Study Summary

Overview of the Problem

One of the biggest challenges faced by California community colleges today is the volume of underprepared students who place into mathematics classes below transfer level. By entering college and placing into mathematics classes below transfer level, students delay attaining their goals of graduation or transfer by at least one semester and sometimes up to four semesters. For years, colleges across the state have offered remedial or basic skills mathematics classes to assist students in progressing to mathematics classes that will transfer to 4-year universities. Unfortunately the growing number of students placing into these basic skills classes, some 70% to 90% of college students (Moore & Shulock, 2007), has put an inordinate burden on colleges to offer programs that will help students progress in mathematics.

To address this issue and provide support for programs that would help students, the California Community College System, the largest system of higher education in the nation, decided to dedicate millions of dollars toward improving this situation and started the BSI in 2006. Since the start of the BSI, many programs have been created at the various campuses within the system to help basic skill mathematics students be successful in their courses. While district-level programs receiving BSI funding have reported how the funds were expended for the past 5 years, the first set of actual student performance results were recently submitted to the BSI. By evaluating these student performance results, one can see which colleges have been successful in producing the largest number of students who have progressed to transfer level and can further examine what has made these programs successful.

In addition to looking at the student progress data, what is important to know is which factors make these programs successful. Both the Center for Student Success and the California Research and Planning Group, who developed the BSI essential program components, and developmental education guru Hunter R. Boylan (2002), have developed frameworks consisting of program factors or best practices that lead to effective basic skills programs. Together, these two documents create a master list of program factors or best practices based on extensive research that should lead to successful basic skills mathematics programs. By examining these

factors and comparing them with the student progress data, one may see a pattern of program factors that emerges as essential to successful programs.

This study attempted to identify elements of successful programs that can be implemented and result in a high-performing basic skills mathematics programs that successfully produce students with transfer-level mathematics competency. This study included a descriptive study and discussion of the basic skills mathematics program results collected by the BSI. Those results were then correlated with the survey responses regarding program factors that exist at these colleges.

Purpose Statement

The purpose of this study was to determine which basic skills program factors were exhibited by successful basic skills programs that helped students advance to transfer-level mathematics. This study specifically examined California community college basic skills programs that assist students who place in mathematics courses two levels below transfer-level mathematics. First, the study provided a descriptive study of the results of basic skills mathematics programs in the state of California, essentially rank ordering them from highest level of student progression to lowest level of student progression based on data from the BSI Cohort Tracker. Second, the individuals administering these programs were surveyed to see what factors their program exhibited.

Research Questions

The following research questions formed the basis of the study.

1. Which program factors are exhibited by successful basics skills mathematics programs?
2. What are the significant differences between high- and low-performing colleges on each of the program factors?
3. Which leadership factors are exhibited in successful basic skills programs?
4. What other factors not listed in the program factors are exhibited by successful basic skills mathematics programs?

Review of the Methodology

This study had three distinct phases of quantitative analysis. First, in order to assess which California community college basic skills mathematics programs are the most successful in having students progress from two levels below to transfer-level mathematics, a descriptive study

was performed. Two levels below transfer level was chosen as the unit of analysis since it is a common entry point for many students. The descriptive study used data from the California Community College Chancellor's Office (2012) Datamart website, which lists all basic skills mathematics programs and their progress results for up to four levels below transfer-level mathematics. The time span chosen for the analysis was from Fall 2008 to Spring 2011 in an effort to have recent data. All community colleges' progress rates were reviewed and then sorted from highest progression percentage to lowest progression percentage.

The second phase of the study included an online survey using structured and closed ended questions that were sent to 100 California community colleges' basic skills coordinators. The survey used in this study asked respondents about their observations of the presence and level of implementation of each of the factors at their respective colleges. These factors, a combination of Boylan's best practices and the BSI program components, formed the conceptual framework for this study. The survey measured which program factors were present in successful basic skills programs and to what degree they had been implemented through a response scale created by Renate Krakauer (2000), in her work *Criteria for a Learning College*. This response scale is as follows:

0 *No implementation*. There is no evidence that this practice has been implemented in the institution.

