty, and students, RTI staff learned about the generally positive effects teaching or participating in the ACE program has

on those who do. While faculty and administrators may point to the demands of teaching in the program, they also report positive effects on teaching approaches and dramatic effects on student behaviors and achievements. Students report significant positive effects both on their academic and personal lives, on their preparation for continuing in college, and on their confidence and communication ability. Students often speak poignantly about how the program had transformed their lives.

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Appendix

Table A1. Research literature for CSSAS, by factor

Self-Efficacy—includes academic self-efficacy, self-regulation, and hope/goal theory
Academic Self-Efficacy

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.
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Hope/Goal Theory

- Covington, M. V. (2000). Goal theory, motivation, and school achievement: An integrative view. *Annual Review of Psychology*, *51*, 171–200.
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Self-Regulation of Behavior

- Guiffrida, D. (2009). Theories of human development that enhance an understanding of the college transition process. *Teacher College Record*, *111*, 2419–2443.
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Teamwork/Leadership

- Le, H., Casillas, A., Robbins, S., & Langley, R. (2005). Motivational and skills, social, and self-management predictors of college outcomes: Constructing the student readiness inventory. *Educational and Psychological Measurement, 65*(3), 482–508.
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- Robbins, S., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin, 130*(2), 261–288.

Interacting with Others – includes communication and personal responsibility Communication

- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*, 41–54.
- Pearlin, L., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2–21.
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Personal Responsibility/Self Determination

- Mergler, A. G., Spencer, F. H., & Patton, W. (2007). Relationships between personal responsibility, emotional intelligence and self-esteem in adolescents and young adults. *Australian Educational and Developmental Psychologist, 24*(1), 5–18.
- Pearlin, L., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2–21.

Mindfulness – includes focusing, accepting, describing, and observing

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky inventory of mindfulness skills. *Assessment, 11*(3), 191–206.

Caldwell, K., Harrison, M., Adams, M., et al. (2010). Developing mindfulness in college students through movement-based courses: Effects on self-regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health, 58*(5), 433–42.

Sauer, S. E., & Baer, R. A. (2009). Responding to negative internal experience: Relationships between acceptance and change-based approaches and psychological adjustment. *Journal of Psychopathology and Behavioral Assessment, 31*(4), 378–386.

Table A2. Confirmatory Factor Analysis results and Cronbach's Alpha reliability scores for fall 2011 CSSAS (N = 821)

Factor	Survey Item	Factor Loadings	Reliability Scores
Overall Reliability Score			0.94
Mindfulness – Focusing/Doing			0.89
	DOING1	0.65	
	DOING2	0.80	
	DOING3	0.69	
Mindfulness – Accepting			0.72
	ACCEPT1	0.64	
	ACCEPT2	0.84	
	ACCEPT3	0.59	
Mindfulness – Describing			0.77
	DESC1	0.69	
	DESC2	0.78	
	DESC3	0.73	
College Identity			0.88
	IDENT1	0.79	
	IDENT2	0.82	
	IDENT3	0.82	
Self-Efficacy			0.92
	SE1	0.74	
	SE2	0.71	
	SE3	0.75	
	SE4	0.75	
	SE5	0.69	
	SE6	0.68	
	SE7	0.65	
	SE8	0.87	
	SE9	0.74	
	SE10	0.74	
	SE11	0.74	
Teamwork			0.92
	TEAM1	0.84	
	TEAM2	0.87	
	TEAM3	0.85	
	TEAM4	0.8	
	TEAM5	0.83	
Interacting with Others			0.86
	INTERACT1	0.73	
	INTERACT2	0.72	
	INTERACT3	0.68	
	INTERACT4	0.88	
	INTERACT5	0.56	
	INTERACT6	0.62	
	INTERACT7	0.59	
	INTERACT8	0.81	
	INTERACT9	0.55	
Observing			0.66
	OBSER1	0.73	
	OBSER2	0.62	
	OBSER3	0.54	

Table A3. Confirmatory Factor Analysis factor correlations

	1	2	3	4	5	6	7	8
1 Focusing	–							
2 Accepting	0.21	–						
3 Describing	0.24	0.49	–					
4 Identity	0.20	0.16	0.27	–				
5 Self-Efficacy	0.48	0.45	0.51	0.44	–			
6 Teamwork	0.35	0.39	0.58	0.39	0.60	–		
7 Interaction	0.33	0.45	0.65	0.39	0.57	0.68	–	
8 Observing	0.05	0.50	0.64	0.16	0.37	0.45	0.53	–

