Instructors' Perceptions About Student Success and Placement in Developmental Mathematics Courses

Linda Reichwein Zientek

Cynthia L. Schneider

Anthony J. Onwuegbuzie

Dr. Zientek is an associate professor of mathematics education in the Department of Mathematics and Statistics at Sam Houston State University.

Dr. Schneider is the government-relations representative of the Texas Council of Teachers of Mathematics (TCTM) and the editor of Texas Mathematics Teacher.

Dr. Onwuegbuzie is a professor in the Department of Educational Leadership and Counseling at Sam Houston State University.

Decreasing the number of students placed in developmental mathematics and addressing barriers that hinder student success in such courses are concerns at both the state and national levels. The present study sought to capture 89 developmental mathematics faculty perceptions of factors that contribute to students' placement and hinder student success in developmental mathematics courses. The results suggest that one of the most common reasons faculty members believe students are placed in developmental mathematics courses, apart from their lack of basic skills, is a time lag between current and previous engagement with mathematics courses. The underlying 17 themes that hinder student success, identified from faculty perspectives, are both personal (e.g., students' individual situations and dispositions) and academic (e.g., their learning behaviors and work habits).

Determining issues that contribute to student placement and success in developmental mathematics courses will assist educators and policy makers on their quest to improve college success rates (Strong American Schools [SAS], 2008). Faculty members regularly collect information from students through assessments and interactions. Through anecdotal stories with colleagues, faculty members gain knowledge about student behaviors and formulate ideas on how to improve their pedagogies. The purposes of the present study were to find out the perceptions developmental mathematics faculty have about what (a) impacts students' placement and (b) hinders student success in developmental mathematics courses. We believed that the themes we identified, which were based on information that faculty collected from their students, could aid in understanding how the developmental education experience might be improved.

Developmental education

Ideally, students with high school diplomas would be ready to succeed in college (i.e., college ready), but a large placement of college students in developmental education courses suggests otherwise (SAS, 2008). The high enrollments in developmental education courses have been more problematic for open-access community colleges than for four-year universities. College-readiness was defined by Conley (2007) as "the level of preparation a student needs to enroll and succeed—without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program" (p. 5). For students, the need for remediation lengthens the time for and increases the cost of attaining a postsecondary degree. The cost is expensive both for students and society. Therefore, determining how to prepare students for college is important. Several researchers have focused on asking postsecondary students about their high school preparation for college. The findings indicated that many of those students identified the existence of a gap between the skills they possess upon high school graduation and the skills needed for college success. Moreover, the majority indicated that if they had known then in high school what they know now about college and the workforce expectations, they would have enrolled in more academically rigorous courses and been more serious about applying themselves (Peter D. Hart Research Associates/Public Option Strategies, 2005; SAS, 2008).

Placement

Because students vary on their mathematical abilities, colleges implemented mathematics placement systems. Gerlaugh, Thompson, Boylan, and Davis (2007) found that 92.4% of institutions required mandatory assessments, whereas a small proportion (7%) included noncognitive or dispositional assessments such as time management, motivation, and personality. They identified the use of a variety of placement instruments such as the American College Testing's (ACT) COMPASS™, the Educational Testing Service's ACCUPLACER, the ASSET test, and institutionally developed assessments.

Although placement tests have been commonly implemented in the hope of placing students into a position that sets them up for success (Hughes & Scott-Clayton, 2011; Parsad, Lewis, & Greene, 2003; Scott-Clayton, 2012), test scores alone might not predict success. Belfield and Crosta (2012) found that high school grade point averages were a better predictor than were placement test scores. They concluded from their review of literature that "overall, the existing literature—albeit limited and mostly conducted by the test makers—suggests that the score validity of the placement test is extremely context- and test-specific" (p. 5). Armstrong (2000) concluded that dispositional variables had greater predictive power in final course grades than did placement test scores and that "students should not be placed on the basis of a single measure" (p. 693). Armstrong (2000) also hypothesized that "the interaction of student traits, instructional

treatments, and instructor practices may have a greater effect on student performance than the skills measured by assessment tests" (p. 691).