1 *Under discussion*. This practice is being discussed or is in the planning stages.

2 *Marginal implementation*. There are isolated examples of this practice in the institution.

3 *Partial implementation*. This practice is being implemented in some areas of the institution in a visible and substantial way.

4 *Full implementation*. This practice has been fully implemented across the institution.

The third and final phase was a statistical analysis of the data collected through the survey. Data were analyzed using frequency tables, running *t* tests on program factors, and coding of a qualitative open-ended question.

M**ajor Findings**

This study surveyed 100 basic skills coordinators at community colleges across the state of California. Of the 70 respondents, 30 were from high-performing college (those having a student basic skills mathematics progression rate above the statewide average of 21.39%), and 40

were considered low-performing colleges, (having a progression rate blow the statewide average). Through a 127-question survey addressing the 43 program factors developed from a combination of BSI program components and Boylan's (2002) basic skills program best practices, respondents provided data about the basic skill programs at their respective colleges. The descriptive study and survey worked in concert to provide answers to the following research questions.

Research Question 1

Which program factors are exhibited by successful basics skills mathematics programs?

Frequency tables were run to see which partially or fully implemented factors were exhibited by high- and low-performing programs. A bar graph comparing factor implementation by high- and low-performing programs was also provided. Quantitative analysis indicates that high- and low-performing programs have implemented many of the same program factors. Table 16 lists highly rated and commonly implemented factors.

It is not surprising that Factor 18, "The faculty play a primary role in needs assessment, planning, and implementation of staff development programs and activities in support of basic skills programs," was highly implemented in both high- and low-performing programs, since California state law has mandated this factor since the 1989 passage of Assembly Bill 1725. The bill requires that faculty be responsible for planning the programming for all faculty professional development in the California community colleges. However, its consistently high ranking for all programs indicates the level of importance of professional development as part of the basic skills programs. The remaining factors' level of implementation is at the discretion of the individual colleges and therefore speaks to their importance in these programs.

Table 16

Highly Implemented Program Factors for all Basic Skills Programs

Factor	Factor description
18	The faculty play a primary role in needs assessment, planning, and implementation of staff development programs and activities in support of basic skills programs.

17	Administrators support and encourage faculty development in basic skills, and the improvement of teaching and learning is connected to the institutional mission
43	A high degree of structure is provided in basic skills courses
36	Teach critical thinking
34	Link basic skills course content to college-level requirements
29	Use of supplemental instruction
10	Orientation, assessment, and placement are mandatory for all new students
7	Provision of comprehensive support services
22	Faculty who are both knowledgeable and enthusiastic about basic skills mathematics are recruited and hired to teach in the program.
12	Formative evaluation for program improvement
41	Curricula and practices that have proven to be effective within specific disciplines are employed.
32	Provision of frequent and timely feedback

High-performing programs. In addition to the list in Table 16, high-performing programs had uniquely implemented Factor 40—sound principles of learning theory are applied in the design and delivery of mathematics courses in the basic skills program, Factor 24—faculty and staff are involved in developmental education professional associations and faculty are involved in mathematics professional associations that have a developmental component, and Factor 31—use technology in moderation. These variations seem to identify some of the fundamental learning theory questioning and exploration occurring in some of the basic skills mathematics programs including the use of cognitive theory (CSS, 2007), the engagement of faculty in seeking out basic skills mathematics professional development outside of their college (Boylan, 2002), and their careful attention to overreliance on technology as a form of course delivery and course support (Boylan, 2002).

Low-performing programs. In addition to the list in Table 16, low-performing programs uniquely implemented Factor 6—identification of basic skills education is an institutional priority, Factor 9—institutional policies require or recommend student completion of necessary basic skills coursework as early as possible in the educational sequence, and Factor

30—provide frequent testing opportunities. These results, especially the high scores for Factors 6 and 9, seem to indicate a focus on the fundamentals of establishing strong institutional support for basic skills programs. For some basic skills programs it is a struggle to get their college community to acknowledge basic skills as a core part of their mission and worthy of their resources. Some colleges would rather focus on transfer education and deem basic skills students as not college ready (Cross, 1971). Factor 30 was partially or fully implemented more often in low-performing programs than in high-performing programs. This could align with another highly rated factor, Factor 32, which includes the provision of frequent and timely feedback or could indicate a drill-and-test approach.