Table A4. T-tests for statistical significance of mean scores on CSSAS scales

Time 1 to Time 2

Factor	Mean Difference	Std. Deviation	Std. Error Mean	t-value	df	Sig. (2-tailed)
Focusing	.049	.908	.033	1.480	767	.139
Accepting	.119	.932	.034	3.532	768	.000
Describing	.163	.716	.026	6.299	768	.000
College Identity	.350	.797	.029	12.151	765	.000
Teamwork	.271	.691	.025	10.866	767	.000
Self-Efficacy	.373	.677	.027	13.731	621	.000
Interacting with Others	.108	.495	.018	6.030	767	.000
Observing	.240	.867	.031	7.677	768	.000

Time 1 to Time 3

Factor	Mean Difference	Std. Deviation	Std. Error Mean	t-value	df	Sig. (2-tailed)
Focusing	.030	1.005	.036	.817	767	.414
Accepting	.166	.986	.036	4.667	768	.000
Describing	.241	.843	.030	7.917	768	.000
College Identity	.316	.916	.033	9.543	765	.000
Teamwork	.197	.837	.030	6.513	767	.000
Self-Efficacy	.421	.767	.031	13.684	621	.000
Interacting with Others	.021	.612	.022	.937	767	.349
Observing	.222	.959	.035	6.431	768	.000

Table A5. Degree-applicable English completion by semester compared to full-time students

	Number of Students in ACE and First Post-ACE Semesters	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Full-time Comp. Group	Diff.	ACE	Full-time Comp. Group	Diff.	ACE	Full-time Comp. Group	Diff.
Accelerated	1,014	51.3	20.0	31.3***	58.5	36.0	22.5 ***	60.6	39.9	20.7***
Non-accelerated	160	19.4	24.4	-5.0	37.5	44.4	-6.9	41.2	53.1	-11.9*

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

NOTE: For the second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 828 for accelerated students and 153 for nonaccelerated.

Table A6. Transfer-level English completion by semester compared to full-time students

	Number of Students in ACE and First Post-ACE Semesters	By End of First Semester after ACE			By End of Second Semester After ACE		
		ACE	Full-time Comp. Group	Diff.	ACE	Full-time Comp. Group	Diff.
Accelerated	1,014	20.4	13.5	6.9***	23.3	20.7	2.6
Nonaccelerated	160	5.6	13.8	-8.1*	11.1	31.0	-19.9***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test

NOTE: Analyses exclude all nonparticipants who passed transfer-level English in the ACE semester and all LMC nonparticipants who passed transfer-level math in the ACE semester. For the second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 828 for accelerated students and 153 for nonaccelerated.

Table A7. Cumulative degree-applicable credits earned by semester compared to full-time students

	Number of Students in ACE and First Post-ACE Semesters	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		ACE	Full-time Comp. Group	Diff.	ACE	Full-time Comp. Group	Diff.	ACE	Full-time Comp. Group	Diff.
Accelerated	1,014	10.8	6.2	4.7***	14.7	11.1	3.6***	17.0	14.3	2.8***
Non-accelerated	160	9.2	6.5	2.7***	13.8	11.8	2.0*	16.4	15.8	0.7

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

NOTE: For the second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 828 for accelerated students and 153 for nonaccelerated.

Table A8. Cumulative transferable credits earned by semester compared to full-time students

	Number of Students in ACE and First Post-ACE Semesters	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Full-time Comp.			Full-time Comp.			Full-time Comp.		
		ACE	Group	Diff.	ACE	Group	Diff.	ACE	Group	Diff.
Accelerated	1,014	1.3	4.0	-2.7***	4.1	7.6	-3.4***	6.0	10.1	-4.1***
Non-accelerated	160	1.7	4.0	-2.4***	3.8	7.6	-3.8***	5.6	10.8	-5.2***

p* < .05; *p* < .01; ****p* < .001; two-tailed test.

NOTE: For the second semester after the ACE semester, which excludes students who started in fall 2012, the N's were 828 for accelerated students and 153 for nonaccelerated.

Table A9. Percent enrolled full time in first semester after the ACE semester compared to full-time students

	Maximum Number of Students	In First Semester after ACE		
		ACE	Comp. group	Diff.
Accelerated	1,014	37.3	44.7	-7.4 **
Nonaccelerated	160	36.3	49.4	-13.1 *

p* < .05; *p* < .01; ****p* < .001; two-tailed test.

