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Abstract

This study utilized the Academic Self-Description Questionnaire (SDQ III) and the Motivation section of the Motivated Strategies for Learning Questionnaire (MSLQ) in the context of a self-paced developmental mathematics course. A total of 108 undergraduate students participated. Descriptive statistics were used to evaluate students' academic self-concept and motivation. The analysis of the results indicated that students exhibited moderate levels of both academic self-concept and motivation. Future research should include measures of academic achievement to better understand these relationships and strengthen the foundation for effective interventions. Further research across diverse populations and settings—particularly longitudinal studies—would offer deeper insights into how academic self-concept and motivation develop over time in self-paced developmental mathematics courses.

Introduction

The importance of academic self-concept and motivation in student success is well established in educational psychology. These two constructs are particularly critical in challenging subjects such as developmental mathematics, which often serve as foundational courses for university students who may have experienced prior difficulties in mathematics. Self-paced course structures, commonly used in developmental mathematics, provide students with autonomy over the timing and progression of their learning. However, the effectiveness of these courses may depend heavily on students' academic self-concept—their beliefs about their mathematical abilities—and their motivation to persist and succeed. While much of the foundational research on academic self-concept and motivation dates back several decades, these constructs remain highly relevant in today's educational context. A strong case can still be made for their continued significance, particularly as learning environments evolve to include more flexible, student-directed models. This literature review examines the enduring influence of academic self-concept and motivation on student outcomes in self-paced developmental mathematics courses, while also highlighting the ongoing need for research in this area to reflect contemporary educational challenges and contexts.

Understanding Academic Self-Concept in Educational Contexts

Self-concept plays an important role in learning. According to Marsh and Shavelson (1985), self-concept is defined as the overall perception individuals have of themselves, including their abilities, values, and social identity. In the context of education, self-concept is often related to academic self-concept, which is the perception students have about their academic abilities (Marsh, 1990; Yang et al., 2023). Studies have shown that students with a positive academic self-concept tend to be more confident in their abilities and are more likely to engage in academic activities, which may contribute to higher academic performance (Ajmal & Rafique, 2018; Ghazvini, 2011; Skaalvik & Skaalvik, 2011).

In developmental mathematics courses, which often serve students who have struggled with mathematics in previous educational settings, a student's academic self-concept may be particularly important. A negative academic self-concept can undermine students' belief in their ability to succeed, leading to avoidance behaviors, lack of persistence, and lower achievement (Alghamdi et al., 2023; Gonzálvez et al., 2019; Pintrich, 2003). For students enrolled in self-paced courses, where they are responsible for regulating their own learning pace, having a positive academic self-concept could be especially critical for staying motivated and on task.

The Role of Motivation in Academic Success

Motivation has a significant influence on learning, playing a crucial role in academic success by affecting the energy and effort students are willing to invest in their studies. Motivation can be intrinsic (driven by personal interest and satisfaction) or extrinsic (driven by external rewards or pressures) (Deci & Ryan, 1985; Lin, McKeachie, & Kim, 2003). According to the Self-Determination Theory, students who are intrinsically motivated tend to experience more engagement and persistence in academic tasks (Ryan & Deci, 2000). Conversely, extrinsically motivated students may engage in tasks for external rewards but may not experience the same level of satisfaction or deep learning.

Academic Self-Concept and Motivation in Self-Paced Learning

In self-paced developmental mathematics courses, motivation can be further divided into two key dimensions: task motivation (interest in the course content) and self-regulation motivation (the ability to manage one's own learning). The latter is particularly significant in a self-paced environment, as students must independently set goals, monitor progress, and adjust their learning strategies as needed (Phillips, 2016; Zimmerman, 2002).
Self-paced learning impacts motivation and academic self-concept. In self-paced courses, where students progress through the material at their own speed, unique opportunities and challenges arise. On the one hand, self-paced learning can increase motivation by allowing students to work at a pace that suits their individual learning styles (Guskey, 2007; Mayer, 2005). For students with high levels of self-regulation and motivation, the flexibility of a self-paced course can lead to higher academic achievement (Bandura, 1997; Schunk & Zimmerman, 2008; Zimmerman, 2000). On the other hand, without external structures, students who struggle with time management or lack motivation may find it difficult to stay engaged and complete the course successfully.