Implementation compared. While the implementation of many of the factors may not be surprising, when reviewing an overlay bar graph comparing high- and low-performing programs, what emerges is the difference in the degree to which high- and low-performing programs have implemented these factors. Figure 4 and Table 13 (which are reproduced here from Chapter IV) show the percentage differences in key factors.

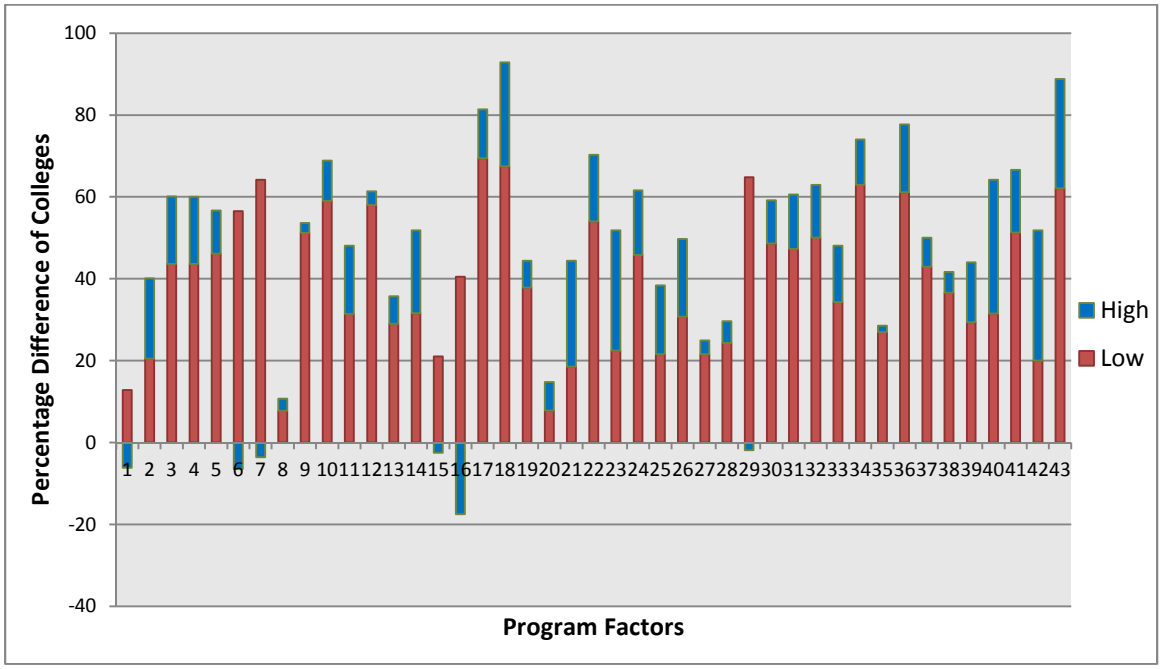

Figure 4. Comparison of high- and low-performing basic skills programs—percentages of colleges with partial and full implementation.

Significant percentage difference. In the first nine factors listed in Table 13, high-performing programs have implemented those factors at a much higher rate than low-performing programs, 19% to 32.7% more of time. This indicates that these factors are present more often in high-performing basic skill mathematics programs than in low-performing programs. Each of these factors takes into thoughtful account the needs of the basic skills student and is responsive to those needs in building effective programs.