Factors impacting student success

Situational factors

Situational factors, which relate to the circumstances surrounding a student's life, have been associated with course outcomes for adult students and have been listed as a possible barrier to learning (Cross, 1981). Situational variables have included (a) costs, (b) home responsibilities, (c) employment responsibilities, and (d) a lack of time, child care, and transportation. Cross (1981) acknowledged that in survey research, situational factors were the barriers cited most often. In addition, of all the situational factors that have been listed, lack of time was cited the most often. Although many of those variables represent challenges faced by nontraditional students (Ely, 1997), the reality is that many traditional-age students often face the same challenges. For this reason, Kim (2002) challenged defining nontraditional students by age, because "even students who may be considered traditional in some cases have qualities that are typically considered nontraditional" (p. 86). In other words, many times, both traditional- and nontraditional-age students share situational factors that impact their ability to devote time and energy to their academic success.

Pascarella and Terenzini's (2005) review of literature identified factors related to students' lack of persistence and degree attainment. These factors included a time delay between college and high school, inadequate academic preparation, enrolling part-time, not enrolling continuously, superficial interactions between faculty and students, and beginning a degree program at a community college. Many of these factors can be linked to characteristics of many students who attend community colleges. Compared with four-year universities, community colleges are more likely to enroll older students (Horn & Nevill, 2006), which suggests that community colleges are more likely to enroll students who have had a time delay between high school and enrollment in college. In addition, community college students often attend college part-time and work more than 30 hours a week (Horn & Nevill, 2006; Knapp, Kelly-Reid, & Ginder, 2011).

Dispositional factors

Mathematics anxiety and self-efficacy are dispositional factors that have been identified as predictors of mathematics achievement (Bandura, 1986, 1997; Howard, 2008; Pajares, 1996). Mathematics anxiety has been a well-documented deterrent to student achievement, and students enrolled in lower-level academic courses have tended to exhibit higher levels of anxiety (Hembree, 1990; Ma, 1999; Zientek, Yetkiner, & Thompson, 2010). Bandura (1997) concluded that "anxiety is best allayed not by anxiety palliatives but by building a strong sense of efficacy through development of cognitive capabilities and generalizable self-regulatory skills for managing academic task demands, self-debilitating thought patterns, and aversive affective states" (p. 236). Further, research has indicated

that mathematics self-efficacy is one of the best predictors of mathematics performance (Pajares, 1996; Pajares & Graham, 1999; Pajares & Kranzler, 1995; Pajares & Miller, 1994; Zientek & Thompson, 2010).

Rationale and purpose

Research is limited on the impact that various hypothesized factors (Armstrong, 2000) have on student success, and including all of those factors in a large-scale study would be difficult, if not impossible, to implement. Moreover, there is a lack of research on collecting data from faculty members' perceptions, which are based on behaviors and work habits and inform decisions about classroom teaching practices (see Shavelson, Cadwell, & Izu, 1997). Shavelson and Stern (1981) concluded from their review of the research that

> teachers' judgments about students, for example, and not the original information about students, appear to be the basis for their decision making . . . and that is, decisions about selecting content, tutoring, handling behavior problems, and grouping students tend to be made on the basis of teachers' judgments about students. (p. 475)

With this in mind, the purpose of the present article was to examine perceptions of developmental mathematics faculty regarding factors that contribute to students' placement in developmental mathematics courses and ultimately hinder student success. The following two research questions were examined: (a) Why are students placed in developmental mathematics courses?; and (b) What factors hinder student success in developmental mathematics courses? By reporting on faculty members' perspectives, it was hoped that the findings from this study would contribute to the scholarly discourse on student placement and success.

Method

Sample

The convenience sample consisted of developmental mathematics faculty at six community colleges and one state college located across four states. For one community college, response rates were not calculated because we did not know the number of full- and part-time instructors. For the remaining colleges, the response rates for participation were 65% of the community college faculty (n = 79) and 100% of the state college faculty (n = 10). Response rates across community colleges ranged from 21% to 82%. The variations in response rates were probably due to the existence of various support mechanisms and campus faculty members who encouraged colleagues to participate. For example, in some cases, faculty members were vocal advocates of the study and were willing to highlight positive outcomes for participation within their college; thus, their support increased participation rates. Table 1 lists the teaching experience of community college and state college faculty.