Research suggests that students in self-paced developmental mathematics courses may experience fluctuations in motivation and academic self-concept throughout the course. Some students may feel empowered by the control they have over their learning, which can improve their academic self-concept and increase motivation (Deci & Ryan, 2000; McClain & Heshmat, 2009). Others, however, may struggle with the lack of structure and fall behind, which could negatively affect both their academic self-concept and motivation (Niemann & Pianta, 2009).Additionally, a student's initial level of motivation and academic self-concept may play a significant role in determining whether they thrive or struggle in a self-paced setting. For example, students with higher self-efficacy (belief in their ability to succeed) may be more likely to persist in self-paced courses and experience a positive outcome. In contrast, students with lower self-efficacy may become discouraged and disengage from the course (Artino, 2012; Schunk, 2003; Wu, 2023).

Influencing Factors on Academic Self-Concept and Motivation

Several factors can influence both academic self-concept and motivation in developmental mathematics courses. While self-paced courses emphasize independent learning, instructor feedback remains essential in supporting students' motivation and academic self-concept. Frequent and constructive feedback can boost students' confidence in their abilities and help them stay motivated (Hattie & Timperley, 2007). Additionally, research has shown that peer collaboration and support play a significant role in motivating students (Johnson & Johnson, 1989; Topping, 2005; Vygotsky, 1978). Online discussion forums, study groups, and collaborative assignments can help mitigate feelings of isolation and enhance motivation. Students' intrinsic motivations, such as their long-term educational or career goals, also influence their engagement in self-paced courses. Research suggests that students who view mathematics as important for their future tend to approach the subject with greater determination and resilience (Eccles, 2005; Eccles & Wigfield, 2002; Schunk, 1991). Finally, the role of technology in self-paced courses cannot be understated. Interactive learning platforms and personalized learning tools can enhance student engagement and provide immediate feedback, both of which contribute to improving motivation and academic self-concept (Baker, 2004; Deci & Ryan, 2002; Fletcher, 2012).

Educational Shifts and the Need for Continued Research

For decades, developmental mathematics educators have worked to improve the mathematical skills of underprepared students (Bickerstaff & Ruck, 2014). As administrators push for higher university degree completion rates, faculty members are increasingly recognizing the need to shift from traditional teaching methods to more modern approaches, such as self-paced, flipped, and online learning (Herbert & Staker, 2014; Liu & McKelroy, 2016; Smerdon & Allen, 2017; Zhao & Liu, 2014). With these changes in classroom structure, factors like academic self-concept and motivation have become critical in discussions about supporting the success of developmental mathematics students.

The primary aim of this observational study was to provide empirical data through descriptive analysis to assess the academic self-concept and motivation of a sample of undergraduate students enrolled in developmental mathematics. This study is significant as it contributes to the existing literature on student academic self-concept and motivation in mathematics within university classroom settings—particularly in addressing a noted gap in this area.

Method

Participants

A total of 108 students enrolled in the developmental mathematics course *Foundational Mathematics – Algebra* at a state university on the East Coast of the United States participated in this study. This course, offered in multiple class sections, is the university's only developmental mathematics offering. The participants' ages ranged from 18 to 52, with a mean age of 26.8 years (SD = 10.1). The university is a public institution offering undergraduate, graduate, and professional programs across four colleges: Business, Law, Public Affairs, and Applied Arts and Sciences. Among the participants, 65 (60.2%) identified as female, and 43 (39.8%) identified as male. Regarding class level, 30 students (27.8%) were freshmen, 17 (15.7%) were sophomores, 20 (18.5%) were juniors, and 41 (38.0%) were seniors. Because the university is relatively small, data was collected over a three-year period to ensure a sufficiently large sample size. All students enrolled in the *Foundational Mathematics – Algebra* class sections during this period were invited to participate in the study.