Table 13

Comparison of Select Program Factor Implementation Percentages Between High- and Low-Performing Programs

Factor	Factor description	High	Low	Difference
40	Sound principles of learning theory are applied in the design and delivery of mathematics courses in the basic skills program.	64.2%	31.5%	32.7%
42	Culturally responsive teaching theory and practices are applied to all aspects of the basic skills instructional programs and services	51.8%	20.0%	31.8%
23	Provision of tutoring.	51.8%	22.4%	29.4%
43	A high degree of structure is provided in basic skills courses	88.8%	62.1%	26.7%
21	Faculty development is clearly connected to intrinsic and extrinsic faculty reward structures.	44.4%	18.5%	25.9%
18	The faculty play a primary role in needs assessment, planning, and implementation of staff development programs and activities in support of basic skills programs.	92.9%	67.5%	25.4%
14	Basic skills philosophy as a guide to program activities	51.8%	31.6%	20.2%
2	Coordination of basic skills education courses and services	40.1%	20.5%	19.6%
26	Integration of classrooms and laboratories in basic skills mathematics programs	49.7%	30.7%	19.0%

9	Institutional policies require or recommend student completion of necessary basic skills coursework as early as possible in the educational sequence.	53.6%	51.2%	2.4%
35	Faculty share instructional strategies	28.5%	27.0%	1.5%
29	Use of supplemental instruction	62.9%	64.8%	-1.9%
15	Counseling support provided is substantial, accessible, and integrated with academic courses/programs	18.5%	21.0%	-2.5%
1	Centralization of program activities	6.6%	12.8%	-6.2%
6	Identification of basic skills education is an institutional priority	50.0%	56.5%	-6.5%
16	Financial aid is disseminated to support basic skills students. Mechanisms exist to ensure that basic skills students are aware of such opportunities and are provided with assistance to apply for and acquire financial aid.	23.0%	40.5%	-17.5%

The degree to which the college has implemented these factors speaks to the time, energy, and effort they have dedicated to carefully considering the "whole student" or a holistic approach as advocated by Boylan (2002). The nine factors are clearly defined. It should be noted that all of the subsections of each definition were included in the survey instrument to ensure complete understanding of the factor.

1. *Sound principles of learning theory are applied in the design and delivery of mathematics courses in the basic skills program.* This factor refers to the program component posed by the CSS (2007), defined as having emphasis on the principles of learning theory including self-regulated learning, problem solving/critical thinking, and cognitive models.
2. *Culturally responsive teaching theory and practices are applied to all aspects of the basic skills instructional programs and services.* According to CSS (2007),

> Culturally Responsive Teaching (CRT) theory and practice articulates basic principles and pedagogical strategies designed to enhance learning among all students, regardless of the students ethnic, socioeconomic, and educational backgrounds. While this theory and practice builds on earlier efforts to diversify the content of curriculum, CRT focuses more directly on the pedagogy for developing students' skills, competencies, and knowledge. (p. 52)

3. *Provision of tutoring.* It is important to note the survey questions relating to this topic asked not only about "tutoring provided either through a centralized developmental program or through an academic support services unit such as a learning assistance center or learning lab associated with the academic department," but also about extensive tutor training in the areas of "learning theory, metacognition, motivation, counseling/interviewing, group dynamics, and adult learning models" as advocated by (Boylan 2002, pp. 49-50). As noted in later findings, tutoring is no longer being limited to lab settings and are proving to be effective during class sessions.
4. *A high degree of structure is provided in basic skills courses.* The program provides a structured learning environment and uses a well-planned, step-by-step sequence of offerings with proactive academic support (CSS, 2007).
5. *Faculty development is clearly connected to intrinsic and extrinsic faculty reward structures.* The staff development program provides faculty the intrinsic incentives of collegial support, professionalism, and commitment. Additional incentives such as salary advancement and release time may be offered to ensure broad-based participation (Boroch et al., 2010).
6. *The faculty play a primary role in needs assessment, planning, and implementation of staff development programs and activities in support of basic skills programs.* Given faculty members' intimate knowledge of their own staff development needs, they are responsible for planning programs and activities related to developmental education (Boroch et al., 2010).
7. *Basic skills philosophy as a guide to program activities.* A holistic philosophy of developmental education, recognizing students as total beings with both affective and cognitive characteristics shaping their attitudes and behaviors. The program values the notion that courses and activities should focus on the learner. These beliefs are reflected in program

mission statements, goals and objectives, policies and procedures, as well as the behaviors of faculty and staff (Boylan 2002).