Table 1. Community College and State College Faculty Members' Teaching Experience at Their Current Institution Type

	Community College (n = 79)		State College (n = 10)	
Teaching Experience at Current Institution Type	Full-time 48%	Part-time 52%	Full-time 50%	Part-time 50%
Years	M = 9.80 SD = 6.21	M = 6.95 SD = 6.46	M = 16.20 SD = 4.60	M = 0.40 SD = 0.89
Range	First-year to 30 years	First-year to 25 years	12 to 22 years	0 to 2 years

Instrument

Faculty members were asked to respond to two items: (a) Please describe factors that you believe impact students' need to be placed in developmental courses, and (b) What factors do you believe hinder the success of some students in developmental mathematics courses? The survey was distributed online via eSurveysPro.com (2013). The study was approved by a university Human Protection Committee.

Data analysis

A research identification code was assigned to each participant. The open-ended responses were transferred to an Excel file and then mail merged into a Word document with a research identification code corresponding to each response. Initially, emergent themes were developed and categorized based on words or phrases that were commonly used by the survey participants. Bogdan and Biklen (1998) noted that in analyzing data, "certain words, phrases, patterns of behavior, subject's ways of thinking, and events repeat and stand out" (p. 171). Constant comparison analysis (Glaser & Strauss, 1967) was used to analyze the open-ended responses. The authors of the manuscript conducted the coding and labeling of themes. First, broad categories were developed and responses were moved into themes. The authors negotiated the contents and labels of themes until a consensus was reached. Some of the theme titles were renegotiated based on the literature review. Several responses were coded to multiple themes. For example, the following response was coded as belonging to both the confidence and the time management themes: "The student gets behind for various reasons and then feels intimidated to ask questions to catch back up to the class."

The categorization of themes within the personal and academic factors is presented in the Appendix. An iterative process was continued until 100% consensus was reached between coders on both the placement of responses within the themes and the theme titles. The themes were then matched with faculty responses in SPSS. For example, all of the theme titles first were added as vari-

ables; then if a person had a theme for attitude, a "1" was placed in that theme's cell. A "0" was placed in a theme's cell if a person did not provide a response for that theme (cf. Onwuegbuzie, 2003; Onwuegbuzie & Teddlie, 2003). This technique allowed the researchers to code and to retrieve responses for multiple analyses (Matteson, Swarthout, & Zientek, 2011; Richards & Richards, 1994). An initial review of the themes resulted in the clustering of success themes into three categories based on the literature (Armstrong, 2000): (a) situational, (b) dispositional, and (c) academic behaviors and work habits. The placement themes did not result in any additional clustering.

Results

Placement

There were 15 researcher-developed themes from the faculty responses to the question about factors that placed students in developmental mathematics courses. The themes are provided in Table 2. The following three responses from two faculty participants were not categorized into a theme: (a) "reading level," (b) "parents," and (c) "some people just aren't very good at math." We limit the remainder of the discussion to faculty responses on the two most popular place-

Table 2. Faculty Members' Themes That Place Students in Developmental Mathematics Courses

Placement Themes	Percent of Faculty (n = 89)
Time delay from previous mathematics course	50.56
Lack of basic math skills	43.82
Mathematics course completion in HS	13.48
Refresher course for review of knowledge	11.24
Confidence/Self-esteem	10.11
Placement test variables	8.99
Calculator use in K–12	7.87
Study skills	7.87
Passed through K–12 Mathematics	7.87
Anxiety	6.74
Previous mathematics experiences	6.74
Prior mathematics instruction	5.62
Lack of effort	4.50
Value of mathematics	4.50
Motivation	3.40
No theme	3.30

Note. Some faculty members' responses were coded into multiple themes.

ment themes. We also discuss the theme *passed along in K–12 mathematics* because we thought that the faculty responses for this theme needed further clarification.