In terms of racial demographics, many participants were African American/Black, with 73 (67.6%) identifying as such. In 2023, the university's total enrollment was 3,710 students, with African American students representing nearly half (49.4%) of the undergraduate population, while female students comprised 62%. The rationale for selecting students from developmental mathematics courses is based on the observation that those placed at this level often exhibit lower motivation and tend to use fewer effective learning strategies. Furthermore, a university student sample was considered more appropriate for this study, as students at this educational level typically have more control over their learning process. Convenience sampling was used for participant selection.

Foundational Mathematics – Algebra (Alkhateeb, 2021)

The developmental mathematics algebra course (intermediate algebra) was aligned with the college algebra curriculum and served as the lowest-level course offered in the program. It functioned as a prerequisite designed to prepare students for university-level mathematics courses, such as college algebra, mathematics for liberal arts, or introductory statistics—each of which are credit-bearing courses. A significant portion of students enrolled in these mathematics courses are credit transfer students, primarily coming from community colleges. Developmental mathematics students are those who demonstrate moderate skill deficiencies in mathematics and require both cognitive and affective development before progressing to credit-bearing courses (Baxter, Bates, & Al-Bataineh, 2017). Placement into developmental mathematics was determined by the results of the ACCUPLACER mathematics placement exam.

The course lasted one semester and was taught in an instructor-led lecture format, with students attending three hours per week. It emphasized active learning, encouraging students to engage directly with the material. Students completed paper-and-pencil exercises, while MyMathLab, an online platform from Pearson Education, was used for homework assignments and exams, providing interactive support to help students meet course outcomes. To support student success, the Mathematics Learning Center offered free tutoring services and access to thirty computers for additional practice, operating 25–38 hours per week. Tutors were also available through the university's Achievement and Learning Center. Faculty members actively monitored student progress, providing early intervention and counseling to those struggling with the material.

The course was structured around eight modules, with a minimum grade of 73% (a "C" or higher) required for mastery of each. The modules covered the following topics: operations with real numbers; fractions and decimals; proportions, ratios, rates, and percents; expressions, linear equations, and inequalities; graphs and equations of lines; polynomials and quadratic applications; rational expressions and equations; and radical expressions and equations. Grading for each module was divided as follows: homework (20%), attendance (20%), and module exam (60%). To successfully complete the course, students must pass all eight modules. If a student does not pass a module, they may retake the exam at the Mathematics Learning Center, where tutoring is required after any unsuccessful attempt.

The course was self-paced, allowing students to progress independently. Self-paced mathematics courses, while not new to higher education (Ironsmith et al., 2003), allow students to progress at their own speed, free from the constraints of a faculty-driven timeline. Students may work on module homework and exams at their own pace, provided they achieve at least 80% on the module homework before attempting the exam. Although students are permitted multiple attempts at the exam, they must seek tutoring after any failed attempt. The course was module-based, with no midterm or final comprehensive exams. At the end of the semester, students who passed all eight modules with a score of 73% or higher received a grade of "S" for Satisfactory (passing), which is not factored into the Grade Point Average. Students who did not complete all eight modules received a grade of "CS" (Continuing Studies) and were eligible to re-enroll in the course in a subsequent semester. The course was structured as a variable-credit offering, allowing students to register for one, two, or three credits in future semesters, depending on the number of modules they had already completed. Modules that were successfully passed did not need to be repeated. If a student does not complete all modules by the third attempt (over the course of three semesters), they will receive a grade of "NS" for Unsatisfactory. It is important to note that developmental mathematics credits do not count toward the 120 credits required for graduation, although they contribute to full-time enrollment status (12 or more credits per semester).

The mathematics program offering developmental mathematics also includes general education courses (such as college algebra, introductory statistics, and mathematics for liberal arts) and advanced mathematics courses (including calculus, discrete mathematics, and applied probability and statistics), primarily serves students in the applied information technology program. This non-degree program employs adjunct (part-time) faculty who teach both developmental and certain general education mathematics courses. Graduate courses and teaching assistants are not part of this program.