8. *Coordination of basic skills education courses and services.* Whether the program is centralized or decentralized, highly coordinated developmental education courses and services have the following characteristics:
    - Regular meetings of all those involved in the delivery of developmental courses and services,
    - Articulation of common goals and objectives for all developmental courses and services,
    - Integration of developmental courses and academic support services, and
    - Coordination of developmental courses and services by an administrator with a primary responsibility for campus-wide developmental education. (Boylan 2002, p. 11)

9. *Integration of classrooms and laboratories in basic skills mathematics programs.* Integration of classroom and laboratories requires concerted effort to ensure that what goes on in the classroom is clearly connected and specifically supported by what goes on in the laboratory. Integrated classroom activities and laboratories were characterized by (Boylan 2002):
    - integration is present when the instructor consults laboratory personnel in developing a particular course to determine how laboratory activities can support that course.
    - integration is present when laboratory materials or activities are directly related to specific course goals and objectives.
    - integration is present when students are required to participate in specific laboratory activities as part of their course assignments.
    - integration is present when laboratory activities count as part of students' grades.
    - integration is present when laboratories are in reasonably close proximity to the courses they will support. (p. 65)

Marginal difference. Interestingly there are several factors that have been equally implemented in both high- and low-performing programs, including early completion of basic skills coursework in the educational sequence, the sharing of instructional strategies, the use of supplemental instruction, and substantial and integrated counseling support. Many of these factors, especially supplemental instruction and counseling, are highly touted by practitioners in the field as helpful to basic skills student success. It should be noted that other factors related to academic advising (Factor 2—coordination of basic skills education courses and services—and Factor 7—provision of comprehensive support services) were rated highly by high-performing programs. What the data seem to indicate is that these factors are being nearly equally implemented by high- and low-performing programs, and they do not seem to be elevating high-performing programs more than low-performing programs.

Negative relationship. Those factors that were more often partially or fully implemented in low-performing programs than high-performing programs include centralization of program activities, identification of basic skills as an institutional priority, and providing awareness and mechanism for students to receive financial aid. Centralization of program activities is a complex factor. It includes three distinct parts that were each listed as a separate survey question. Part A of the question included the concept that basic skills departments for English, ESL, and mathematics were all located in one department. While Boylan (2002) listed this as a best practice, very few California community colleges structure their program in this manner. They opt instead to align the basic skills courses in the specific discipline department for better integration with transfer-level curriculum. This specific question was one of the lowest rated in the entire survey. The fact that low-performing schools more often implement their program in this manner may be affecting their student progression rates. As previously discussed, the need for lower performing programs to emphasize the identification of basic skills as an institutional priority may be part of overcoming a larger campus cultural attitude toward basic skills education in general. Lastly, the fact that low-performing programs more often provide mechanisms and access to financial aid may be connected to the financial needs of their student population, which was not a focus of this study. The significant percentage difference may indicate a relationship between lower performing schools and lower socioeconomic status.

Research Question 2

What are the significant differences between high- and low-performing colleges on each of the program factors?

In looking at the differences between the total mean scores for each of the 43 factors, there was a statistically significant difference between the high- and low-performing groups on six of the factors. These six factors are listed in Table 17.

Table 17

T-Test Results Comparing High- and Low-Performing Colleges on Basic Skills Program Factors

Factor	Factor description	Significance level
22	Faculty who are both knowledgeable and enthusiastic about basic skills mathematics are recruited and hired to teach in the program	$p = .02$
23	Provision of tutoring	$p = .03$
32	Provision of frequent and timely feedback	$p = .01$
40	Sound principles of learning theory are applied in the design and delivery of mathematics courses in the basic skills program.	$p = .04$
42	Culturally responsive teaching theory and practices are applied to all aspects of the basic skills instructional programs and services	$p = .03$
43	A high degree of structure is provided in basic skills courses	$p = .02$