Time delay. The most frequent placement reason faculty gave as to why their students were placed in a developmental mathematics course was *time delay* since completing a previous mathematics course (51%). Faculty responses regarding time delay were related either to (a) returning students had a time delay between college and high school or (b) recent high school graduates had a time delay between now and their enrollment in a high school mathematics course. One faculty member, whose response was coded in the latter case, stated that

> In the higher levels of developmental math (beginning and intermediate algebra), a common thread seems to be that the student, even though he might have earned passing grades in high school math, did not take a math course during senior year and, therefore, lost some skills.

Mathematics skills. Another common theme (44%) that emerged from faculty members' responses regarding placement was a *lack of basic mathematics skills*. Some faculty members specified that the problem originated in elementary or middle school. For example, one faculty member identified a lack of a "solid math foundation in grade school" as a reason for placement in developmental mathematics. Another faculty member noted that "most of the time the student has gotten behind over the years of their educational life for whatever reasons and aren't able to understand higher level math." Several faculty members mentioned that gaps existed in their students' mathematics education. For example, one respondent noted that the students had a "poor high school foundation (not necessarily the fault of the high school)." One participant in particular, whose response was categorized into several themes, was very passionate about the lack of mathematics skills and the origins of the problem. This participant stated that

> students do not get the foundation of math concepts needed in elementary schools . . . beginning with multiplication facts, place value, fractions, etc. . . . . Therefore, they struggle in middle school. They are taught "to the test" for standardized testing so the school district looks good, but the students never actually retain the information. Later, in high school, they continue to struggle because there is no application of what they are learning. They cannot reason or logically answer questions because they have been "spoon-fed" all through school. Students are no longer independent thinkers, and often when something is difficult for them, they just simply give up!

Passed along in K–12 mathematics. Only seven of the 89 (7.87%) faculty members had a response that was categorized into the *passed along in K–12 mathematics* theme; however, a clarification of these faculty members' comments is warranted. Many of the open-ended responses indicated this perception related to problems within the K–12 system and not with the K–12 teachers. Some faculty members indicated that they believed junior high and/or high school teachers were forced to pass students along. Responses included (a) some students were

passed on because of sports; (b) some students were given "dishonest evaluations of performance and abilities in high school;" and (c) a problem occurs when "students are allowed to move up a grade level without passing a mathematics course." The faculty member who made the latter comment concluded that this "scenario can occur for many years in a row," thereby causing "the student to believe that math is not important to learning and stops trying."

Student success

Table 3 contains the researcher-developed themes from the faculty responses identifying factors that hinder student success in developmental mathematics courses. Family or work responsibilities, effort, and attendance were the most popular themes, followed by study skills, time management, motivation, attitude, confidence/self-efficacy, anxiety, performance expectations, and not prepared for college. The appendix contains the three factors.

Table 3. Faculty Members' Themes That Hinder Student Success in Developmental Mathematics Courses

Success Themes	Percent of Instructors (*n* = 89)
Situational Factors: Family or work responsibilities	41.57
Attendance	29.21
Study skills	20.22
Effort	19.10
Motivation	17.98
Time management	16.85
Attitude in general	14.61
Confidence/Self-esteem	14.61
Anxiety	13.48
No theme	9.00
Performance expectations	8.99
Not prepared for college	8.99
Educational background	5.62
Seek help	5.60
Take responsibility	4.50
Attitude: Not interested	4.49
Attitude: Persistence	3.40
College instructor	2.20

Note. Some faculty members' responses were coded into multiple themes.

Academic Behaviors and Work Habits. When themes were grouped collectively together in factors, the factor that was identified most often by faculty as hindering student success was Academic Behaviors and Work Habits (67.4%). We grouped nine themes into this factor. As seen in Table 3, *study skills* and *attendance* were the most popular themes in this factor, followed by *effort* and *time management*. Some faculty members believed students' unwillingness to put forth the *effort* to complete or to follow through with the homework was a hindrance to their success. Explanations for lack of study skills varied and ranged from no or lack of study skills to poor study skills. Some other comments that we categorized as *study skills* included note-taking abilities and expecting to "complete classes without study time outside of class." The theme *not prepared for college-level work* related to overall preparedness to succeed in college (i.e., maturity) and not content preparedness.