Measure

The SDQIII, or Self-Description Questionnaire III, developed by Marsh in 1992, designed to measure self-concept, which is the perception that individuals have of themselves across various domains (e.g., academic, physical, social). It provides insight into how an individual views their abilities, personality, and overall sense of self in comparison to others. It is an extension of the earlier versions (SDQ I and II) and includes a broader set of domains and scales, designed to measure multiple dimensions of self-concept for university students and other adults. The SDQIII comprises a multidimensional structure that is firmly rooted in the Shavelson, Hubner, and Stanton (1976) theoretical model of self-concept. More specifically, the SDQIII is designed to measure self-concepts related to eight nonacademic areas (Physical Ability, Physical Appearance, Peer Relations – Same Sex, Peer Relations – Opposite Sex, Parent Relations, Spiritual Values/Religion, Honesty/Trustworthiness, and Emotional Stability), four academic areas (Verbal, Mathematics, Problem Solving, and General Academic), and a single global perception of self (General – Self). The SDQIII is a widely validated self-concept measure that is available for use with adults, including late adolescents and young adults.

The Academic Self-Description Questionnaire III (ASDQ-III), which assesses four academic self-concepts—Mathematics, Verbal, Problem Solving, and General Academic—was used in this study solely to evaluate individuals' self-concepts regarding their academic abilities. The Mathematics self-concept reflects students' perceptions of their skills and abilities in mathematics. The Verbal self-concept pertains to their ratings of skills and abilities in English and reading. The Problem Solving self-concept relates to students' assessments of their ability to engage in problem-solving tasks. The General Academic self-concept represents students' overall evaluations of their academic skills and abilities across subjects. Each item on the ASDQ-III, which contains 40 items, is rated on an 8-point Likert scale. Respondents indicate the degree to which they agree or disagree with each statement, with ratings ranging from 1 (definitely false) to 8 (definitely true). Scores for each scale in the ASDQ III are calculated by summing the scores of the 10 items within the scale, reversing the negatively worded items, and then computing the average.

The Motivated Strategies for Learning Questionnaire (MSLQ), developed by Pintrich et al. (1991), is designed to assess university students' motivational orientations and their use of learning strategies in relation to specific courses. This widely used instrument evaluates self-regulated learning and is frequently cited in educational research (Chen, 2002; Mills & Gay, 2018; Morais, Santos, & Mouraz, 2025). Rooted in a general cognitive framework of motivation and learning strategies, the MSLQ consists of two primary sections: the motivation questionnaire (MSLQ Motivation) and the learning strategies questionnaire (MSLQ Learning Strategies). The motivation section includes six scales, while the learning strategies section comprises nine scales. These sections are modular, allowing researchers to use individual scales or combinations based on their specific objectives. For this study, only MSLQ Motivation was utilized.

The MSLQ Motivation questionnaire is based on a social-cognitive model of motivation, which encompasses three key constructs: value, expectancy, and affect. The value component reflects students' beliefs about why they engage in academic tasks. This is assessed through three scales: intrinsic goal orientation (emphasizing learning and mastery), extrinsic goal orientation (focused on grades and approval from others), and task value (assessing how interesting, useful, and important students perceive the course content). The expectancy component relates to students' beliefs in their ability to accomplish tasks, measured by two scales: control beliefs about learning (the belief that outcomes depend on one's own effort) and self-efficacy for learning and performance (students' self-assessment of their ability to master tasks). The third construct, affect, is measured using the test anxiety scale, which evaluates students' worry and concern about exams (Pintrich et al., 1993).

MSLQ Motivation includes 31 items that assess students' goals and value beliefs regarding a course, their beliefs in their ability to succeed, and their anxiety about tests in the course. Each item is scored on a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me), with students rating themselves on each item. The motivation section includes the following scales: intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and performance, and test anxiety. Similarly, scores for each scale are determined by summing the individual scores within the scale and then calculating the average. The score for this scale is determined by summing the scores for the four items and calculating the average. The items in the scales, apart from Test Anxiety, were stated positively. The items on the test anxiety scale are scored in reverse, so that higher scores indicate greater anxiety or worry, in contrast to the other scales, where higher scores reflect more positive outcomes. Negative items are reversed before calculating individual scores (Pintrich et al., 1991).