While several of the factors were listed in Research Question 1 as having been implemented by high-performing programs, it is important to note that even under this more stringent test in analyzing the difference of means, they remain statistically significant. One new factor, Factor 22, emerged during this analysis. This factor speaks to the need for faculty to have specialized training in developmental education as well as empathy for basic skills students. Boroch et al. (2010) defined this factor as knowledgeable, well-prepared faculty, with specific developmental expertise are hired by the institution. Instructors who choose to teach remedial courses and are sympathetic to the needs of at-risk students and are committed to the field of developmental education. Again, this list focuses on factors that have a holistic approach of

providing a structured program with tutoring, feedback, and enthusiastic instructors, all based in sound learning theory and cultural sensitivity in the delivery of courses and services.

Research Question 3

Which leadership factors are exhibited in successful basic skills programs?

Program leadership was evaluated by the type of position held by the basic skills coordinator, whether the program was headed by a chair or director and the level of program coordination. This analysis also reviewed the percentage of release time the basic skills coordinator received at each college and the total release time dedicated to basic skills collegewide.

While there are a wide variety of leadership structures in basic skills programs statewide, ranging from one basic skills coordinator to faculty cochairs, to a full basic skills committee, no one structure clearly emerges as leading to a high-performing program. Both high- and low-performing programs are most often led by a faculty basic skills coordinator, with 63% of high-performing programs being headed by faculty and 72.50% of low programs being faculty led. High-performing programs were more often led by a single chair or director, and the program was highly coordinated. In the 22 manager-led programs surveyed, the program benefited more when the manager dedicated more time to the program as part of their assignment. Unfortunately, the same cannot be said for faculty-led programs. In 48 faculty-led programs that responded, release time beyond 50% for basic skills coordination did not result in a higher performing program. The same was true when looking at the total amount of release time dedicated by each college to the basic skills program. When the program was manager-led, the higher the amount of released or assigned time, the higher the program performed. In faculty-led programs, higher amounts of total release time did not equate to higher performing programs.

These findings would indicate that manager-led programs may outperform faculty-led programs. This may be due to the fact that managers, especially those whose primary responsibility is to be the basic skills coordinator, may be able to focus more time on the task than a faculty member who is only on partial release time. In each case where the program was led by a full-time management basic skills coordinator, the program was high performing. This may be due to the performance of the manager but may also be enhanced by the fact that the

college sees basic skills as a high enough priority to hire a full-time management employee to oversee the program.

Research Question 4

What other factors not listed in the program factors are exhibited by successful basic skills mathematics programs?

A single qualitative question was included at the end of the survey asking, "What other factor(s) are present that have affected the success of your college's basic skills mathematics program?" This question was specifically included to learn more about innovative programs colleges have created to assist basic skills mathematics students. By coding the responses to this open-ended question, 10 themes emerged, including precourse/assessment prep, tutoring, course changes, learning communities, supplemental instruction, complaints/concerns, teaching strategies, interventions/second chances, and partnerships (university and nonprofit). The most common responses from high-performing programs were related to faculty involvement/engagement, tutoring, and course changes; the most common for low-performing programs were about complaints/concerns. Most complaints/concerns submitted by low-performing programs were in relation to reduced budgets which were impacting their ability to offer basic skills courses and programs. The high-performing responses align closely with the quantitative findings in the areas of faculty involvement and tutoring. Since course changes, such as accelerated course sequencing and alternative curriculum pathways, were not one of the program factors in this study, this was a new finding unique to this question. These topics are very popular in the current literature and are discussed in recommendations for further study.

Conclusions

Based on the findings of the research in this study, the top 11 factors more often implemented in high-performing programs than in low-performing programs and arguably making the most difference in student progression are the following:

1. Sound principles of learning theory are applied in the design and delivery of mathematics courses in the basic skills program.
2. Culturally responsive teaching theory and practices are applied to all aspects of the basic skills instructional programs and services.
3. Provision of tutoring.