Dispositional Factors. *Motivation*, *attitude in general*, *confidence/self-esteem*, *anxiety*, *persistence*, and *interest* were themes we identified as Dispositional Factors, with approximately 49% of the faculty having at least one of their responses coded into this category. For the responses we coded into the *attitude in general* theme, a number of faculty only mentioned attitude, but did not elaborate further on the specifics of these attitudes. Some of the faculty members' comments that we categorized into the *attitude in general* theme were (a) laissez-faire attitudes, (b) "unhappy about being in developmental mathematics" and "thinking it will 'punish' the teacher if they do not perform," (c) "believing it is a punishment," and (d) "overall attitude about what we are trying to do with these courses." Multiple responses categorized into this theme were about students not taking the course seriously and students' lack of commitment.

Situational Factors. Because faculty participants often mentioned both family and work problems within their responses, the two were not disaggregated and we renegotiated this theme as Situational Factors. Approximately 42% of faculty members had at least one of their responses coded into this category, as they discussed students' need to juggle family and work obligations. Several faculty members mentioned that child-care issues were problematic for students, and some faculty members noted that life factors, in general, hinder student success. For example, a faculty participant stated that student success was hindered by "outside 'real world' issues (life)." Another faculty member elaborated further about work and family responsibilities by stating that "some of the students have jobs and families that also interfere with their ability to complete work and/or attend class." One faculty member suggested that the time devoted to other responsibilities prevents students from being able to seek help. Seeking help was a theme that we categorized as a Dispositional factor; thus, this faculty member's response suggests that the Situational factors might impact some themes categorized as Dispositional factors.

Discussion and recommendations

Collecting evidence about student success from faculty is valuable because faculty synthesize information from their regular interactions with and assessments of students. This information collected from faculty can help educators and policy makers in their quest to decrease the number of students placed in developmental courses and to increase the number of students who succeed in college. Conducting empirical studies with existing student data to find out why students are placed in developmental mathematics courses is difficult because the ability to match K–12 data and postsecondary data is problematic and, in a number of cases, impossible. In addition, the ability to capture metacognitive and cognitive constructs on a large scale would require that researchers be allotted time and funding. Although we encourage future endeavors of collecting this information from students, the results from this study provide the groundwork for future large-scale studies.

The present study sought to capture and to synthesize the beliefs of a sample of developmental mathematics faculty about why their students are placed in developmental courses and factors that subsequently hinder student success in these courses. Although the data collection was limited to faculty, these faculty members have been gathering information from a large sample of students over time. The results suggest that for developmental mathematics students at community colleges and state colleges (a) a delay from previous mathematics courses and lack of basic mathematics skills were the two most common themes that emerged as explanations for why students are placed in developmental mathematics courses; and (b) academic behaviors and work habits, dispositional factors, and situational factors were three factors that emerged that affected student success.

Placement in developmental mathematics courses

The primary reasons faculty from the present sample believed students were placed in developmental mathematics courses were *a time delay since their last mathematics course* and *weak mathematics skills*. As seen in Table 2, other placement themes that emerged from faculty responses with at least a 10% response rate were *course completion in high school*, *refresher course for review of knowledge*, and *confidence/self-esteem*.

In the present study, a theme that emerged from faculty members' responses was that *time delay* was a primary reason for students being placed in developmental mathematics courses. Basically, faculty members limited their responses to length of time between courses because traditional students did not take a mathematics course during their senior year or there had been a time lapse since nontraditional students had enrolled in a mathematics course.

Ideally, evidence of time delay and the association with college readiness should be communicated to current high school students. Offering online review modules that are highlighted during the registration process might help

some students self-remediate into college-level mathematics classes. The hope would be that this communication would encourage more students to enter college immediately after high school and continuously enroll in mathematics courses. Advisors, high school teachers, college instructors, and current college students should make a concerted effort to communicate with both middle school and high school students.