Procedure and Analysis

Pintrich et al. (1993) confirmed the reliability of the MSLQ scales and demonstrated its reasonable predictive validity. The instrument's validity and reliability have also been supported in subsequent studies by de Araujo, Gomes, and Jelihovschi (2023) and Pintrich et al. (1991). Both the ASDQ III and MSLQ Motivation questionnaires are somewhat dated, but they remain widely used and continue to provide relevant insights today. At the end of the semester, students filled out the academic self-concept and motivation questionnaires, along with additional questions regarding their background, during their regular class sessions. The collected data were then entered into SPSS for statistical analysis. Descriptive analysis was performed using frequency and mean values. Participation was voluntary, and all student information was kept confidential.

Results

The internal consistency of the Academic Self-Description Questionnaire III (ASDQ-III) and the MSLQ Motivation scales was assessed using Cronbach's alpha reliability index (Cronbach, 1951). Descriptive statistics were also calculated for both questionnaires. Table 1 presents the Cronbach's alpha reliability indices. The internal consistency coefficients for the ASDQ-III scales ranged from 0.67 for the Problem Solving scale to 0.84 for the Mathematics scale. The SDQ III has undergone comprehensive psychometric evaluations across various populations, showing strong reliability and validity (Byrne, 1988; Faria, 1996). For the MSLQ Motivation scales, the consistency indices ranged from 0.65 for the Test Anxiety scale to 0.91 for the Self-efficacy for Learning scale. These values are generally considered acceptable, as indicated by Pintrich et al. (1991) and Pintrich et al. (1993). However, the reliabilities of some scales were relatively low, which may be attributed to Cronbach's alpha being highly sensitive to the number of items (Pelham, 2013). Overall, Cronbach's alpha was ≥ 0.70 for most scales of MSLQ Motivation, which aligns with the findings in (Cook & Skrupky, 2024; Holland et al., 2018; Khampirat, 2021).

Table 1. Cronbach's Alpha Reliability Indices for the MSLQ Motivation and ASDQ-III

Scales	# of Items	Cronbach Alpha
Academic Self-concept	40	0.85
Mathematics	10	0.84
Verbal	10	0.76
General Academic	10	0.75
Problem Solving	10	0.67
Motivation	31	0.92
Intrinsic Goal Orientation	4	0.77
Extrinsic Goal Orientation	4	0.69
Task Value	6	0.81
Control of Learning Beliefs	4	0.72
Self-Efficacy for Learning	8	0.91
Test Anxiety	5	0.65

In Table 2, the mean scores for the four academic self-concept scales (ASDQ-III) ranged from 3.83 for mathematics to 5.78 for verbal, reflecting a moderate range. These results indicate an overall positive response to the scales, with scores exceeding the neutral benchmark (midpoint representing a neutral or undecided stance) of 4.5, except for the mathematics scale, which fell slightly below the neutral benchmark.

Table 2. Descriptive Statistics for the ASDQ-III Scores

Scales	Mean	SD
Mathematics	3.83	1.47
Verbal	5.78	1.20
General Academic	5.34	1.17
Problem Solving	5.32	1.05
Academic Self-concept	5.07	0.84

In Table 3, the mean scores for the six motivation scales from the MSLQ Motivation questionnaire ranged from 3.48 for test anxiety to 5.04 for extrinsic goal orientation, indicating moderate levels of motivation. These results reflect an overall positive response to the scales, with scores exceeding the neutral benchmark of 4.0. The exception is test anxiety, where a higher score indicates greater anxiety or worry. A test anxiety score of 3.48 indicates a moderate level of anxiety, which is generally acceptable and may help keep students motivated without overwhelming them.

The negatively worded items in ASDQ-III were reverse scored in the overall mean calculations presented in Table 2 but were not reversed in the item mean calculations in Table 4. Similarly, the five negatively worded items in the Test Anxiety scale of the MSLQ Motivation questionnaire were reverse scored in the overall mean calculations in Table 3, but not for the item-level mean calculations in Table 5. Therefore, the items in Tables 4 and 5 are presented as they appeared in the survey. The following two tables (Table 4 and Table 5) present all 40 ASDQ-

III items and 31 MSLQ Motivation items, along with their respective itemized mean scores. These scores are derived using descriptive statistics, including mean and standard deviation, which form the foundation for further interpretation and analysis. An evaluation of the mean scores shows that students demonstrated a moderate academic self-concept (maximum score of 8.0) in Table 4 and moderate motivation (maximum score of 7.0) in Table 5.