4. A high degree of structure is provided in basic skills courses.
5. Faculty development is clearly connected to intrinsic and extrinsic faculty reward structures.
6. The faculty play a primary role in needs assessment, planning, and implementation of staff development programs and activities in support of basic skills programs.
7. Basic skills philosophy as a guide to program activities.
8. Coordination of basic skills education courses and services.
9. Integration of classrooms and laboratories in basic skills mathematics programs.
10. Faculty who are both knowledgeable and enthusiastic about basic skills mathematics are recruited and hired to teach in the program.
11. Provision of frequent and timely feedback.

In addition to these 11 factors, what emerges from the findings is a general sense of really trying to understand the needs of basic skills students, both from a learning theory and culturally responsive perspective. This approach was first advocated by Boylan in 2002 and continues to be a vital factor. Tutoring has emerged as a focus point going forward. Some of the most successful programs in this survey have focused resources on in-class tutoring, an emerging trend that is proving effective. Knowledgeable faculty involvement and enthusiasm supported by well-planned professional development have been and continue to be a key factor to successful programs.

In regard to basic skills program leadership, it appears that greater involvement on the part of management in administering the program leads to improved program success. Manager-led programs out-performed faculty-led programs, especially as more time was dedicated collegewide to the program. Having a single chair and a highly coordinated program was also key to a higher performing program.

While at the time of this study, Boylan's program factors were 11 years old and the BSI program components were created 6 years before, new ideas are still flourishing among the creative minds at colleges across the state in an effort to help basic skills students. Accelerating the delivery of basic skills mathematics courses by having back-to-back sessions within one semester to streamline student progression is one such measure. Another is alternative curriculum paths, such as a statistics-based model for certain majors, in place of the traditional

algebra-based model used for science and mathematics majors. Both of these alternatives were mentioned in the qualitative question as part of the survey.

Implications for Action

Based on the findings of this study, practitioners in community colleges can hopefully find validation in the programs and practices they already have in place and also guidance in where to develop program elements next in order to create effective programs that support basic skills student success. With limited resources available at each college, this study can provide the basis for directing resources to program factors that have proven to be statistically significant in high-performing programs. No one college is likely to implement all 43 program factors; however, this study provides a list of the factors upon which to focus time, energy, and resources. It provides guidance for program factors, program leadership, implications for faculty hiring, and the support needed through faculty professional development. It also advocates for continuing research on emerging programs such as acceleration or alternative curriculum paths, as they may prove to help students progress more quickly through their curriculum.

Recommendations for Further Research

The topics of developmental education, the origins of the BSI, and each one of the program factors included in this study are supported by a vast amount of scholarly research and decades of work by experts in the field. Through the course of this study and an attempt at a thorough review of the literature, there are several recommendations for further research.

1. Further in-depth research on any of the top 11 factors and how they have been implemented at different community colleges should be considered. This could be a further in-depth study in California or a national study of any of the factors that emerged. Each college has its own way of implementing ideas and differing levels of program commitment by the employees and leadership involved.
2. An in-depth qualitative study at either one of the top-ranked programs listed in the descriptive study. Both Antelope Valley College and De Anza College have an over 50% progression rate for basic skills mathematics students. It would be fascinating to see what they are doing differently at their colleges to produce that level of student progression.
3. Another interesting finding in the descriptive study ranking of college basic skills mathematics programs was the dramatic drop-off in the number of students who complete

one level below transfer level and then do not enroll in the transfer-level class. I would suggest a cross analysis to find which students stopped at A.A./A.S. degrees and thus did not need transfer-level mathematics. It would be interesting to see what is producing that phenomenon and why students are not enrolling.