Table A10. Percent persisted to first semester after the ACE semester compared to full-time students

	Maximum Number of Students	In First Semester after ACE		
		ACE	Comp. group	Diff.
Accelerated	1,014	66.2	72.5	-6.3 **
Nonaccelerated	160	66.9	75.6	-8.8

p* < .05; *p* < .01; ****p* < .001; two-tailed test.

Table A11. Degree-applicable math completion by semester, Los Medanos College compared to full-time students

Los Medanos College	Number of Students in ACE and First Post-ACE Semesters	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Full-time Comp.			Full-time Comp.			Full-time Comp.		
		ACE	Group	Diff.	ACE	Group	Diff.	ACE	Group	Diff.
	113	42.5	8.8	33.6***	59.3	20.4	38.9***	53.3	25.8	27.4***

p* < .05; *p* < .01; ****p* < .001; two-tailed test.

† Fall 2012 ACE students are not included in the results for "Second Semester after ACE" because their results for the second semester (Fall 2013) were not available at the time this report was written.

Table A12. Transfer-level math completion by semester, Los Medanos College compared to full-time students

	Maximum Number of Students	By End of First Semester after ACE			By End of Second Semester after ACE		
		Full-time Comp. Group			Full-time Comp. Group		
		ACE	Group	Diff.	ACE	Group	Diff.
Los Medanos College	113	46.0	6.2	39.8***	40.2	12.4	27.9***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Table A13. Degree-applicable English and math completion by semester, Los Medanos College compared to full-time students

	Maximum Number of Students	In ACE Semester			By End of First Semester after ACE			By End of Second Semester after ACE		
		Full-time Comp. Group			Full-time Comp. Group			Full-time Comp. Group		
		ACE	Group	Diff.	ACE	Group	Diff.	ACE	Group	Diff.
Los Medanos College	113	39.8	1.8	38.1***	57.5	12.4	45.1***	52.2	20.2	31.9***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Table A14. Transfer-level English and math completion by semester, Los Medanos College compared to full-time students

	Maximum Number of Students	By End of First Semester after ACE			By End of Second Semester after ACE		
		Full-time Comp. Group			Full-time Comp. Group		
		ACE	Group	Diff.	ACE	Group	Diff.
Los Medanos College	113	34.5	2.7	31.9***	28.3	9.0	19.3***

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed test.

† Fall 2012 ACE students are not included in the results for “Second Semester after ACE” because their results for the second semester (Fall 2013) were not available at the time this report was written.

Table A15. Distribution of Foundation Course grades, by college and overall

Fall 2010-Fall 2012 combined										
Grade	Cabrillo		Hartnell		Los Medanos		Berkeley City		All Four Colleges	
	Pct	N	Pct	N	Pct	N	Pct	N	Pct	N
Grades indicating participation										
A	-	-	-	-	73.6	106	55.9	190	18.3	296
B	-	-	-	-	9.0	13	16.5	56	4.3	69
C	-	-	-	-	11.1	16	8.5	29	2.8	45
P (pass)	91.5	594	85.2	413	-	-	-	-	62.2	1,007
<i>All grades indicating participation</i>	<i>91.5</i>	<i>594</i>	<i>85.2</i>	<i>413</i>	<i>93.8</i>	<i>135</i>	<i>80.9</i>	<i>275</i>	<i>87.6</i>	<i>1,417</i>
Grades not indicating participation										
D	-	-	-	-	-	-	2.4	8	0.5	8
F	-	-	-	-	3.5	5	4.1	14	1.2	19
IF (Incomplete, with default F grade)	-	-	-	-	0.7	1	-	-	0.1	1
IX (incomplete)	0.3	2	-	-	-	-	1.5	5	0.4	7
NP (no pass)	3.2	21	11.6	56	-	-	-	-	4.8	77
RD (report delayed)	-	-	-	-	-	-	2.1	7	0.4	7
UD (ungraded dependent not affiliated with another ACE course)	-	-	0.6	3	-	-	-	-	0.2	3
W (withdrew after drop deadline)	4.9	32	2.7	13	2.1	2	8.5	29	4.9	73
DR (dropped before census)	-	-	-	-	-	-	0.6	2	0.1	2
Total number of grades	100.0	649	100.0	485	100.0	144	100.0	340	100.0	1,618

NOTE: Detail may not sum to total because of rounding. Students who took the Foundation Course more than once are counted multiple times. Distribution based on most recent data available, but grades may change over time.