Table 3. Descriptive Statistics for MSLQ Motivation Scores

Scales	Mean	SD
Intrinsic Goal Orientation	4.34	1.54
Extrinsic Goal Orientation	5.04	1.37
Task Value	4.46	1.39
Control of Learning Beliefs	4.75	1.39
Self-Efficacy for Learning	4.74	1.46
Test Anxiety (reversed)	3.48	1.30
Motivation	4.47	1.02

Table 4. Item Descriptive Statistics of the Academic Self Description Questionnaire III Scores

#	Statement	M	SD
	Mathematics		
1	I find many mathematical problems interesting and challenging.	5.09	2.39
2*	I have hesitated to take courses that involve mathematics.	5.86	2.45
3	I have generally done better in mathematics courses than other courses.	3.00	2.25
4*	Mathematics makes me feel inadequate.	4.48	2.44
5	I am quite good at mathematics.	3.57	2.23
6*	I have trouble understanding anything that is based upon mathematics.	4.65	2.21
7	I have always done well in mathematics classes.	3.69	2.30
8*	I never do well on tests that require mathematical reasoning.	4.85	2.21
9	At school, my friends always came to me for help in mathematics.	3.10	2.25
10*	I have never been very excited about mathematics.	5.51	2.30
	Verbal		
11*	I have trouble expressing myself when trying to write something.	2.68	1.92
12	I can write effectively.	6.41	1.94
13*	I have a poor vocabulary.	2.49	2.01
14	I am an avid reader.	5.71	2.02
15*	I do not do well on tests that require a lot of verbal reasoning ability.	3.41	2.11
16	Relative to most people, my verbal skills are quite good.	5.97	2.00
17*	I often have to read things several times before I understand them.	4.75	2.05
18	I am good at expressing myself.	5.55	2.30
19*	In school I had more trouble learning to read than most other students.	3.00	2.39

#	Statement	M	SD
20	I have good reading comprehension.	5.73	2.42
	Academic		
21	I enjoy doing work for most academic subjects.	5.54	1.87
22*	I hate studying for many academic subjects.	4.16	2.16
23	I like most academic subjects.	5.48	1.90
24*	I have trouble with most academic subjects.	3.44	1.91
25	I am good at most academic subjects.	5.55	2.01
26*	I am not particularly interested in most academic subjects.	3.78	2.22
27	I learn quickly in most academic subjects.	5.29	1.86
28*	I hate most academic subjects.	3.58	2.18
29	I get good marks in most academic subjects.	5.36	2.18
30*	I could never achieve academic honours, even if I worked harder.	3.36	2.38
	Problem Solving		
31*	I am never able to think up answers to problems that haven't already been figured out.	3.47	1.93
32	I am good at combining ideas in ways that others have not tried.	5.57	1.79
33*	I wish I had more imagination and originality.	3.51	2.20
34	I enjoy working out new ways of solving problems.	4.82	2.16
35*	I am not much good at problem solving.	3.52	1.80
36	I have a lot of intellectual curiosity.	5.78	2.01
37*	I am not very original in my ideas thoughts and actions.	3.45	2.16
38	I am an imaginative person.	5.54	2.29
39*	I would have no interest in being an inventor.	4.52	2.27
40	I can often see better ways of doing routine tasks.	5.38	2.00

*Negatively stated items were not reverse scored in this table.