4. Further research is needed to fully understand why certain equally implemented factors such as supplemental instruction and counseling demonstrated no difference between high- and low-performing programs.
5. While this study focused on how to create the best program for all basic skills students, it would be very interesting to ask basic skills students what they need to be more successful. In order to be prepared for basic skills students, colleges must be better prepared. Cross (1971), a revered expert in developmental education, offered an insight into the issue facing developmental education in community colleges by asking, "Are colleges prepared for under-prepared students?" The main theme of her seminal work on developmental education entitled, *Beyond the Open Door*, was for colleges to look at the programs they offer to see whether education could change to accommodate the needs of the growing population of underprepared students (Barr & Schuetz, 2008). She challenged educators and college administrators to stop teaching the way they learned as successful college students and instead engage in dialog with todays' developmental students about what they need to succeed. Even though it may be uncomfortable for the teachers/administrators to become the students on this issue, it may lead to insights that might not have been discovered otherwise (Cross, 1971). Astin (1993) further supported this position stating that "the richest source of data on the students' environmental experiences is the students themselves" (pp. 84-85).
6. While this study focused exclusively on mathematics basic skills, this study could be replicated with a focus on basic skills English.
7. As stated in Chapter I, one of the greatest challenges creating a large number of underprepared students in California is the lack of articulation between high school and college. The researcher sees it as one of the underlying causes of the need for remedial education. As Nolting (as cited in Boylan, 2011) stated, "Think of mathematics as a foreign language, if you do not use it, you will lose it" (p. 20). When high school students are

allowed to forego mathematics for the final 2 years of high school, they are bound to need remedial mathematics education upon entering college. A future study, after the newly established Common Core K-12 curriculum has been in place for a few years, may yield interesting results. A pathway and advocacy to align high school and college mathematics curriculum is desperately needed in the state of California.

8. As noted by Offenstein and Shulock (2011), "Placement into basic skills courses based on assessment results is, by law, advisory only" (p. 164). While the researcher understands each person has the right to fail, if it is known that the individual has been assessed at a certain level of ability, placement into the proper course should be required. A study and advocacy on this issue is needed. Currently, through the California Community Colleges Student Success Task Force recommendations (2011), California is contemplating adopting a statewide assessment. The time for requiring mandatory placement is now.
9. One of the emerging areas of success for basic skills mathematics students is the concept of contextualized mathematics. Contextualized mathematics can be delivered in a variety of ways, but at its basis is a direct link to the community college mission supporting career technical education. Contextualized mathematics would be an applied mathematics class such as automotive technology mathematics, culinary arts mathematics, or mathematics for the construction trades. These classes provide mathematics education for those students seeking a certificate or degree in a career technical field. Further study on the ways it is being implemented and its success rates would provide useful information for colleges.
10. Another area of purported success is the concept of taking the series of mathematics classes a basic skills student has to complete and accelerating the delivery of said courses. For example, in this study we looked at students placing into mathematics classes at two levels below transfer level. The accelerated program would take those two courses and instead of taking each course for a full semester, offer two 8-week courses back to back in the same semester to streamline the amount of time it takes the student to progress through the coursework. A thorough study of the acceleration programs offered their format, support systems, and results is recommended.
11. The final recommendation for further study is in regard to alternative basic skills mathematics curriculum paths that have been developed at some California community

colleges. Traditional mathematics sequences have students advancing to college algebra and then usually on to calculus. This is the traditional path for science, technology, engineering, and mathematics (STEM) majors. However, only about 40% of students are STEM majors. The other 60% plan to pursue other majors that do not require this level of mathematics proficiency. Faculty at a variety of colleges around the state have proposed an alternative curriculum path for non-STEM majors that prepares them to take transfer-level statistics instead of algebra. Preliminary results are very positive and should be studied further.

Concluding Remarks

This chapter provided a summary of the study as well as detailed review of the major findings by research question. Conclusions based on the research as well as implications for action and recommendations for further research were also included.

In conclusion, this study sought to determine the program factors that are making a difference in student progression rates in basic skills programs in California community colleges. Through a descriptive study and survey of 100 basic skills coordinators across the state, there were 11 factors that rose to the top of the list of 43 original program factors proposed by Boylan and the BSI. Also, conclusions were drawn about leadership structures that assist in producing high-performing programs as well as emerging areas that are helping support student success. As funding for basic skills continues to be tenuous in the state of California, colleges will have to decide where to focus their resources. Hopefully this study will help them in making those difficult decisions by identifying the top 11 factors they can focus on that were evident in high-performing programs that participated in this study.