In addition to *time delay*, in our study *lack of basic mathematics skills* was identified by developmental mathematics faculty as a reason students are placed into developmental mathematics courses. Basic mathematics skills have been established as prerequisite skills needed for success in algebra (Brown & Quinn, 2007a, 2007b; Wu, 2001). In particular, the National Math Advisory Panel highlighted that skills with rational numbers were a foundation for learning algebra, and emphasized that proficiency with rational numbers should be a major goal of K–8 mathematics educators (U.S. Department of Education, 2008). In a study of developmental mathematics students, Rotman (1991) contended that "there appeared to be some connection between some arithmetic skills and performance in algebra, but the data is [sic] not convincing" (p. 5) and concluded that "fraction concepts deserve to be singled out" (p. 8).

Basic mathematics skills were identified by Stigler, Givvin, and Thompson (2010) as problematic for community college developmental mathematics students. Students made procedural errors that have been identified in the literature as being frequently made by younger students and preservice teachers. Common procedural errors identified by Stigler et al. (2010) involved problems containing fractions, decimals, exponents, and square roots. Stigler et al. (2010) also concluded that procedural misunderstandings might be accompanied by inadequate problem-solving abilities. For example, some students completed only the first step of a multistep problem, falling short of acquiring the correct answer. Stigler et al. (2010) found evidence that some developmental mathematics students exclusively focused on remembering a large number of procedures. Existing research suggests that mathematical errors might occur because students focus on memorizing algorithms, become confused among algorithms, or inappropriately apply algorithms (Kelly, Gersten, & Carnine, 1990; Tirosh, 2000; Williams & Ryan, 2002). In the present study, the origin of the problem was identified by some faculty members as developing in elementary or middle school and possibly persisting through the years.

Student success

The cross-disciplinary section of the Texas College and Career Readiness Standards clearly supports the recommendation that skills beyond performance skills are needed to succeed in postsecondary education (Texas Higher Education Coordinating Board, 2008), including key cognitive skills such as academic behaviors and work habits. The results from the present study support their recommendation. Three themes emerged from faculty members' responses: academic behaviors and work habits, dispositional factors, and situational factors.

A success theme that emerged from faculty responses was academic behaviors and work habits, which included nine themes such as *attendance*, *time management*, and *study skills* (see Appendix). Faculty responses corroborate research findings that academic engagement measures and attendance are predictors of mathematics performance (Zientek, Yetkiner, Fong, & Griffin, 2013). Determining how to address and to improve academic behaviors and work habits should be a topic of discussion for faculty. Some of these academic engagement measures such as help-seeking, time-management, study skills, and required effort can be addressed in study skills courses. However, when developmental mathematics students are not required to complete a study skills course, educators need to examine further their roles in improving these measures.

Educational psychology researchers know that academic success is not limited to intelligence. For example, mathematics anxiety, self-efficacy, and self-regulated learning have been identified as predictors of student success (Ma, 1999; Pajares, 1996, 2008; Pajares & Graham, 1999; Pajares & Kranzler, 1995; Pajares & Miller, 1994; Zimmerman & Schunk, 2008). As seen in the Appendix, dispositional factors emerged from faculty responses as factors that hindered developmental mathematics student success and six themes were identified that were grouped into this factor: *motivation*, *anxiety*, *confidence/self-esteem*, *persistence*, *interest*, and *attitude*. The results corroborated the students' perspectives in the Howard (2008) study. Howard identified five emergent themes that pertained to factors students believed contributed to their past failures and factors that contributed to their success in learning basic mathematics, which were: "*turning point, attitude, motivation, learning environment,* and *learning strategies*" (p. iv). In addition, a lack of interest in mathematics also was identified by Zientek and Yetkiner-Ozel (2012) as a primary reason that developmental mathematics students did not enroll in more mathematics courses during high school.