Table 5. Item Descriptive Statistics of the MSLQ Motivation Scores

#	Statement	M	SD
	Intrinsic Goal Orientation		
1	In a class like this, I prefer course material that really challenges me so I can learn new things.	4.08	2.01
2	In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	4.00	2.03
3	The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	4.97	1.95
4	When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	4.32	1.97
	Extrinsic Goal Orientation		

#	Statement	M	SD
5	Getting a good grade in this class is the most satisfying thing for me right now.	5.33	1.82
6	The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	5.31	1.85
7	If I can, I want to get better grades in this class than most of the other students.	4.91	1.86
8	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	4.61	2.07
	Task Value		
9	I think I will be able to use what I learn in this course in other courses.	4.11	2.02
10	It is important for me to learn the course material in this class.	5.59	1.58
11	I am very interested in the content area of this course.	3.98	2.10
12	I think the course material in this class is useful for me to learn.	4.53	1.95
13	I like the subject matter of this course.	3.85	2.08
14	Understanding the subject matter of this course is very important to me.	4.72	1.97
	Control of Learning Beliefs		
15	If I study in appropriate ways, then I will be able to learn the material in this course.	4.93	1.90
16	It is my own fault if I don't learn the material in this course.	4.95	1.85
17	If I try hard enough, then I will understand the course material.	4.98	1.77
18	If I don't understand the course material, it is because I didn't try hard enough.	4.15	2.01
	Self-Efficacy for Learning		
19	I believe I will receive an excellent grade in this class.	4.44	1.84
20	I'm certain I can understand the most difficult material presented in the readings for this course.	4.18	1.95
21	I'm confident I can learn the basic concepts taught in this course.	5.39	1.68
22	I'm confident I can understand the most complex material presented by the instructor in this course.	4.48	1.96
23	I'm confident I can do an excellent job on the assignments and tests in this course.	4.81	1.88
24	I expect to do well in this class.	5.00	1.81
25	I'm certain I can master the skills being taught in this class.	4.67	1.92
26	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	5.00	1.75
	*Test Anxiety**		
27	When I take a test I think about how poorly I am doing compared with other students.	3.91	2.05
28	When I take a test I think about items on other parts of the test I can't answer.	4.90	1.78
29	When I take tests I think of the consequences of failing.	5.07	1.94
30	I have an uneasy, upset feeling when I take an exam.	4.77	2.01
31	I feel my heart beating fast when I take an exam.	4.24	2.14

**Test Anxiety* items (27, 28, 29, 30, 31) were not reverse scored in this table.

Conclusion and Recommendations

This study used descriptive analysis to examine academic self-concept and motivation among undergraduate students in developmental mathematics. The findings revealed moderate levels of both constructs, underscoring the need for instructional strategies that support student growth in these areas. The results suggest several recommendations for enhancing academic self-concept and motivation, particularly in self-paced learning environments. To support these factors, universities may consider adopting learner-centered teaching approaches that promote autonomy, mastery, and relevance. Such strategies can strengthen students' sense of competence and foster both a more positive academic self-concept and sustained motivation to learn (Benson & McKinney, 2014; Booth & Gindlesperger, 2018; Niemann & Wolfe, 2010).

Academic self-concept and motivation are essential to student success in self-paced developmental mathematics courses. A strong academic self-concept fosters students' belief in their ability to succeed, while motivation promotes engagement and persistence (Deci & Ryan, 2002; Schunk & Ertmer, 2000). However, course structure, instructor support, peer interaction, and students' personal motivations and goals all significantly influence the development of academic self-concept and motivation. Timely, strategy-focused feedback can enhance students' sense of progress and potential. Collaborative learning opportunities—such as group work and online discussions—help reduce isolation and reinforce motivation and academic identity. Encouraging goal setting and self-monitoring supports self-regulation and intrinsic motivation. Additionally, adaptive technologies and interactive tools can personalize learning and sustain student interest, further strengthening both motivation and academic self-concept.

It is important to note that this study did not collect achievement data, limiting the ability to draw definitive conclusions about the relationship between academic performance, academic self-concept, and motivation. Without this data, the link between academic self-concept, motivation, and academic performance remains speculative. Future research should include measures of academic achievement to better understand these relationships and strengthen the foundation for effective interventions. Additionally, because this study involved a single sample and used descriptive analysis, its findings may not be generalizable. Further research across diverse populations and settings—particularly longitudinal studies—would offer deeper insights into how academic self-concept and motivation develop over time in self-paced developmental mathematics courses.

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commercial, or non-profit organizations.

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