Two of our themes identified by several faculty—anxiety and motivation—have been linked to self-efficacy and self-regulated learning. Bandura (1997) suggested that a method to alleviate mathematics anxiety was to address mathematics self-efficacy by developing cognitive skills through self-regulatory skills. The perceptions that anxiety was a hindrance to student success become even more imperative with the realization that developmental mathematics students tend to have higher levels of mathematics anxiety than does the population (Zientek et al., 2010). Motivation was identified as a theme in our study and is one dimension of self-regulation. Learners who are categorized as self-regulated learners continually monitor and react to feedback to improve their learning strategies and methods (Zimmerman & Schunk, 2008). Dr. Claire Ellen Weinstein has suggested that a learning frameworks course that helps developmental education students become strategic and self-regulated learners should be offered simultaneously "using a metacurriculum in other content or paired courses" (Acee, 2009, p. 22). Our results suggest that developmental mathematics students would benefit from an intervention designed to improve self-regulation.

A theme that emerged from faculty members' responses in the present study as a hindrance to student success was situational factors. Cross (1981) also identified situational factors as leading the list of barriers for adult learners. Responses in this category pertained to *both* family and work, which indicate community college faculty members are working with students who have multiple responsibilities outside of the classroom. An implication of this finding is that educators and policy makers should consider situational factors when developing placement criteria, placement settings, and designing educational interventions. For example, a possibility of addressing this factor could be the offering of placement tests and tutorials outside of the 8-to-5 time frame.

Limitations and future research

Given the population size of developmental mathematics faculty, the sample size in this study is relatively small, results were based on responses of teachers who volunteered, and only one state college was represented; therefore, caution should be taken before generalizing these results to the broader population. However, although the sample size was relatively small, these faculty members were collecting information from a large sample of students over multiple semesters. In addition, the data are reliant on the subjective perceptions of the faculty and might not accurately reflect the true situations, attitudes, or backgrounds of students.

Next steps for this line of research include, but are not limited to, surveying a broader audience of educators and students to determine how strong these factors are based on student response and if the perceptions of a broader educator audience hold the same factors at the same level of importance. In addition, as community colleges continue to innovate to serve this population, we will seek to discover how those innovations impact these factors or whether other factors arise due to the innovations. For example, a new placement policy is being implemented by the use of a common assessment for Texas colleges. Will this change impact the perception of factors influencing placement, and if so, how? We might also be able to investigate whether students are passed on in K–12 education and, if so, how does that impact the percent of students that are placed in developmental education and their subsequent success in college?

Conclusions

The results from the present study corroborate previous research findings on factors that are important to student success, including time delay, mathematics skills, and dispositional and situational factors (Armstrong, 2000; Berkner & Choy, 2008; Cross, 1981; Howard, 2008; Pascarella & Terenzini, 2005). If a decreased enrollment in developmental mathematics classes is the desired outcome, then interventions need to be provided early, particularly for improving basic mathematics skills for students who have had a time delay since their last mathematics class. State and community colleges might consider providing on-

line reviews or modular-type courses to help students review and improve skills. Results from the present study suggest colleges need to provide student support services both before and during students' enrollment in developmental mathematics courses. In addition, professional development should be provided for faculty on the impact that dispositional and academic behaviors have on student performance and the role faculty can have on improving these behaviors.

The emergence of situational factors for community colleges and state colleges suggests that when interventions are designed to help improve student success, consideration needs to be given to the multitude of real-world responsibilities that can hinder student success. Even though faculty and administrators cannot address most situational factors, they need to be cognizant of how these factors might impact student success. Financial resources and support systems need to be accessible to students; for example, financial aid advisors and counselors should be available when students arrive for evening classes. Providing support systems based on teachers' insight can aid in improving student learning.

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Appendix

Themes developmental faculty members believe hinder student success, by type of factor:

Situational Factors

- Family or work responsibilities

Dispositional Factors: Motivation and Affective Variables

- Motivation
- Confidence/Self-esteem
- Anxiety
- Attitude: Persistence
- Attitude in General
- Attitude: Not interested

Academic Behaviors and Work Habits

- Not Prepared for College
- Seek help
- Take responsibility
- Attendance
- Effort
- Study Skills
- Performance Expectations
- Time Management
- Educational Background

Other Factor that formed a theme

- College Instructor

No Theme